

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-10/0184**  
**of 18 October 2023**

English translation prepared by DIBt - Original version in German language

### General Part

Technical Assessment Body issuing the  
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

Fastening screws Zebra Pias, Zebra Piasta and FABA®

Product family  
to which the construction product belongs

Fastening screws for metal members and sheeting

Manufacturer

Adolf Würth GmbH & Co. KG  
74650 Künzelsau  
DEUTSCHLAND

Manufacturing plant

Plants of Adolf Würth GmbH & Co. KG

This European Technical Assessment  
contains

105 pages including 97 annexes which form an integral  
part of this assessment

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## Specific part

### 1 Technical description of the product

The fastening screws are self-drilling or self-tapping screws made of austenitic stainless steel or carbon steel with anticorrosion coating (listed in Table 1). The fastening screws are normally completed with sealing washers consisting of metal washer and EPDM-seal.

**Table 1 - Fastening screws for metal members and sheeting**

| Product                       |                              | Productcode                            | Components |       | Anx. |
|-------------------------------|------------------------------|----------------------------------------|------------|-------|------|
| ZEBRA Pias Ø 4,2 x L          | cross recessed               | SCR-DBIT-PANHD-H2-(A3K)-4,2 x L        | Steel      | Steel | 9    |
| ZEBRA Pias plus Ø 4,2 x L     | pan head                     | SCR-DBIT-PLUS-PANHD-H2-(A3K)-4,2 x L   | Steel      | Steel | 10   |
| ZEBRA Pias Ø 4,2 x L          | pan head, AW or              | SCR-DBIT-PANHD-AW20-(A3K)-4,2 x L      | Steel      | Steel | 11   |
| ZEBRA Pias plus Ø 4,2 x L     | RW drive                     | SCR-DBIT-PLUS-PANHD-AW20-(A3K)-4,2 x L | Steel      | Steel | 12   |
| ZEBRA Pias Ø 4,8 x L          | cross recessed               | SCR-DBIT-PANHD-H2-(A3K)-4,8 x L        | Steel      | Steel | 13   |
| ZEBRA Pias plus Ø 4,8 x L     | pan head                     | SCR-DBIT-PLUS-PANHD-H2-(A3K)-4,8 x L   | Steel      | Steel | 14   |
| ZEBRA Pias Ø 4,8 x L          | pan head, AW or              | SCR-DBIT-PANHD-AW25-(A3K)-4,8 x L      | Steel      | Steel | 15   |
| ZEBRA Pias plus Ø 4,8 x L     | RW drive                     | SCR-DBIT-PLUS-PANHD-AW25-(A3K)-4,8 x L | Steel      | Steel | 16   |
| ZEBRA Pias Ø 4,2 x L          | With hexagon                 | SCR-DBIT-WS7-(A3K)-4,2 x L             | Steel      | Steel | 17   |
| ZEBRA Pias plus Ø 4,2 x L     | head                         | SCR-DBIT-PLUS-WS7-(A3K)-4,2 x L        | Steel      | Steel | 18   |
| ZEBRA Pias Ø 4,2 x L          | hexagon head,                | SCR-DBIT-WSH16-WS7-(A3K)-4,2 x L       | Steel      | Steel | 19   |
| ZEBRA Pias plus Ø 4,2 x L     | washer ≥ Ø16                 | SCR-DBIT-PLUS-WSH16-WS7-(A3K)-4,2 x L  | Steel      | Steel | 20   |
| ZEBRA Pias Ø 4,8 x L          | With hexagon                 | SCR-DBIT-WS8-(A3K)-4,8 x L             | Steel      | Steel | 21   |
| ZEBRA Pias plus Ø 4,8 x L     | head                         | SCR-DBIT-PLUS-WS8-(A3K)-4,8 x L        | Steel      | Steel | 22   |
| ZEBRA Pias Ø 4,8 x L          | hexagon head,                | SCR-DBIT-WSH16-WS8-(A3K)-4,8 x L       | Steel      | Steel | 23   |
| ZEBRA Pias plus Ø 4,8 x L     | washer ≥ Ø16                 | SCR-DBIT-PLUS-WSH16-WS8-(A3K)-4,8 x L  | Steel      | Steel | 24   |
| ZEBRA Pias Ø 5,5 x L          | with hexagon                 | SCR-DBIT-WS8-(A3K)-5,5 x L             | Steel      | Steel | 25   |
| ZEBRA Pias plus Ø 5,5 x L     | head                         | SCR-DBIT-PLUS-WS8-(A3K)-5,5 x L        | Steel      | Steel | 26   |
| ZEBRA Pias Ø 5,5 x L          | With hexagon                 | SCR-DBIT-WS8-(A3K)-5,5 x L             | Steel      | Steel | 27   |
| ZEBRA Pias plus Ø 5,5 x L     | head                         | SCR-DBIT-PLUS-WS8-(A3K)-5,5 x L        | Steel      | Steel | 28   |
| ZEBRA Pias Ø 5,5 x L          | hexagon head,                | SCR-DBIT-WSH19-WS8-(A3K)-5,5 x L       | Steel      | Steel | 29   |
| ZEBRA Pias plus Ø 5,5 x L     | washer ≥ Ø16                 | SCR-DBIT-PLUS-WSH19-WS8-(A3K)-5,5 x L  | Steel      | Steel | 30   |
| ZEBRA Pias Ø 5,5 x L          | hexagon head                 | SCR-DBIT-WSH19-WS8-(A3K)-5,5 x L       | Steel      | Steel | 31   |
| ZEBRA Pias plus Ø 5,5 x L     | washer ≥ Ø16                 | SCR-DBIT-PLUS-WSH19-WS8-(A3K)-5,5 x L  | Steel      | Steel | 32   |
| ZEBRA Pias Ø 5,5 -12 x L      | hexagon head                 | SCR-DBITL-WS8-(A3K)-5,5 x L            | Steel      | Steel | 33   |
| ZEBRA Pias plus Ø 5,5 -12 x L | long drill bit               | SCR-DBITL-PLUS-WS8-(A3K)-5,5 x L       | Steel      | Steel | 34   |
| ZEBRA Pias Ø 5,5 -12 x L      | hexagon head,                | SCR-DBITL-WSH19-WS8-(A3K)-5,5 x L      | Steel      | Steel | 35   |
| ZEBRA Pias plus Ø 5,5 -12 x L | washer ≥ Ø16, long drill bit | SCR-DBITL-PLUS-WSH19-WS8-(A3K)-5,5 x L | Steel      | Steel | 36   |
| ZEBRA Pias Ø 6,3 x L          | With hexagon                 | SCR-DBIT-WS10-(A3K)-6,3 x L            | Steel      | Steel | 37   |
| ZEBRA Pias plus Ø 6,3 x L     | head                         | SCR-DBIT-PLUS-WS10-(A3K)-6,3 x L       | Steel      | Steel | 38   |
| ZEBRA Pias Ø 6,3 x L          | With hexagon                 | SCR-DBIT-WS10-(A3K)-6,3 x L            | Steel      | Steel | 39   |
| ZEBRA Pias plus Ø 6,3 x L     | head                         | SCR-DBIT-PLUS-WS10-(A3K)-6,3 x L       | Steel      | Steel | 40   |
| ZEBRA Pias Ø 6,3 x L          | hexagon head,                | SCR-DBIT-WSH16-WS10-(A3K)-6,3 x L      | Steel      | Steel | 41   |
| ZEBRA Pias plus Ø 6,3 x L     | washer ≥ Ø16                 | SCR-DBIT-PLUS-WSH16-WS10-(A3K)-6,3 x L | Steel      | Steel | 42   |
| ZEBRA Pias Ø 6,3 x L          | hexagon head                 | SCR-DBIT-WSH16-WS10-(A3K)-6,3 x L      | Steel      | Steel | 43   |
| ZEBRA Pias plus Ø 6,3 x L     | washer ≥ Ø16                 | SCR-DBIT-PLUS-WSH16-WS10-(A3K)-6,3 x L | Steel      | Steel | 44   |
| ZEBRA Pias Ø 6,0 x L          | stainless steel              | SCR-DBIT-A2HD-WSH16-(A3K)-6 x L        | Steel      | Steel | 45   |
| ZEBRA Pias plus Ø 6,0 x L     | protection cap, washer ≥ Ø16 | SCR-DBIT-PLUS-A2HD-WSH16-(A3K)-6 x L   | Steel      | Steel | 46   |
| ZEBRA Pias Ø 6,0 x L          | stainless steel              | SCR-DBIT-A2HD-WSH16-(A3K)-6 x L        | Steel      | Steel | 47   |
| ZEBRA Pias plus Ø 6,0 x L     | protection cap washer ≥ Ø16  | SCR-DBIT-PLUS-A2HD-WSH16-(A3K)-6 x L   | Steel      | Steel | 48   |

Table 1 - Continued

| Product                                                                                                                      |                                        | Productcode                                                                                                                                              | Components |       | Anx. |
|------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------|------|
| ZEBRA Pias A2 Ø 4,2 x L<br>ZEBRA Pias A2 plus Ø 4,2 x L<br>ZEBRA Pias A2 Liko Ø 4,2 x L<br>ZEBRA Pias A2 plus Liko Ø 4,2 x L | With hexagon head or pan head          | SCR-DBIT-A2-WS7-4,2 x L<br>SCR-DBIT-PLUS-A2-WS7-4,2 x L<br>SCR-DBIT-PANHD-AW20-A2-4,2 X L<br>SCR-DBIT-PLUS-PANHD-AW20-A2-4,2 X L                         | Alu        | Alu   | 29   |
| ZEBRA Pias A2 Ø 4,2 x L<br>ZEBRA Pias A2 plus Ø 4,2 x L<br>ZEBRA Pias A2 Liko Ø 4,2 x L<br>ZEBRA Pias A2 plus Liko Ø 4,2 x L | hexagon head or pan head, washer ≥ Ø16 | SCR-DBIT-A2-WSH16-WS7-4,2 x L<br>SCR-DBIT-PLUS-A2-WSH16-WS7-4,2 x L<br>SCR-DBIT-PANHD-AW20-A2-WSH16-4,2 X L<br>SCR-DBIT-PLUS-PANHD-AW20-A2-WSH16-4,2 X L | Alu        | Alu   | 30   |
| ZEBRA Pias A2 Ø 4,8 x L<br>ZEBRA Pias A2 plus Ø 4,8 x L<br>ZEBRA Pias A2 Liko Ø 4,8 x L<br>ZEBRA Pias A2 plus Liko Ø 4,8 x L | With hexagon head or pan head          | SCR-DBIT-A2-WS8-4,8 x L<br>SCR-DBIT-PLUS-A2-WS8-4,8 x L<br>SCR-DBIT-PANHD-AW20-A2-4,8 X L<br>SCR-DBIT-PLUS-PANHD-AW20-A2-4,8 X L                         | Alu        | Alu   | 31   |
| ZEBRA Pias A2 Ø 4,8 x L<br>ZEBRA Pias A2 plus Ø 4,8 x L<br>ZEBRA Pias A2 Liko Ø 4,8 x L<br>ZEBRA Pias A2 plus Liko Ø 4,8 x L | hexagon head or pan head washer ≥ Ø16  | SCR-DBIT-A2-WSH16-WS8-4,8 x L<br>SCR-DBIT-PLUS-A2-WSH16-WS8-4,8 x L<br>SCR-DBIT-PANHD-AW20-A2-WSH16-4,8 X L<br>SCR-DBIT-PLUS-PANHD-AW20-A2-WSH16-4,8 X L | Alu        | Alu   | 32   |
| ZEBRA Pias A2 Ø 6,3 x L<br>ZEBRA Pias A2 plus Ø 6,3 x L                                                                      | With hexagon head                      | SCR-DBIT-A2-WS10-6,3 x L<br>SCR-DBIT-PLUS-A2-WS10-6,3 x L                                                                                                | Alu        | Alu   | 33   |
| ZEBRA Pias A2 Ø 6,3 x L<br>ZEBRA Pias A2 plus Ø 6,3 x L                                                                      | hexagon head, washer ≥ Ø16             | SCR-DBIT-A2-WSH16-WS10-6,3 x L<br>SCR-DBIT-PLUS-A2-WSH16-WS10-6,3 x L                                                                                    | Alu        | Alu   | 34   |
| ZEBRA Piasta Ø 4,2 x L<br>ZEBRA Piasta plus Ø 4,2 x L                                                                        | pan head, AW or RW drive               | SCR-DBIT-PANHD-AW20-(RUS)-4,2 x L<br>SCR-DBIT-PLUS-PANHD-AW20-(RUS)-4,2 x L                                                                              | Steel      | Steel | 35   |
| ZEBRA Piasta Ø 4,2 x L<br>ZEBRA Piasta plus Ø 4,2 x L                                                                        | With hexagon head                      | SCR-DBIT-WS7-(RUS)-4,2 x L<br>SCR-DBIT-PLUS-WS7-(RUS)-4,2 x L                                                                                            | Steel      | Steel | 36   |
| ZEBRA Piasta Ø 4,2 x L<br>ZEBRA Piasta plus Ø 4,2 x L                                                                        | hexagon head washer ≥ Ø16              | SCR-DBIT-WSH16-WS7-(RUS)-4,2 x L<br>SCR-DBIT-PLUS-WSH16-WS7-(RUS)-4,2 x L                                                                                | Steel      | Steel | 37   |
| ZEBRA Piasta Ø 4,8 x L<br>ZEBRA Piasta plus Ø 4,8 x L                                                                        | pan head, AW or RW drive               | SCR-DBIT-PANHD-AW20-(RUS)-4,8 x L<br>SCR-DBIT-PLUS-PANHD-AW20-(RUS)-4,8 x L                                                                              | Steel      | Steel | 38   |
| ZEBRA Piasta Ø 4,8 x L<br>ZEBRA Piasta plus Ø 4,8 x L                                                                        | pan head, AW or RW drive               | SCR-DBIT-PANHD-AW20-(RUS)-4,8 x L<br>SCR-DBIT-PLUS-PANHD-AW20-(RUS)-4,8 x L                                                                              | Alu        | Steel | 39   |
| ZEBRA Piasta Ø 4,8 x L<br>ZEBRA Piasta plus Ø 4,8 x L                                                                        | pan head, AW or RW drive               | SCR-DBIT-PANHD-AW20-(RUS)-4,8 x L<br>SCR-DBIT-PLUS-PANHD-AW20-(RUS)-4,8 x L                                                                              | Alu        | Alu   | 40   |
| ZEBRA Piasta Ø 4,8 x L<br>ZEBRA Piasta plus Ø 4,8 x L                                                                        | With hexagon head                      | SCR-DBIT-WS8-(RUS)-4,8 x L<br>SCR-DBIT-PLUS-WS8-(RUS)-4,8 x L                                                                                            | Steel      | Steel | 41   |
| ZEBRA Piasta Ø 4,8 x L<br>ZEBRA Piasta plus Ø 4,8 x L                                                                        | With hexagon head                      | SCR-DBIT-WS8-(RUS)-4,8 x L<br>SCR-DBIT-PLUS-WS8-(RUS)-4,8 x L                                                                                            | Alu        | Steel | 42   |
| ZEBRA Piasta Ø 4,8 x L<br>ZEBRA Piasta plus Ø 4,8 x L                                                                        | With hexagon head                      | SCR-DBIT-WS8-(RUS)-4,8 x L<br>SCR-DBIT-PLUS-WS8-(RUS)-4,8 x L                                                                                            | Alu        | Alu   | 43   |
| ZEBRA Piasta Ø 4,8 x L<br>ZEBRA Piasta plus Ø 4,8 x L                                                                        | hexagon head washer ≥ Ø16              | SCR-DBIT-WSH16-WS8-(RUS)-4,8 x L<br>SCR-DBIT-PLUS-WSH16-WS8-(RUS)-4,8 x L                                                                                | Steel      | Steel | 44   |
| ZEBRA Piasta Ø 4,8 r x L<br>ZEBRA Piasta plus Ø 4,8 r x L                                                                    | hexagon head, washer ≥ Ø16             | SCR-DBITR-WSH16-WS8-(RUS)-4,8 x L<br>SCR-DBITR-PLUS-WSH16-WS8-(RUS)-4,8 x L                                                                              | Steel      | Steel | 45   |
| ZEBRA Piasta H Ø 4,8 x L<br>ZEBRA Piasta plus H Ø 4,8 x L                                                                    | undercut, hexagon head washer ≥ Ø14    | SCR-DBITR-WSH14-H-WS8-(RUS)-4,8 x L<br>SCR-DBITR-PLUS-WSH14-H-WS8-(RUS)-4,8 x L                                                                          | Steel      | Steel | 46   |
| ZEBRA Piasta H Ø 4,8 x L<br>ZEBRA Piasta plus H Ø 4,8 x L                                                                    | undercut, hexagon head, washer ≥ Ø14   | SCR-DBITR-WSH14-H-WS8-(RUS)-4,8 x L<br>SCR-DBITR-PLUS-WSH14-H-WS8-(RUS)-4,8 x L                                                                          | Alu        | Steel | 47   |
| ZEBRA Piasta H Ø 4,8 x L<br>ZEBRA Piasta plus H Ø 4,8 x L                                                                    | undercut, hexagon head, washer ≥ Ø14   | SCR-DBITR-WSH14-H-WS8-(RUS)-4,8 x L<br>SCR-DBITR-PLUS-WSH14-H-WS8-(RUS)-4,8 x L                                                                          | Alu        | Alu   | 48   |
| ZEBRA Piasta Ø 5,5 x L<br>ZEBRA Piasta plus Ø 5,5 x L                                                                        | With hexagon head                      | SCR-DBIT-WS8-(RUS)-5,5 x L<br>SCR-DBIT-PLUS-WS8-(RUS)-5,5 x L                                                                                            | Steel      | Steel | 49   |
| ZEBRA Piasta Ø 5,5 x L<br>ZEBRA Piasta plus Ø 5,5 x L                                                                        | With hexagon head                      | SCR-DBIT-WS8-(RUS)-5,5 x L<br>SCR-DBIT-PLUS-WS8-(RUS)-5,5 x L                                                                                            | Steel      | Steel | 50   |
| ZEBRA Piasta Ø 5,5 x L<br>ZEBRA Piasta plus Ø 5,5 x L                                                                        | hexagon head washer ≥ Ø16              | SCR-DBIT-WSH16-WS8-(RUS)-5,5 x L<br>SCR-DBIT-PLUS-WSH16-WS8-(RUS)-5,5 x L                                                                                | Steel      | Steel | 51   |
| ZEBRA Piasta Ø 5,5 x L<br>ZEBRA Piasta plus Ø 5,5 x L                                                                        | hexagon head washer ≥ Ø16              | SCR-DBIT-WSH16-WS8-(RUS)-5,5 x L<br>SCR-DBIT-PLUS-WSH16-WS8-(RUS)-5,5 x L                                                                                | Steel      | Steel | 52   |



Table 1 - Continued

| Product                         |                                | Productcode                              | Components |                  | Anx. |
|---------------------------------|--------------------------------|------------------------------------------|------------|------------------|------|
| ZEBRA Piasta Ø 5,5 x L          | hexagon head                   | SCR-DBIT-WSH16-WS8-(RUS)-5,5 x L         | Steel      | 2xSteel          | 53   |
| ZEBRA Piasta plus Ø 5,5 x L     | washer ≥ Ø16                   | SCR-DBIT-PLUS-WSH16-WS8-(RUS)-5,5 x L    |            |                  |      |
| ZEBRA Piasta H Ø 5,5 x L        | undercut,                      | SCR-DBITR-WSH14-H-WS8-(RUS)-5,5 x L      | Steel      | Steel            | 54   |
| ZEBRA Piasta plus H Ø 5,5 x L   | hexagon head<br>washer ≥ Ø14   | SCR-DBITR-PLUS-WSH14-H-WS8-(RUS)-5,5 x L |            |                  |      |
| ZEBRA Piasta H Ø 5,5 x L        | undercut,                      | SCR-DBITR-WSH14-H-WS8-(RUS)-5,5 x L      | Steel      | 2xSteel          | 55   |
| ZEBRA Piasta plus H Ø 5,5 x L   | hexagon head<br>washer ≥ Ø14   | SCR-DBITR-PLUS-WSH14-H-WS8-(RUS)-5,5 x L |            |                  |      |
| ZEBRA Piasta H Ø 5,5 x L        | undercut,                      | SCR-DBITR-WSH14-H-WS8-(RUS)-5,5 x L      | Alu        | Steel            | 56   |
| ZEBRA Piasta plus H Ø 5,5 x L   | hexagon head<br>washer ≥ Ø14   | SCR-DBITR-PLUS-WSH14-H-WS8-(RUS)-5,5 x L |            |                  |      |
| ZEBRA Piasta H Ø 5,5 x L        | undercut,                      | SCR-DBITR-WSH14-H-WS8-(RUS)-5,5 x L      | Alu        | Alu              | 57   |
| ZEBRA Piasta plus H Ø 5,5 x L   | hexagon head<br>washer ≥ Ø14   | SCR-DBITR-PLUS-WSH14-H-WS8-(RUS)-5,5 x L |            |                  |      |
| ZEBRA Piasta H Ø 5,5 x L        | undercut,                      | SCR-DBITR-WSH14-H-WS8-(RUS)-5,5 x L      | Alu        | 2xSteel          | 58   |
| ZEBRA Piasta plus H Ø 5,5 x L   | hexagon head<br>washer ≥ Ø14   | SCR-DBITR-PLUS-WSH14-H-WS8-(RUS)-5,5 x L |            |                  |      |
| ZEBRA Piasta Ø 5,5 -12 x L      | hexagon head                   | SCR-DBITL-WS8-(RUS)-5,5 x L              | Steel      | Steel            | 59   |
| ZEBRA Piasta plus Ø 5,5 -12 x L | long drill bit                 | SCR-DBITL-PLUS-WS8-(RUS)-5,5 x L         |            |                  |      |
| ZEBRA Piasta Ø 5,5 -12 x L      | hexagon head                   | SCR-DBITL-WSH16-WS8-(RUS)-5,5 x L        | Steel      | Steel            | 60   |
| ZEBRA Piasta plus Ø 5,5 -12 x L | long drill bit<br>washer ≥ Ø16 | SCR-DBITL-PLUS-WSH16-WS8-(RUS)-5,5 x L   |            |                  |      |
| ZEBRA Piasta Ø 5,5 -12 x L      | hexagon head                   | SCR-DBITL-WSH16-WS8-(RUS)-5,5 x L        | Alu        | Steel            | 61   |
| ZEBRA Piasta plus Ø 5,5 -12 x L | long drill bit<br>washer ≥ Ø16 | SCR-DBITL-PLUS-WSH16-WS8-(RUS)-5,5 x L   |            |                  |      |
| ZEBRA Piasta Ø 5,5 -12 x L      | hexagon head                   | SCR-DBITL-WSH16-WS8-(RUS)-5,5 x L        | Alu        | Alu              | 62   |
| ZEBRA Piasta plus Ø 5,5 -12 x L | long drill bit<br>washer ≥ Ø16 | SCR-DBITL-PLUS-WSH16-WS8-(RUS)-5,5 x L   |            |                  |      |
| ZEBRA Piasta Ø 6,3 x L          | With hexagon                   | SCR-DBIT-WS3/8-(RUS)-6,3 x L             | Steel      | Steel            | 63   |
| ZEBRA Piasta plus Ø 6,3 x L     | head                           | SCR-DBIT-PLUS-WS3/8-(RUS)-6,3 x L        |            |                  |      |
| ZEBRA Piasta Ø 6,3 x L          | With hexagon                   | SCR-DBIT-WS3/8-(RUS)-6,3 x L             | Steel      | Steel            | 64   |
| ZEBRA Piasta plus Ø 6,3 x L     | head                           | SCR-DBIT-PLUS-WS3/8-(RUS)-6,3 x L        |            |                  |      |
| ZEBRA Piasta Ø 6,3 x L          | hexagon head                   | SCR-DBIT-WSH16-WS3/8-(RUS)-6,3 x L       | Steel      | Steel            | 65   |
| ZEBRA Piasta plus Ø 6,3 x L     | washer ≥ Ø16                   | SCR-DBIT-PLUS-WSH16-WS3/8-(RUS)-6,3 x L  |            |                  |      |
| ZEBRA Piasta Ø 6,3 x L          | hexagon head                   | SCR-DBIT-WSH16-WS3/8-(RUS)-6,3 x L       | Steel      | Steel            | 66   |
| ZEBRA Piasta plus Ø 6,3 x L     | washer ≥ Ø16                   | SCR-DBIT-PLUS-WSH16-WS3/8-(RUS)-6,3 x L  |            |                  |      |
| ZEBRA Piasta Ø 6,3 r x L        | hexagon head                   | SCR-DBITR-WSH16-WS3/8-(RUS)-6,3 x L      | Steel      | Steel            | 67   |
| ZEBRA Piasta plus Ø 6,3 r x L   | washer ≥ Ø16                   | SCR-DBITR-PLUS-WSH16-WS3/8-(RUS)-6,3 x L |            |                  |      |
| ZEBRA Piasta Ø 6,3 r x L        | hexagon head                   | SCR-DBITR-WSH16-WS3/8-(RUS)-6,3 x L      | Alu        | Steel            | 68   |
| ZEBRA Piasta plus Ø 6,3 r x L   | washer ≥ Ø16                   | SCR-DBITR-PLUS-WSH16-WS3/8-(RUS)-6,3 x L |            |                  |      |
| ZEBRA Piasta Ø 6,3 r x L        | hexagon head                   | SCR-DBITR-WSH16-WS3/8-(RUS)-6,3 x L      | Alu        | Alu              | 69   |
| ZEBRA Piasta plus Ø 6,3 r x L   | washer ≥ Ø16                   | SCR-DBITR-PLUS-WSH16-WS3/8-(RUS)-6,3 x L |            |                  |      |
| ZEBRA Piasta Ø 6,0 x L          | wood thread                    | SCR-DBITR-WOTHR-WSH14-(RUS)-6,0 x L      | Steel      | Timber           | 70   |
| ZEBRA Piasta Ø 6,0 x L          | washer ≥ Ø14                   |                                          |            |                  |      |
| ZEBRA Piasta Ø 6,0 x L          | wood thread                    | SCR-DBITR-WOTHR-WSH16-(RUS)-6,0 x L      | Steel      | Timber           | 71   |
| ZEBRA Piasta Ø 6,0 x L          | washer ≥ Ø16                   |                                          |            |                  |      |
| ZEBRA Piasta Ø 6,0 x L          | wood thread                    | SCR-DBITR-WOTHR-WSH14-(RUS)-6,0 x L      | Alu        | Timber           | 72   |
| ZEBRA Piasta Ø 6,0 x L          | washer ≥ Ø14                   |                                          |            |                  |      |
| FABA Typ A A2 6,5 x L           | hexagon head                   | SCR-A-WSH16-A2-WS3/8-(A2K)-6,5 x L       | Steel      | Steel/<br>Timber | 73   |
| FABA Typ A A2 6,5 x L           | washer ≥ Ø16                   |                                          |            |                  |      |
| FABA Typ A A2 6,5 x L           | hexagon head                   | SCR-A-WSH16-A2-WS3/8-(A2K)-6,5 x L       | Alu        | Steel/<br>Timber | 74   |
| FABA Typ A A2 6,5 x L           | washer ≥ Ø16                   |                                          |            |                  |      |
| FABA Typ A A2 6,5 x L           | hexagon head                   | SCR-A-WSH16-A2-WS3/8-(A2K)-6,5 x L       | Alu        | Alu/<br>Timber   | 75   |
| FABA Typ A A2 6,5 x L           | washer ≥ Ø16                   |                                          |            |                  |      |
| FABA Typ BZ A2 6,3 x L          | hexagon head                   | SCR-BZ-WSH16-A2-WS3/8-(A2K)-6,3 x L      | Steel      | Steel            | 76   |
| FABA Typ BZ A2 6,3 x L          | washer ≥ Ø16                   |                                          |            |                  |      |
| FABA Typ BZ A2 6,3 x L          | hexagon head                   | SCR-BZ-WSH16-A2-WS3/8-(A2K)-6,3 x L      | Alu        | Steel            | 77   |
| FABA Typ BZ A2 6,3 x L          | washer ≥ Ø16                   |                                          |            |                  |      |

Table 1 – Continued

| Product                                                                           |                                                                       | Productcode                                                        | Components |       | Anx. |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------|--------------------------------------------------------------------|------------|-------|------|
| FABA Typ BZ A2 6,3 x L                                                            | hexagon head washer $\geq \varnothing 16$                             | SCR-BZ-WSH16-A2-WS3/8-(A2K)-6,3 x L                                | Alu        | Alu   | 78   |
| ZEBRA DBS $\varnothing$ 4,8 x L                                                   | hexagon head or pan head, AW or RW drive                              | SCR-DBS-WS8-(A3K)-4,8 x L<br>SCR-DBS-PANHD-COLLATED-AW25-A3K-4,8xL | Steel      | Steel | 79   |
| ZEBRA DBS Bimetall – 4,5 x L                                                      | hexagon head or pan head, AW or RW drive                              | SCR-DBS-BIMET/A2-WS8-(RUS)-4,5 x L                                 | Steel      | Steel | 80   |
| ZEBRA DBS Bimetall – 4,5 x L                                                      | hexagon head or pan head, AW or RW drive washer $\geq \varnothing 14$ | SCR-DBS-WSH14-BIMET/A2-WS8-(RUS)-4,5 x L                           | Steel      | Steel | 81   |
| ZEBRA DBS Bimetall – 4,5 x L                                                      | hexagon head or pan head, AW or RW drive washer $\geq \varnothing 14$ | SCR-DBS-WSH14-BIMET/A2-WS8-(RUS)-4,5 x L                           | Alu        | Steel | 82   |
| ZEBRA DBS Bimetall – 4,5 x L                                                      | hexagon head or pan head, AW or RW drive washer $\geq \varnothing 14$ | SCR-DBS-WSH14-BIMET/A2-WS8-(RUS)-4,5 x L                           | Alu        | Alu   | 83   |
| ZEBRA DBS Bimetall – 6,0 x L                                                      | hexagon head or pan head, AW or RW drive                              | SCR-DBS-BIMET/A2-WS8-(RUS)-6,0 x L                                 | Steel      | Steel | 84   |
| ZEBRA DBS Bimetall – 6,0 x L                                                      | hexagon head or pan head, AW or RW drive washer $\geq \varnothing 16$ | SCR-DBS-WSH16-BIMET/A2-WS8-(RUS)-6,0 x L                           | Steel      | Steel | 85   |
| ZEBRA DBS Bimetall – 6,0 x L                                                      | hexagon head or pan head, AW or RW drive washer $\geq \varnothing 16$ | SCR-DBS-WSH16-BIMET/A2-WS8-(RUS)-6,0 x L                           | Alu        | Steel | 86   |
| ZEBRA DBS Bimetall – 6,0 x L                                                      | hexagon head or pan head, AW or RW drive washer $\geq \varnothing 16$ | SCR-DBS-WSH16-BIMET/A2-WS8-(RUS)-6,0 x L                           | Alu        | Alu   | 87   |
| FABA Typ A A2 7,2 x L                                                             | hexagon head washer $\geq \varnothing 19$                             | SCR-A-WSH19-A2-WS3/8-7,2 x L                                       | Steel      | Steel | 88   |
| FABA Typ A A2 7,2 x L                                                             | hexagon head washer $\geq \varnothing 19$                             | SCR-A-WSH19-A2-WS3/8-7,2 x L                                       | Alu        | Steel | 89   |
| FABA Typ A A2 7,2 x L                                                             | hexagon head washer $\geq \varnothing 19$                             | SCR-A-WSH19-A2-WS3/8-7,2 x L                                       | Alu        | Alu   | 90   |
| FABA Typ BZ 6,3 x L                                                               | hexagon head washer $\geq \varnothing 16$                             | SCR-BZ-WSH16-WS3/8-(A2K)-6,3 x L                                   | Steel      | Steel | 91   |
| FABA Typ BZ 6,3 x L                                                               | hexagon head washer $\geq \varnothing 16$                             | SCR-BZ-WSH16-WS3/8-(A2K)-6,3 x L                                   | Alu        | Steel | 92   |
| FABA Typ BZ 6,3 x L                                                               | hexagon head washer $\geq \varnothing 16$                             | SCR-BZ-WSH16-WS3/8-(A2K)-6,3 x L                                   | Alu        | Alu   | 93   |
| ZEBRA Pias $\varnothing$ 5,5 -12 x L<br>ZEBRA Pias plus $\varnothing$ 5,5 -12 x L | hexagon head, long drill bit                                          | SCR-DBITL-WS8-(A3K)-5,5 x L<br>SCR-DBITL-PLUS-WS8-(A3K)-5,5 x L    | Steel      | Steel | 94   |
| Zebra Pias $\varnothing$ 4,8 r x L                                                | With hexagon head                                                     | SCR-DBITR-WS8-(A3K)-4,8 x L                                        | Steel      | Steel | 95   |
| ZEBRA Pias $\varnothing$ 5,5 x L<br>ZEBRA Pias plus $\varnothing$ 5,5 x L         | pan head, AW or RW drive                                              | SHR-BSP-LIKPF-AW25-(A3K)-5,5 x L                                   | Steel      | Steel | 96   |
| W-ABZ M4                                                                          | pan head RW drive                                                     | AY-SCR-DBIT-PANHD-WABZ-RW25-(A2K)-4,0 X L                          | Steel      | Steel | 97   |

## 2 Specification of the intended use in accordance with the applicable European Assessment Document

The fastening screws are intended to be used for fastening metal sheeting to metal or timber substructures. The sheeting can either be used as wall or roof cladding or as load bearing wall and roof element. The fastening screws can also be used for the fastening of any other thin gauge metal members. The intended use comprises fastening screws and connections for indoor and outdoor applications. Fastening screws which are intended to be used in external environments with  $\geq$  C2 corrosion according to the standard EN ISO 12944-2 are made of stainless steel. Furthermore the intended use comprises connections with predominantly static loads (e.g. wind loads, dead loads). The fastening screws are not intended for re-use.

The performances given in Section 3 are only valid if the fastening screws are used in compliance with the specifications and conditions given in Annex (1-97).

The verification and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the fastening screws of at least 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

## 3 Performance of the product and references to the methods used for its assessment

### 3.1 Mechanical resistance and stability (BWR 1)

| Essential characteristic                                                        | Performance             |
|---------------------------------------------------------------------------------|-------------------------|
| Shear Resistance of the Connection                                              | see Annexes to this ETA |
| Tension Resistance of the Connection                                            | see Annexes to this ETA |
| Design Resistance in case of combined Tension and Shear Forces (interaction)    | see Annexes to this ETA |
| Check of Deformation Capacity in case of constraining forces due to temperature | see Annexes to this ETA |
| Durability                                                                      | see Annexes to this ETA |

### 3.2 Safety in case of fire (BWR 2)

| Essential characteristic | Performance          |
|--------------------------|----------------------|
| Reaction to fire         | Performance Class A1 |

**4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base**

In accordance with EAD No. 330046-01-0602, the applicable European legal act is: Commission Decision 1998/214/EC, amended by 2001/596/EC.

The system to be applied is: 2+

**5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD**

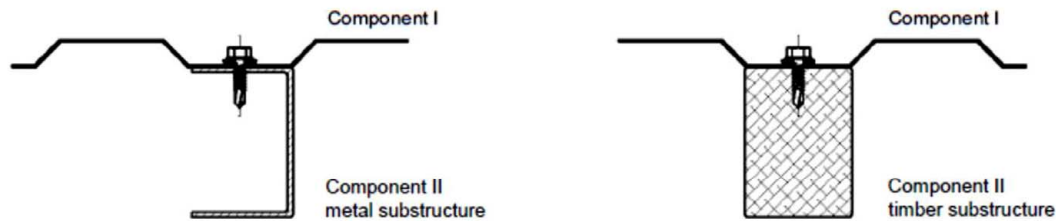
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 18 October 2023 by Deutsches Institut für Bautechnik

BD Dr.-Ing. Ronald Schwuchow  
Head of Section

*beglaubigt:*  
Hahn

Examples of execution of a connection



Terms for materials

|              |                          |
|--------------|--------------------------|
| Fastener     | Fastening screw          |
| Washer       | Sealing washer           |
| Component I  | Metal member or sheeting |
| Component II | Substructure             |

Terms for dimensions

|               |                                                                        |
|---------------|------------------------------------------------------------------------|
| $t_I$         | Thickness of metal member or sheeting                                  |
| $t_{II}$      | Thickness of metal substructure                                        |
| $\Sigma(t_i)$ | Sum of the thicknesses of all components                               |
| $l_{ef}$      | Effective screw-in length in timber substructure (without drill point) |
| $d_{dp}$      | Pre-drill diameter of metal member or sheeting and substructure        |
| $d_{dp,I}$    | Pre-drill diameter of metal member or sheeting                         |

Terms for performances

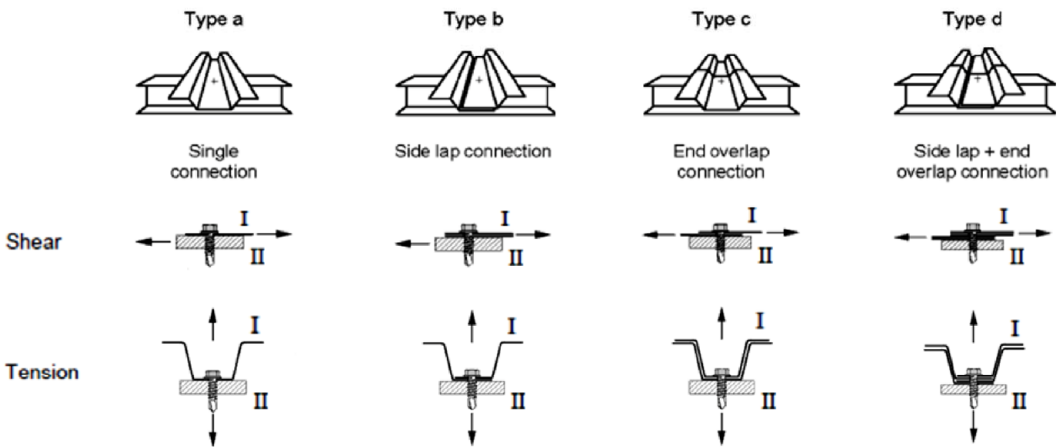
|              |                                                                                       |
|--------------|---------------------------------------------------------------------------------------|
| $V_{R,k}$    | Characteristic value of shear resistance of the connection                            |
| $N_{R,k}$    | Characteristic value of tension resistance of the connection                          |
| $V_{R,I,k}$  | Characteristic value of shear resistance of metal member or sheeting                  |
| $N_{R,I,k}$  | Characteristic value of tension resistance (pull-through) of metal member or sheeting |
| $N_{R,II,k}$ | Characteristic value of tension resistance (pull-out) of the substructure             |

Additionally for timber substructure the following terms are used:

|            |                                             |
|------------|---------------------------------------------|
| $M_{y,Rk}$ | Characteristic value of yield moment        |
| $f_{ax,k}$ | Characteristic value of withdrawal strength |
| $f_{h,k}$  | Characteristic value of embedding strength  |

| Used terms in the Annexes                       |  | Annex 1 |
|-------------------------------------------------|--|---------|
| Fastening screws for metal members and sheeting |  |         |

**Types of connection and occurred loadings**



**Determination of Design Values**

The design value of tension and shear resistance has to be determined as follows:

$$N_{R,d} = \frac{N_{R,k}}{\gamma_M} \quad V_{R,d} = \frac{V_{R,k}}{\gamma_M}$$

The characteristic values  $N_{R,k}$  and  $V_{R,k}$  are given in the Annexes. For intermediate dimension of metal member or sheeting or substructure the characteristic value of the thinner dimension is used.

The recommended partial safety factor  $\gamma_M = 1,33$  is used, provided no partial safety factor is given in national regulations or national Annexes to Eurocode 3.

For the types of connection (a, b, c, d) listed in the Annexes it is not necessary to take into account the effect of constrains due to temperature. Otherwise this has to be considered unless constrains due to temperature do not occur or are not significant (e.g. sufficient flexibility of the substructure).

For asymmetric metal substructures with thickness  $t_{II} < 5$  mm (for instance Z- or C-shaped profiles), the characteristic value  $N_{R,k}$  given in the Annexes has to be reduced to 70%.

In case of combined tension and shear forces the following interaction equation is taken into account:

$$\frac{N_{S,d}}{N_{R,d}} + \frac{V_{S,d}}{V_{R,d}} \leq 1,0$$

$N_{S,d}$  and  $V_{S,d}$  indicates the design values of applied tension and shear forces.

**Installation conditions**

The installation is carried out according to the manufacturer's instructions.

The fastening screws are screwed-in with electric screw driver. The use of impact wrenches is not allowed.

The fastening screws are fixed rectangular to the surface of the metal member or sheeting.

The metal member or sheeting and substructure are in contact to each other. The use of compression resistant thermal insulation strips up to a thickness of 3 mm is allowed.

The thickness (or minimum thickness) of metal substructure needs to be covered by the clamping length of the fastening screw. Otherwise only the screwed-in clamping length of the fastening screw may be considered.

**Basics for the design**

Fastening screws for metal members and sheeting

**Annex 2**



### Timber substructures

Characteristic values of tension and shear resistance of the connection for other  $k_{mod}$  or  $\rho_k$  as indicated in the Annexes can be determined as follows:

$$N_{R,k} = \min \left\{ \begin{array}{l} N_{R,I,k} \\ F_{ax,Rk} * k_{mod} \end{array} \right. \quad V_{R,k} = \min \left\{ \begin{array}{l} V_{R,I,k} \\ F_{v,Rk} * k_{mod} \end{array} \right.$$

The characteristic values  $N_{R,I,k}$  and  $V_{R,I,k}$  are given in the corresponding Annex of the fastening screw.

$F_{ax,Rk}$  indicates the characteristic value of tension resistance of timber substructure. The value has to be determined according to EN 1995-1-1:2004 + A1:2008, equation (8.40a) with  $f_{ax,k}$  given in the corresponding Annex of the fastening screw.

$F_{v,Rk}$  indicates the characteristic shear resistance of timber substructure. The value has to be determined according to EN 1995-1-1:2004 + A1:2008, equation (8.9) with  $M_{y,Rk}$  and  $f_{h,k}$  given in the corresponding Annex of the fastening screw.

### Aluminium members and sheeting

Characteristic values of tension resistance of the connection can be determined as follows:

$$N_{R,k} = \min \left\{ \begin{array}{l} N_{R,I,k} \\ N_{R,II,k} \end{array} \right.$$

The characteristic value  $N_{R,I,k}$  has to be determined according to EN 1999-1-4:2007 + AC:2009, equation (8.13).

The characteristic value  $N_{R,II,k}$  is given in the corresponding Annex of the fastening screw.

### Perforated steel members and sheeting

Characteristic values of tension and shear resistance of the connection can be determined as follows:

$$N_{R,k} = \min \left\{ \begin{array}{l} N_{R,I,k} \\ N_{R,II,k} \end{array} \right. \quad V_{R,k} = \min \left\{ \begin{array}{l} V_{R,I,k} \\ V_{R,k} \end{array} \right.$$

The characteristic values  $N_{R,I,k}$  and  $V_{R,I,k}$  are given in Annex 4 and 5.

The characteristic values  $N_{R,II,k}$  and  $V_{R,k}$  are given in the corresponding Annex of the fastening screw.

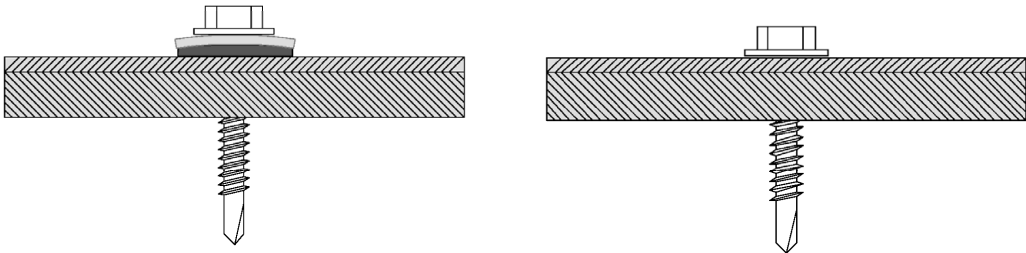
### Specific notes to the Annexes

Fastening screws for metal members and sheeting

### Annex 3

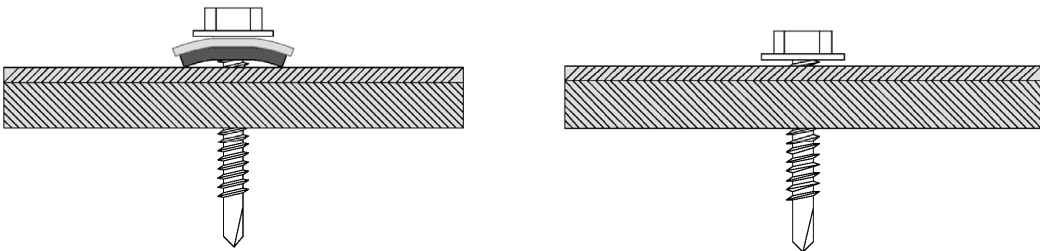
Examples of execution of a connection

Correct execution:

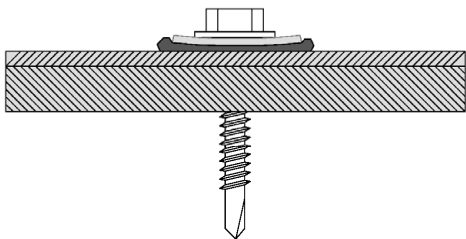


Incorrect execution:

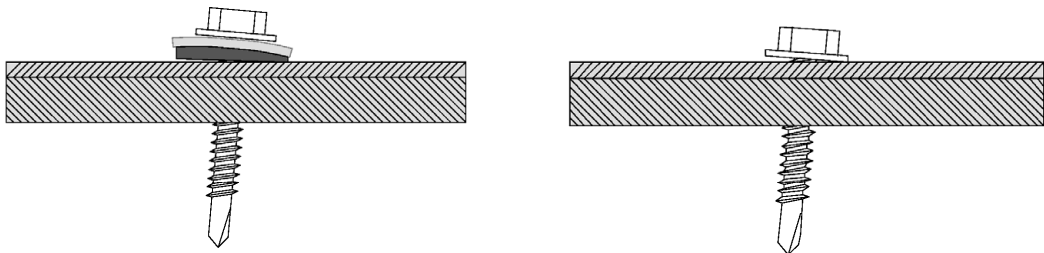
Too weak:



Too strong:



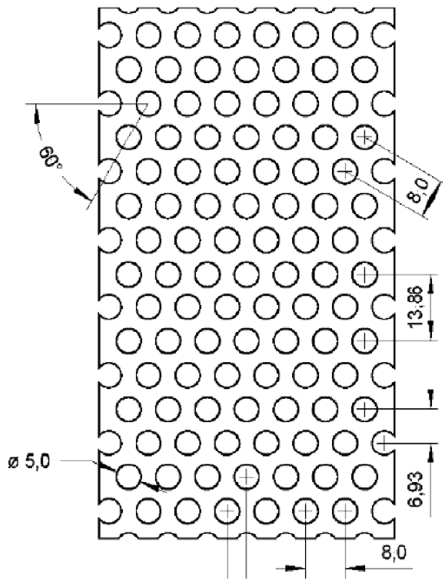
Not straight:



Installation

Fastening screws for metal members and sheeting

Annex 4



#### Fastener

Self tapping screw from Ø 6,3 mm to Ø 6,5 mm

Self drilling screw from Ø 5,5 mm to Ø 6,3 mm

#### Materials

Component I: S280GD to S350GD - EN 10346

Component II: According to the Annex of the corresponding fastener

| sheet                   |                         | perforated sheet made of<br>S280 GD - 10346 |      |      |      | perforated sheet made of<br>S320 GD - 10346 |      |      |      | perforated sheet made of<br>S350 GD - 10346 |      |      |      |      |
|-------------------------|-------------------------|---------------------------------------------|------|------|------|---------------------------------------------|------|------|------|---------------------------------------------|------|------|------|------|
| washer Ø [mm]           |                         | 16                                          | 19   | 22   | 25   | 16                                          | 19   | 22   | 25   | 16                                          | 19   | 22   | 25   |      |
| Component I<br>t I [mm] | V <sub>R,I,k</sub> [kN] | 0,75                                        | 2,16 | 2,22 | 2,24 | 2,38                                        | 2,34 | 2,40 | 2,44 | 2,58                                        | 2,54 | 2,60 | 2,62 | 2,78 |
|                         |                         | 0,88                                        | 2,56 | 2,64 | 2,64 | 2,78                                        | 2,78 | 2,86 | 2,86 | 3,02                                        | 3,00 | 3,10 | 3,10 | 3,26 |
|                         |                         | 1,00                                        | 2,92 | 3,04 | 3,02 | 3,16                                        | 3,16 | 3,30 | 3,26 | 3,42                                        | 3,42 | 3,56 | 3,52 | 3,68 |
|                         |                         | 1,13                                        | 3,32 | 3,48 | 3,42 | 3,56                                        | 3,60 | 3,76 | 3,70 | 3,86                                        | 3,88 | 4,10 | 4,00 | 4,16 |
|                         |                         | 1,25                                        | 3,70 | 3,88 | 3,80 | 3,94                                        | 4,00 | 4,20 | 4,10 | 4,26                                        | 4,32 | 4,54 | 4,42 | 4,60 |
|                         |                         | 1,50                                        | 4,46 | 4,74 | 4,56 | 4,72                                        | 4,84 | 5,12 | 4,96 | 5,10                                        | 5,22 | 5,54 | 5,34 | 5,50 |
|                         | N <sub>R,I,k</sub> [kN] | 0,75                                        | 1,40 | 1,94 | 2,14 | 2,22                                        | 1,52 | 2,08 | 3,32 | 2,42                                        | 1,64 | 2,26 | 2,50 | 2,60 |
|                         |                         | 0,88                                        | 1,82 | 2,34 | 2,62 | 2,70                                        | 1,96 | 2,54 | 2,82 | 2,92                                        | 2,12 | 2,74 | 3,04 | 3,14 |
|                         |                         | 1,00                                        | 2,24 | 2,74 | 3,06 | 3,14                                        | 2,44 | 2,96 | 3,32 | 3,42                                        | 2,62 | 3,20 | 3,58 | 3,68 |
|                         |                         | 1,13                                        | 2,74 | 3,18 | 3,58 | 3,64                                        | 2,98 | 3,44 | 3,88 | 3,96                                        | 3,20 | 3,70 | 4,18 | 4,26 |
|                         |                         | 1,25                                        | 3,24 | 3,58 | 4,08 | 4,12                                        | 3,52 | 3,88 | 4,40 | 4,46                                        | 3,78 | 4,18 | 4,76 | 4,80 |
|                         |                         | 1,50                                        | 4,36 | 4,46 | 5,12 | 5,12                                        | 4,74 | 4,84 | 5,56 | 5,56                                        | 5,10 | 5,22 | 5,98 | 5,98 |

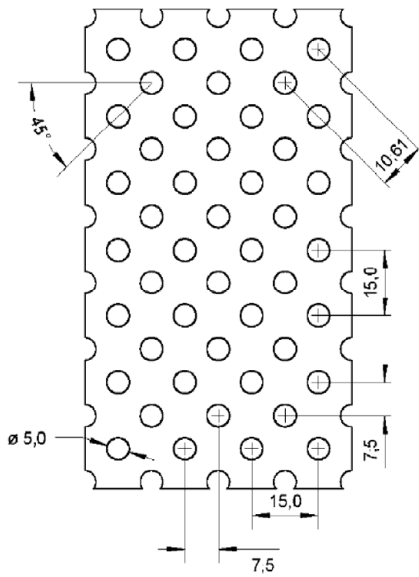
The load bearing capacity of component II is according to the Annex of the corresponding fastener.

The thickness of the perforated sheets which are exposed to wind loads shall be at least 1,00 mm.

#### Fastening of perforated sheets

#### Load bearing capacity of component I

#### Annex 5



#### Fastener

Self tapping screw from Ø 6,3 mm to Ø 6,5 mm

Self drilling screw from Ø 5,5 mm to Ø 6,3 mm

#### Materials

Component I: S280GD - EN 10346

Component II: According to the Annex of the corresponding fastener

| sheet                   |                         | perforated sheet made of<br>S280 GD - 10346  |      |      |      |                                             |      |      |      |      |
|-------------------------|-------------------------|----------------------------------------------|------|------|------|---------------------------------------------|------|------|------|------|
| Fastener                |                         | self drilling screws<br>Ø 5,5 mm to Ø 6,0 mm |      |      |      | self tapping screws<br>Ø 6,3 mm to Ø 6,5 mm |      |      |      |      |
| washer Ø [mm]           |                         | 16                                           | 19   | 22   | 25   | 16                                          | 19   | 22   | 25   |      |
| Component I<br>t l [mm] | V <sub>R,l,k</sub> [kN] | 0,75                                         | 2,48 | 2,52 | 2,84 | 2,76                                        | 2,38 | 2,64 | 3,16 | 3,24 |
|                         |                         | 0,88                                         | 3,04 | 3,12 | 3,42 | 3,32                                        | 3,02 | 3,28 | 3,78 | 3,88 |
|                         |                         | 1,00                                         | 3,56 | 3,70 | 3,84 | 3,84                                        | 3,64 | 3,96 | 4,36 | 4,50 |
|                         |                         | 1,13                                         | 4,14 | 4,26 | 4,40 | 4,40                                        | 4,36 | 4,70 | 5,00 | 5,18 |
|                         |                         | 1,25                                         | 4,68 | 5,84 | 4,92 | 4,94                                        | 5,06 | 5,40 | 5,60 | 5,84 |
|                         |                         | 1,50                                         | 5,76 | 6,04 | 5,90 | 6,10                                        | 6,62 | 6,94 | 6,88 | 7,16 |
|                         | N <sub>R,l,k</sub> [kN] | 0,75                                         | 2,88 | 3,16 | 3,24 | 3,14                                        | 2,86 | 3,46 | 3,72 | 3,92 |
|                         |                         | 0,88                                         | 3,42 | 3,72 | 3,76 | 3,70                                        | 3,40 | 4,02 | 4,30 | 4,46 |
|                         |                         | 1,00                                         | 3,92 | 4,28 | 4,28 | 4,20                                        | 3,90 | 4,56 | 4,82 | 4,96 |
|                         |                         | 1,13                                         | 4,46 | 4,86 | 4,88 | 4,72                                        | 4,44 | 5,12 | 5,38 | 5,48 |
|                         |                         | 1,25                                         | 4,96 | 5,42 | 5,42 | 5,26                                        | 4,94 | 5,66 | 5,88 | 5,94 |
|                         |                         | 1,50                                         | 6,04 | 6,60 | 6,60 | 6,38                                        | 6,00 | 6,74 | 6,92 | 6,90 |

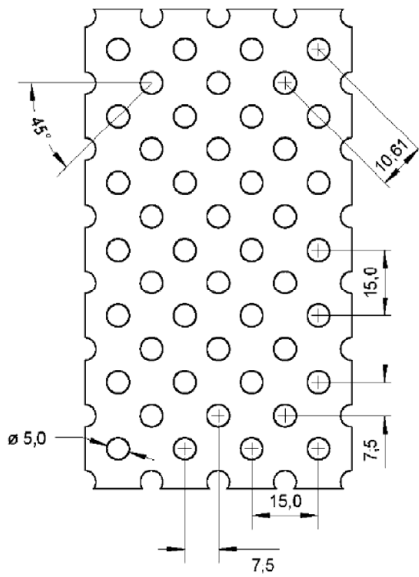
The load bearing capacity of component II is according to the Annex of the corresponding fastener.

The thickness of the perforated sheets which are exposed to wind loads shall be at least 1,00 mm.

#### Fastening of perforated sheets

Load bearing capacity of component I

**Annex 6**



#### Fastener

Self tapping screw from Ø 6,3 mm to Ø 6,5 mm

Self drilling screw from Ø 5,5 mm to Ø 6,3 mm

#### Materials

Component I: S320GD - EN 10346

Component II: According to the Annex of the corresponding fastener

| sheet                   |                         | perforated sheet made of<br>S320 GD - 10346  |      |      |      |                                             |      |      |      |
|-------------------------|-------------------------|----------------------------------------------|------|------|------|---------------------------------------------|------|------|------|
| Fastener                |                         | self drilling screws<br>Ø 5,5 mm to Ø 6,0 mm |      |      |      | self tapping screws<br>Ø 6,3 mm to Ø 6,5 mm |      |      |      |
| washer Ø [mm]           |                         | 16                                           | 19   | 22   | 25   | 16                                          | 19   | 22   | 25   |
| Component I<br>t l [mm] | V <sub>R,l,k</sub> [kN] |                                              |      |      |      |                                             |      |      |      |
|                         | 0,75                    | 2,68                                         | 2,74 | 3,08 | 3,00 | 2,68                                        | 2,88 | 3,42 | 3,50 |
|                         | 0,88                    | 3,30                                         | 3,38 | 3,70 | 3,60 | 3,36                                        | 3,60 | 4,10 | 4,22 |
|                         | 1,00                    | 3,86                                         | 4,00 | 4,16 | 4,16 | 4,02                                        | 4,30 | 4,72 | 4,88 |
|                         | 1,13                    | 4,48                                         | 4,62 | 4,76 | 4,76 | 4,76                                        | 5,08 | 5,42 | 5,60 |
|                         | 1,25                    | 5,06                                         | 5,24 | 5,32 | 5,36 | 5,50                                        | 5,84 | 6,08 | 6,30 |
|                         | 1,50                    | 6,24                                         | 6,54 | 6,40 | 6,60 | 7,10                                        | 7,52 | 7,46 | 7,76 |
|                         | N <sub>R,l,k</sub> [kN] |                                              |      |      |      |                                             |      |      |      |
|                         | 0,75                    | 3,12                                         | 3,42 | 3,50 | 3,40 | 3,12                                        | 3,68 | 4,06 | 4,26 |
|                         | 0,88                    | 3,70                                         | 4,04 | 4,08 | 4,00 | 3,70                                        | 4,32 | 4,68 | 4,86 |
|                         | 1,00                    | 4,24                                         | 4,64 | 4,64 | 4,54 | 4,24                                        | 4,92 | 5,24 | 5,40 |
|                         | 1,13                    | 4,84                                         | 5,26 | 5,28 | 5,12 | 4,84                                        | 5,54 | 5,86 | 5,96 |
|                         | 1,25                    | 5,38                                         | 5,88 | 5,88 | 5,70 | 5,38                                        | 6,14 | 6,40 | 6,48 |
|                         | 1,50                    | 6,54                                         | 7,16 | 7,16 | 6,92 | 6,54                                        | 7,38 | 7,54 | 7,52 |

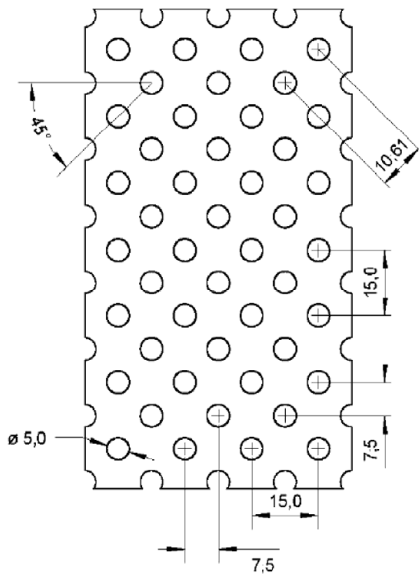
The load bearing capacity of component II is according to the Annex of the corresponding fastener.

The thickness of the perforated sheets which are exposed to wind loads shall be at least 1,00 mm.

#### Fastening of perforated sheets

Load bearing capacity of component I

**Annex 7**



#### Fastener

Self tapping screw from Ø 6,3 mm to Ø 6,5 mm

Self drilling screw from Ø 5,5 mm to Ø 6,3 mm

#### Materials

Component I: S350GD - EN 10346

Component II: According to the Annex of the corresponding fastener

| sheet                   |                         | perforated sheet made of<br>S350 GD - 10346  |      |      |      |                                             |      |      |      |
|-------------------------|-------------------------|----------------------------------------------|------|------|------|---------------------------------------------|------|------|------|
| Fastener                |                         | self drilling screws<br>Ø 5,5 mm to Ø 6,0 mm |      |      |      | self tapping screws<br>Ø 6,3 mm to Ø 6,5 mm |      |      |      |
| washer Ø [mm]           |                         | 16                                           | 19   | 22   | 25   | 16                                          | 19   | 22   | 25   |
| Component I<br>t l [mm] | V <sub>R,l,k</sub> [kN] |                                              |      |      |      |                                             |      |      |      |
|                         | 0,75                    | 2,88                                         | 2,92 | 3,30 | 3,20 | 2,98                                        | 3,20 | 3,72 | 3,92 |
|                         | 0,88                    | 3,54                                         | 3,62 | 3,96 | 3,86 | 3,62                                        | 3,88 | 4,42 | 4,54 |
|                         | 1,00                    | 4,14                                         | 4,28 | 4,46 | 4,46 | 4,24                                        | 4,52 | 5,08 | 5,12 |
|                         | 1,13                    | 4,80                                         | 4,94 | 5,10 | 5,10 | 4,92                                        | 5,24 | 5,78 | 5,74 |
|                         | 1,25                    | 5,44                                         | 5,62 | 5,70 | 5,72 | 5,56                                        | 5,92 | 6,46 | 6,32 |
|                         | 1,50                    | 6,24                                         | 6,54 | 6,40 | 7,02 | 6,94                                        | 7,36 | 7,86 | 7,48 |
|                         | N <sub>R,l,k</sub> [kN] |                                              |      |      |      |                                             |      |      |      |
|                         | 0,75                    | 3,34                                         | 3,66 | 3,76 | 3,64 | 3,52                                        | 4,16 | 4,52 | 4,64 |
|                         | 0,88                    | 3,96                                         | 4,36 | 4,38 | 4,28 | 3,98                                        | 4,76 | 5,04 | 5,24 |
|                         | 1,00                    | 4,54                                         | 4,98 | 4,96 | 4,86 | 4,40                                        | 5,24 | 5,50 | 5,76 |
|                         | 1,13                    | 5,16                                         | 5,64 | 5,64 | 5,48 | 4,86                                        | 5,76 | 5,96 | 6,32 |
|                         | 1,25                    | 5,80                                         | 6,28 | 6,28 | 6,14 | 5,38                                        | 6,24 | 6,40 | 6,80 |
|                         | 1,50                    | 6,54                                         | 7,16 | 7,16 | 7,46 | 6,54                                        | 7,38 | 7,54 | 7,80 |

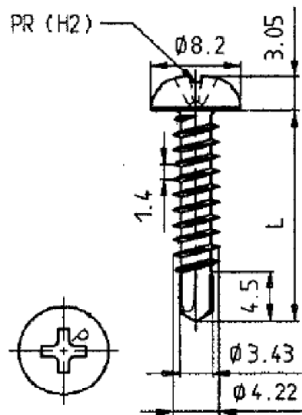
The load bearing capacity of component II is according to the Annex of the corresponding fastener.

The thickness of the perforated sheets which are exposed to wind loads shall be at least 1,00 mm.

#### Fastening of perforated sheets

Load bearing capacity of component I

**Annex 8**



#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 3.00$  mm

#### Timber substructures

no performance determined

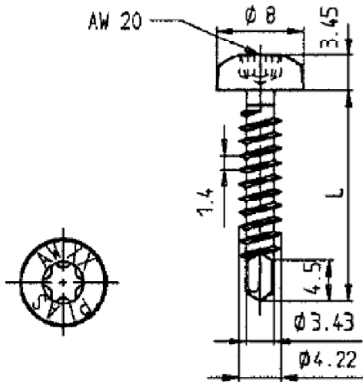
|                         |                       | Component II |        |        |         |         |         |         |         |         |         |
|-------------------------|-----------------------|--------------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
|                         |                       | t II [mm]    |        |        |         |         |         |         |         |         |         |
|                         |                       | 0,50         | 0,55   | 0,63   | 0,75    | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,50         | 0,78 - | 0,78 - | 0,78 -  | 0,78 -  | 0,98 -  | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 ac |
|                         |                       | 0,55         | 0,78 - | 0,90 - | 0,90 -  | 0,90 -  | 1,04 -  | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 ac |
|                         |                       | 0,63         | 0,78 - | 0,90 - | 1,30 ac | 1,40 ac | 1,50 ac | 1,60 ac | 1,70 ac | 1,80 ac | 2,00 ac |
|                         |                       | 0,75         | 0,78 - | 0,90 - | 1,30 -  | 1,40 -  | 1,60 ac | 1,70 ac | 1,90 ac | 2,00 ac | 2,20 ac |
|                         |                       | 0,88         | 0,78 - | 0,90 - | 1,40 -  | 1,50 -  | 1,70 -  | 1,80 -  | 2,10 a  | 2,20 ac | 2,50 a  |
|                         |                       | 1,00         | 0,78 - | 0,90 - | 1,40 -  | 1,70 -  | 1,90 -  | 2,10 -  | 2,30 -  | 2,50 a  | 2,80 a  |
|                         |                       | 1,13         | 0,78 - | 0,90 - | 1,40 -  | 1,70 -  | 2,00 -  | 2,20 -  | 2,60 -  | 2,60 a  | 3,10 a  |
|                         |                       | 1,25         | 0,78 - | 0,90 - | 1,50 -  | 1,80 -  | 2,00 -  | 2,30 -  | 2,60 -  | 2,90 -  | 3,40 -  |
|                         |                       | 1,50         | 0,78 - | 0,90 - | 1,50 -  | 1,80 -  | 2,00 -  | 2,30 -  | 2,60 -  | 3,00 -  | 3,90 -  |
|                         |                       | 1,75         | 0,78 - | 0,90 - | 1,50 -  | 1,80 -  | 2,00 -  | 2,30 -  | 2,60 -  | 3,00 -  | - -     |
|                         |                       | 2,00         | 0,78 - | 0,90 - | 1,50 -  | 1,80 -  | 2,00 -  | 2,30 -  | - -     | - -     | - -     |
|                         | N <sub>R,k</sub> [kN] | 0,50         | 0,29 - | 0,33 - | 0,50 ac | 0,60 ac | 0,90 ac | 1,02 ac | 1,02 ac | 1,02 ac | 1,02 ac |
|                         |                       | 0,55         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 ac | 1,12 ac | 1,12 ac | 1,12 ac | 1,12 ac |
|                         |                       | 0,63         | 0,29 - | 0,33 - | 0,50 ac | 0,60 ac | 0,90 ac | 1,18 ac | 1,29 ac | 1,40 ac | 1,70 ac |
|                         |                       | 0,75         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 ac | 1,18 ac | 1,29 ac | 1,40 ac | 1,70 ac |
|                         |                       | 0,88         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 a  | 1,40 ac | 1,70 a  |
|                         |                       | 1,00         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 a  | 1,70 a  |
|                         |                       | 1,13         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 a  | 1,70 a  |
|                         |                       | 1,25         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 -  | 1,70 -  |
|                         |                       | 1,50         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 -  | 1,70 -  |
|                         |                       | 1,75         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 -  | - -     |
|                         |                       | 2,00         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | - -     | - -     | - -     |
|                         | N <sub>R,k,II</sub>   | 0,29 -       | 0,33 - | 0,50 - | 0,60 -  | 0,90 -  | 1,18 -  | 1,29    | 1,40 -  | 1,70 -  | 2,40 -  |

#### Self-drilling screw

ZEBRA Pias Ø 4,2 x L, ZEBRA Pias plus Ø 4,2 x L  
with cross recessed pan head

#### Annex 9





#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 3.00$  mm

#### Timber substructures

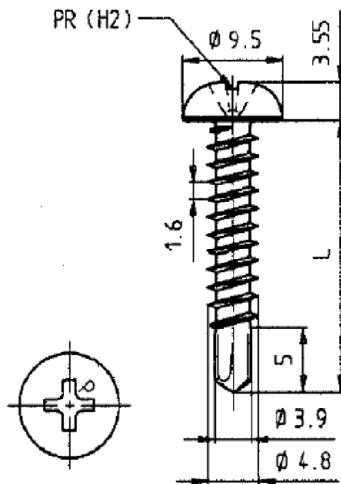
no performance determined

|                         |                       | Component II |        |        |         |         |         |         |         |         |         |         |
|-------------------------|-----------------------|--------------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
|                         |                       | t II [mm]    |        |        |         |         |         |         |         |         |         |         |
|                         |                       | 0,50         | 0,55   | 0,63   | 0,75    | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |         |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,50         | 0,78 - | 0,78 - | 0,78 -  | 0,78 -  | 0,98 -  | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 ac |
|                         |                       | 0,55         | 0,78 - | 0,90 - | 0,90 -  | 0,90 -  | 1,04 -  | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 ac |
|                         |                       | 0,63         | 0,78 - | 0,90 - | 1,20 ac | 1,30 ac | 1,40 ac | 1,40 ac | 1,50 ac | 1,60 ac | 1,80 ac | 2,00 ac |
|                         |                       | 0,75         | 0,78 - | 0,90 - | 1,20 -  | 1,30 -  | 1,40 ac | 1,50 ac | 1,70 ac | 1,80 ac | 2,00 ac | 2,30 a  |
|                         |                       | 0,88         | 0,78 - | 0,90 - | 1,30 -  | 1,40 -  | 1,50 -  | 1,60 -  | 1,90 a  | 2,00 ac | 2,20 a  | 2,70 a  |
|                         |                       | 1,00         | 0,78 - | 0,90 - | 1,30 -  | 1,50 -  | 1,70 -  | 1,90 -  | 2,10 -  | 2,20 a  | 2,50 a  | 3,10 -  |
|                         |                       | 1,13         | 0,78 - | 0,90 - | 1,30 -  | 1,50 -  | 1,80 -  | 2,00 -  | 2,30 -  | 2,30 a  | 2,80 a  | - -     |
|                         |                       | 1,25         | 0,78 - | 0,90 - | 1,40 -  | 1,60 -  | 1,80 -  | 2,10 -  | 2,30 -  | 2,60 -  | 3,10 -  | - -     |
|                         |                       | 1,50         | 0,78 - | 0,90 - | 1,40 -  | 1,60 -  | 1,80 -  | 2,10 -  | 2,30 -  | 2,70 -  | 3,50 -  | - -     |
|                         |                       | 1,75         | 0,78 - | 0,90 - | 1,40 -  | 1,60 -  | 1,80 -  | 2,10 -  | 2,30 -  | 2,70 -  | - -     | - -     |
|                         |                       | 2,00         | 0,78 - | 0,90 - | 1,40 -  | 1,60 -  | 1,80 -  | 2,10 -  | - -     | - -     | - -     | - -     |
|                         | N <sub>R,k</sub> [kN] | 0,50         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,02 ac | 1,02 ac | 1,02 ac | 1,02 ac | 1,02 ac |
|                         |                       | 0,55         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,12 ac | 1,12 ac | 1,12 ac | 1,12 ac | 1,12 ac |
|                         |                       | 0,63         | 0,29 - | 0,33 - | 0,50 ac | 0,60 ac | 0,90 ac | 1,18 ac | 1,29 ac | 1,40 ac | 1,70 ac | 1,70 ac |
|                         |                       | 0,75         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 ac | 1,18 ac | 1,29 ac | 1,40 ac | 1,70 ac | 2,00 a  |
|                         |                       | 0,88         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 a  | 1,40 ac | 1,70 a  | 2,40 a  |
|                         |                       | 1,00         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 a  | 1,70 a  | 2,40 -  |
|                         |                       | 1,13         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 a  | 1,70 a  | - -     |
|                         |                       | 1,25         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 -  | 1,70 -  | - -     |
|                         |                       | 1,50         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 -  | 1,70 -  | - -     |
|                         |                       | 1,75         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 -  | - -     | - -     |
|                         |                       | 2,00         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | - -     | - -     | - -     | - -     |
| N <sub>R,k,II</sub>     |                       | 0,29 -       | 0,33 - | 0,50 - | 0,60 -  | 0,90 -  | 1,18 -  | 1,29    | 1,40 -  | 1,70 -  | 2,40 -  |         |

#### Self-drilling screw

ZEBRA Pias Ø 4,2 x L, ZEBRA Pias plus Ø 4,2 x L  
with pan head with AW or RW drive

#### Annex 10



#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 4.40$  mm

#### Timber substructures

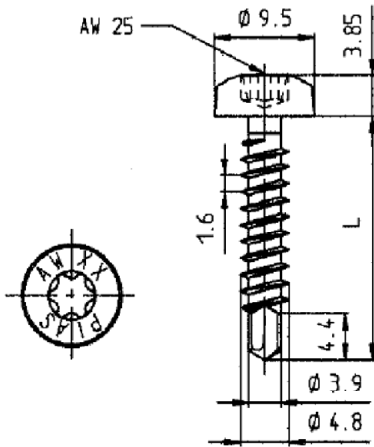
no performance determined

|                         |                | Component II |        |        |        |        |        |         |         |         |         |         |
|-------------------------|----------------|--------------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|
|                         |                | t II [mm]    |        |        |        |        |        |         |         |         |         |         |
|                         |                | 0,40         | 0,50   | 0,55   | 0,63   | 0,75   | 0,88   | 1,00    | 1,25    | 1,50    | 2,00    | 3,00    |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] | 0,40         | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 -  | 0,75 -  | 0,75 -  | 0,75 -  | 0,75 -  |
|                         |                | 0,50         | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 -  | 1,29 ac | 1,29 ac | 1,29 ac | 1,29 ac |
|                         |                | 0,55         | 0,75 - | 0,75 - | 0,93 - | 0,93 - | 0,93 - | 0,93 -  | 1,29 ac | 1,29 ac | 1,29 ac | 1,29 ac |
|                         |                | 0,63         | 0,75 - | 0,75 - | 0,93 - | 1,50 - | 1,50 - | 1,50 ac | 1,60 ac | 1,60 ac | 1,60 ac | 1,70 ac |
|                         |                | 0,75         | 0,75 - | 0,75 - | 0,93 - | 1,50 - | 1,60 - | 1,70 -  | 1,80 ac | 2,10 ac | 2,20 ac | 2,20 ac |
|                         |                | 0,88         | 0,75 - | 0,75 - | 0,93 - | 1,50 - | 1,70 - | 1,90 -  | 2,10 -  | 2,60 -  | 2,80 ac | 2,80 ac |
|                         |                | 1,00         | 0,75 - | 0,75 - | 0,93 - | 1,50 - | 1,70 - | 2,10 -  | 2,50 -  | 2,90 -  | 3,10 ac | 3,60 ac |
|                         |                | 1,25         | 0,75 - | 0,75 - | 0,93 - | 1,50 - | 1,70 - | 2,10 -  | 2,50 -  | 2,90 -  | 3,60 -  | 4,00 -  |
|                         |                | 1,50         | 0,75 - | 0,75 - | 0,93 - | 1,50 - | 1,70 - | 2,10 -  | 2,50 -  | 2,90 -  | 4,20 -  | 4,60 -  |
|                         |                | 1,75         | 0,75 - | 0,75 - | 0,93 - | 1,50 - | 1,70 - | 2,10 -  | 2,50 -  | 2,90 -  | 4,20 -  | -       |
|                         |                | 2,00         | 0,75 - | 0,75 - | 0,93 - | 1,50 - | 1,70 - | 2,10 -  | 2,50 -  | 2,90 -  | 4,20 -  | -       |
|                         | $N_{R,k}$ [kN] | 0,40         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,24    | 1,24    | 1,24    |
|                         |                | 0,50         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,24    | 1,24    | 1,24    |
|                         |                | 0,55         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,28 ac | 1,28 ac | 1,28 ac |
|                         |                | 0,63         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 ac | 1,10 ac | 1,40 ac | 1,40 ac | 1,40 ac |
|                         |                | 0,75         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 ac | 1,40 ac | 1,80 ac | 1,80 ac |
|                         |                | 0,88         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,40 -  | 2,00 ac | 2,30 ac |
|                         |                | 1,00         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,40 -  | 2,00 ac | 2,70 ac |
|                         |                | 1,25         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,40 -  | 2,00 -  | 3,10 -  |
|                         |                | 1,50         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,40 -  | 2,00 -  | 3,10 -  |
|                         |                | 1,75         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,40 -  | 2,00 -  | -       |
|                         |                | 2,00         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,40 -  | 2,00 -  | -       |
|                         | $N_{R,k,II}$   | 0,31 -       | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 - | 1,10 -  | 1,40 -  | 2,00 -  | 3,10 -  | 4,60 -  |

#### Self-drilling screw

ZEBRA Pias Ø 4,8 x L, ZEBRA Pias Ø 4,8 x L  
with cross recessed pan head

#### Annex 11



#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 4.40$  mm

#### Timber substructures

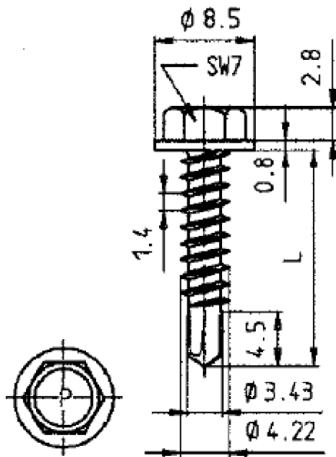
no performance determined

|                         |                       | Component II |        |        |        |        |        |         |         |         |         |         |         |
|-------------------------|-----------------------|--------------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|
|                         |                       | t II [mm]    |        |        |        |        |        |         |         |         |         |         |         |
|                         |                       | 0,40         | 0,50   | 0,55   | 0,63   | 0,75   | 0,88   | 1,00    | 1,25    | 1,50    | 2,00    | 3,00    |         |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,40         | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 -  | 0,75 -  | 0,75 -  | 0,75 -  | 0,75 -  | 0,75 -  |
|                         |                       | 0,50         | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 -  | 0,75 -  | 1,29 ac | 1,29 ac | 1,29 ac | 1,29 ac |
|                         |                       | 0,55         | 0,75 - | 0,75 - | 0,93 - | 1,40 - | 1,40 - | 1,40 ac | 1,40 ac | 1,29 ac | 1,29 ac | 1,29 ac | 1,29 ac |
|                         |                       | 0,63         | 0,75 - | 0,75 - | 0,93 - | 1,40 - | 1,40 - | 1,50 -  | 1,60 ac | 1,40 ac | 1,40 ac | 1,50 ac | 1,70 ac |
|                         |                       | 0,75         | 0,75 - | 0,75 - | 0,93 - | 1,40 - | 1,50 - | 1,70 -  | 1,90 -  | 1,90 ac | 2,00 ac | 2,00 ac | 2,00 ac |
|                         |                       | 0,88         | 0,75 - | 0,75 - | 0,93 - | 1,40 - | 1,50 - | 1,90 -  | 2,30 -  | 2,30 -  | 2,50 ac | 2,50 ac | 2,50 ac |
|                         |                       | 1,00         | 0,75 - | 0,75 - | 0,93 - | 1,40 - | 1,50 - | 1,90 -  | 2,30 -  | 2,60 -  | 2,70 ac | 2,80 ac | 3,20 ac |
|                         |                       | 1,25         | 0,75 - | 0,75 - | 0,93 - | 1,40 - | 1,50 - | 1,90 -  | 2,30 -  | 2,60 -  | 3,20 -  | 3,60 -  | 4,70 -  |
|                         |                       | 1,50         | 0,75 - | 0,75 - | 0,93 - | 1,40 - | 1,50 - | 1,90 -  | 2,30 -  | 2,60 -  | 3,80 -  | 4,10 -  | 5,20 -  |
|                         |                       | 1,75         | 0,75 - | 0,75 - | 0,93 - | 1,40 - | 1,50 - | 1,90 -  | 2,30 -  | 2,60 -  | 3,80 -  | 4,10 -  | - -     |
|                         |                       | 2,00         | 0,75 - | 0,75 - | 0,93 - | 1,40 - | 1,40 - | 1,40 ac | 1,40 ac | 2,60 -  | 3,80 -  | 4,10 -  | - -     |
|                         | N <sub>R,k</sub> [kN] | 0,40         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,24    | 1,24    | 1,24    | 1,24    |
|                         |                       | 0,50         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,24    | 1,24    | 1,24    | 1,24    |
|                         |                       | 0,55         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,28 ac | 1,28 ac | 1,28 ac | 1,28 ac |
|                         |                       | 0,63         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 ac | 1,10 ac | 1,40 ac | 1,40 ac | 1,40 ac | 1,40 ac |
|                         |                       | 0,75         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 ac | 1,40 ac | 1,80 ac | 1,80 ac | 1,80 ac |
|                         |                       | 0,88         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,40 -  | 2,00 ac | 2,30 ac | 2,30 ac |
|                         |                       | 1,00         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,40 -  | 2,00 ac | 2,70 ac | 2,70 ac |
|                         |                       | 1,25         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,40 -  | 2,00 -  | 3,10 -  | 3,90 -  |
|                         |                       | 1,50         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,40 -  | 2,00 -  | 3,10 -  | 4,60 -  |
|                         |                       | 1,75         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,40 -  | 2,00 -  | 3,10 -  | - -     |
|                         |                       | 2,00         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,90 -  | 1,10 -  | 1,40 -  | 2,00 -  | 3,10 -  | - -     |
| N <sub>R,k,II</sub>     | 0,31 -                | 0,37 -       | 0,42 - | 0,50 - | 0,70 - | 0,90 - | 1,10 - | 1,40 -  | 2,00 -  | 3,10 -  | 4,60 -  |         |         |

#### Self-drilling screw

ZEBRA Pias Ø 4,8 x L, ZEBRA Pias plus Ø 4,8 x L  
with pan head with AW or RW drive

#### Annex 12



#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 3.00$  mm

#### Timber substructures

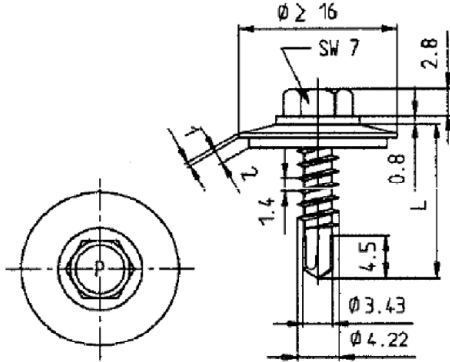
no performance determined

|                         |                       | Component II |        |        |         |         |         |         |         |         |         |         |
|-------------------------|-----------------------|--------------|--------|--------|---------|---------|---------|---------|---------|---------|---------|---------|
|                         |                       | t II [mm]    |        |        |         |         |         |         |         |         |         |         |
|                         |                       | 0,50         | 0,55   | 0,63   | 0,75    | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |         |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,50         | 0,78 - | 0,78 - | 0,78 -  | 0,78 -  | 0,98 -  | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 ac |
|                         |                       | 0,55         | 0,78 - | 0,90 - | 0,90 -  | 0,90 -  | 1,04 -  | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 ac |
|                         |                       | 0,63         | 0,78 - | 0,90 - | 1,20 -  | 1,30 ac | 1,50 ac | 1,60 ac | 1,80 ac | 2,10 ac | 2,30 ac | 2,60 ac |
|                         |                       | 0,75         | 0,78 - | 0,90 - | 1,20 -  | 1,57 -  | 1,70 -  | 1,90 -  | 2,00 ac | 2,20 ac | 2,50 ac | 2,80 a  |
|                         |                       | 0,88         | 0,78 - | 0,90 - | 1,20 -  | 1,57 -  | 1,80 -  | 2,10 -  | 2,20 -  | 2,40 ac | 2,70 a  | 3,00 a  |
|                         |                       | 1,00         | 0,78 - | 0,90 - | 1,20 -  | 1,57 -  | 2,06 -  | 2,52 -  | 2,56 -  | 2,60 -  | 2,80 a  | 3,40 a  |
|                         |                       | 1,13         | 0,78 - | 0,90 - | 1,20 -  | 1,57 -  | 2,06 -  | 2,52 -  | 2,56 -  | 2,70 -  | 3,10 -  | - -     |
|                         |                       | 1,25         | 0,78 - | 0,90 - | 1,20 -  | 1,57 -  | 2,06 -  | 2,52 -  | 2,60 -  | 2,80 -  | 3,30 -  | - -     |
|                         |                       | 1,50         | 0,78 - | 0,90 - | 1,20 -  | 1,57 -  | 2,06 -  | 2,52 -  | 2,80 -  | 3,20 -  | 3,70 -  | -       |
|                         |                       | 1,75         | 0,78 - | 0,90 - | 1,20 -  | 1,57 -  | 2,06 -  | 2,52 -  | 2,80 -  | 3,20 -  | - -     | -       |
|                         |                       | 2,00         | 0,78 - | 0,90 - | 1,20 -  | 1,57 -  | 2,06 -  | 2,52 -  | - -     | - -     | - -     | -       |
|                         | N <sub>R,k</sub> [kN] | 0,50         | 0,29 - | 0,33 - | 0,50 ac | 0,60 ac | 0,90 ac | 0,92 ac | 0,92 ac | 0,92 ac | 0,92 ac | 0,92 ac |
|                         |                       | 0,55         | 0,29 - | 0,33 - | 0,50 ac | 0,60 ac | 0,90 ac | 1,16 ac | 1,16 ac | 1,16 ac | 1,16 ac | 1,16 ac |
|                         |                       | 0,63         | 0,29 - | 0,33 - | 0,50 ac | 0,60 ac | 0,90 ac | 1,18 ac | 1,29 ac | 1,40 ac | 1,70 ac | 1,70 ac |
|                         |                       | 0,75         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 ac | 1,18 ac | 1,29 ac | 1,40 ac | 1,70 ac | 2,00 a  |
|                         |                       | 0,88         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 a  | 1,40 ac | 1,70 a  | 2,40 a  |
|                         |                       | 1,00         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 a  | 1,70 a  | 2,40 a  |
|                         |                       | 1,13         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 a  | 1,70 a  | - -     |
|                         |                       | 1,25         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 -  | 1,70 -  | - -     |
|                         |                       | 1,50         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 -  | 1,70 -  | - -     |
|                         |                       | 1,75         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | - -     | - -     | -       |
|                         |                       | 2,00         | 0,29 - | 0,33 - | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | - -     | - -     | - -     | - -     |
| N <sub>R,k,II</sub>     |                       | 0,29 -       | 0,33 - | 0,50 - | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 -  | 1,70 -  | 2,40 -  |         |

#### Self-drilling screw

ZEBRA Pias Ø 4,2 x L, ZEBRA Pias plus Ø 4,2 x L  
with hexagon head

#### Annex 13



#### Materials

Fastener: carbon steel; case hardened and galvanized  
Washer: steel, zinc coated and with vulcanized EPDM

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 3.00$  mm

#### Timber substructures

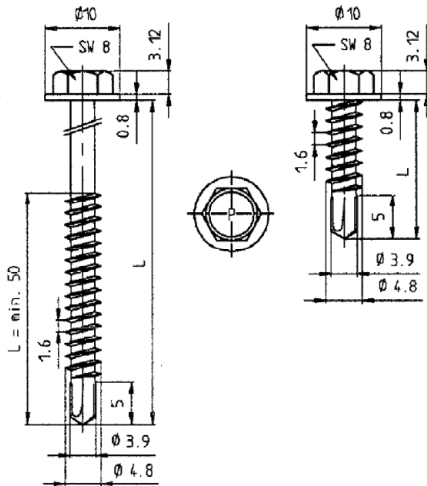
no performance determined

|                         |                       | Component II |         |         |         |         |         |         |         |         |         |         |
|-------------------------|-----------------------|--------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                         |                       | t II [mm]    |         |         |         |         |         |         |         |         |         |         |
|                         |                       | 0,40         | 0,50    | 0,55    | 0,63    | 0,75    | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,40         | 0,55 ac | 0,55 ac | 0,55 ac | 0,55 ac | 0,55 ac | 0,55 ac | 1,29 ac | 1,29 ac | 1,29 ac | 1,29 ac |
|                         |                       | 0,50         | 0,55 -  | 0,70 ac | 0,70 ac | 0,70 ac | 0,70 ac | 0,70 ac | 1,29 ac | 1,29 ac | 1,29 ac | 1,29 ac |
|                         |                       | 0,55         | 0,55 -  | 0,70 -  | 0,78 ac | 0,78 ac | 0,78 ac | 0,78 ac | 1,29 ac | 1,29 ac | 1,29 ac | 1,29 ac |
|                         |                       | 0,63         | 0,55 -  | 0,70 -  | 0,78 -  | 0,90 ac | 1,10 ac | 1,40 ac | 1,50 ac | 1,60 ac | 1,70 ac | 2,10 ac |
|                         |                       | 0,75         | 0,55 -  | 0,70 -  | 0,78 -  | 0,90 ac | 1,10 ac | 1,40 ac | 1,60 ac | 1,80 ac | 2,00 ac | 2,30 ac |
|                         |                       | 0,88         | 0,55 -  | 0,70 -  | 0,78 -  | 0,90 ac | 1,10 ac | 1,40 ac | 1,70 ac | 2,10 ac | 2,30 ac | 2,60 a  |
|                         |                       | 1,00         | 0,55 -  | 0,70 -  | 0,78 -  | 0,90 ac | 1,10 ac | 1,40 ac | 1,80 a  | 2,40 a  | 2,60 a  | 2,90 a  |
|                         |                       | 1,13         | 0,55 -  | 0,70 -  | 0,78 -  | 0,90 ac | 1,10 a  | 1,50 a  | 1,90 a  | 2,50 a  | 2,80 a  | 3,10 a  |
|                         |                       | 1,25         | 0,55 -  | 0,70 -  | 0,78 -  | 0,90 a  | 1,10 a  | 1,70 -  | 2,00    | 2,70 -  | 3,10 -  | 3,40 -  |
|                         |                       | 1,50         | 0,55 -  | 0,70 -  | 0,78 -  | 1,20 -  | 1,60 -  | 2,00 -  | 2,50    | 3,00 -  | 3,60 -  | 4,00 -  |
|                         |                       | 1,75         | 0,55 -  | 0,70 -  | 0,78 -  | 1,20 -  | 1,60 -  | 2,00 -  | 2,50    | 3,00 -  | 3,60 -  | - -     |
|                         |                       | 2,00         | 0,55 -  | 0,70 -  | 0,78 -  | 1,20 -  | 1,60 -  | 2,00 -  | 2,50    | - -     | - -     | - -     |
|                         | N <sub>R,k</sub> [kN] | 0,40         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 ac | 0,60 ac | 0,90 ac | 1,18 ac | 1,29 ac | 1,32 ac | 1,32 ac |
|                         |                       | 0,50         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 ac | 0,60 ac | 0,90 ac | 1,18 ac | 1,29 ac | 1,32 ac | 1,32 ac |
|                         |                       | 0,55         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 ac | 0,60 ac | 0,90 ac | 1,18 ac | 1,29 ac | 1,40 ac | 1,64 ac |
|                         |                       | 0,63         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 ac | 0,60 ac | 0,90 ac | 1,18 ac | 1,29 ac | 1,40 Ac | 1,70 ac |
|                         |                       | 0,75         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,90 ac | 1,18 ac | 1,29 ac | 1,40 ac | 1,70 Ac |
|                         |                       | 0,88         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 a  | 1,40 ac | 1,70 a  |
|                         |                       | 1,00         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 a  | 1,70 a  |
|                         |                       | 1,13         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 a  | - -     |
|                         |                       | 1,25         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 -  | 1,70 -  |
|                         |                       | 1,50         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 -  | 1,70 -  |
|                         |                       | 1,75         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29 -  | 1,40 -  | - -     |
|                         |                       | 2,00         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | - -     | - -     | - -     |
|                         | N <sub>R,k,II</sub>   | 0,25         | -       | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,90 -  | 1,18 -  | 1,29    | 1,40 -  | 1,70 -  |

#### Self-drilling screw

ZEBRA Pias Ø 4,2 x L, ZEBRA Pias plus Ø 4,2 x L  
with hexagon head and sealing washer  $\geq \text{Ø}16$  mm

#### Annex 14



#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 4.40$  mm

#### Timber substructures

no performance determined

|                     |                       | Component II |        |        |        |        |         |         |         |         |         |         |         |
|---------------------|-----------------------|--------------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
|                     |                       | t II [mm]    |        |        |        |        |         |         |         |         |         |         |         |
|                     |                       | 0,40         | 0,50   | 0,55   | 0,63   | 0,75   | 0,88    | 1,00    | 1,25    | 1,50    | 2,00    | 3,00    |         |
| Component I         | t I [mm]              | 0,40         | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 -  | 0,75 -  | 0,75 -  | 0,75 -  | 0,75 -  | 0,75 -  | 0,75 -  |
|                     |                       | 0,50         | 0,75 - | 0,95 - | 0,95 - | 0,95 - | 0,95 -  | 0,95 -  | 0,95 -  | 0,95 -  | 0,95 -  | 0,95 -  | 0,95 -  |
|                     |                       | 0,55         | 0,75 - | 0,95 - | 1,04 - | 1,04 - | 1,04 -  | 1,04 -  | 1,04 -  | 1,04 -  | 1,04 -  | 1,04 -  | 1,04 -  |
|                     |                       | 0,63         | 0,75 - | 0,95 - | 1,04 - | 1,20 - | 1,40 ac | 1,50 ac | 1,70 ac | 2,00 ac | 2,30 ac | 2,40 ac | 2,40 ac |
|                     |                       | 0,75         | 0,75 - | 0,95 - | 1,04 - | 1,30 - | 1,50 ac | 1,70 ac | 1,90 ac | 2,20 ac | 2,50 ac | 3,00 ac | 3,00 ac |
|                     |                       | 0,88         | 0,75 - | 0,95 - | 1,04 - | 1,40 - | 1,70 -  | 1,90 ac | 2,10 ac | 2,50 ac | 2,80 ac | 3,40 ac | 3,40 ac |
|                     |                       | 1,00         | 0,75 - | 0,95 - | 1,04 - | 1,40 - | 1,80 -  | 2,00 -  | 2,30 ac | 2,70 ac | 3,10 ac | 3,70 ac | 4,10 ac |
|                     |                       | 1,25         | 0,75 - | 0,95 - | 1,04 - | 1,50 - | 1,90 -  | 2,30 -  | 2,70 -  | 3,30 -  | 3,70 ac | 4,40 ac | 4,80 a  |
|                     |                       | 1,50         | 0,75 - | 0,95 - | 1,04 - | 1,50 - | 2,00 -  | 2,40 -  | 3,00 -  | 3,90 -  | 4,50 -  | 5,00 -  | - -     |
|                     |                       | 1,75         | 0,75 - | 0,95 - | 1,04 - | 1,50 - | 2,00 -  | 2,40 -  | 3,00 -  | 3,90 -  | 4,50 -  | 5,00 -  | - -     |
|                     | 2,00                  | 0,75 -       | 0,95 - | 1,04 - | 1,50 - | 2,00 - | 2,40 -  | 3,00 -  | 3,90 -  | 4,50 -  | 5,00 -  | - -     |         |
|                     | N <sub>R,k</sub> [kN] | 0,40         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,08 -  | 1,08 -  | 1,08 -  | 1,08 -  |
|                     |                       | 0,50         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,30 -  | 1,33 -  | 1,33 -  | 1,33 -  |
|                     |                       | 0,55         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,30 -  | 1,63 -  | 1,63 -  | 1,63 -  |
|                     |                       | 0,63         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 ac | 0,80 ac | 1,00 ac | 1,30 ac | 1,70 ac | 2,10 ac | 2,10 ac |
|                     |                       | 0,75         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 ac | 0,80 ac | 1,00 ac | 1,30 ac | 1,70 ac | 2,30 ac | 2,30 ac |
|                     |                       | 0,88         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 -  | 0,80 ac | 1,00 ac | 1,30 ac | 1,70 ac | 2,50 ac | 2,50 ac |
|                     |                       | 1,00         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 -  | 0,80 -  | 1,00 ac | 1,30 ac | 1,70 ac | 2,50 ac | 2,50 ac |
|                     |                       | 1,25         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,30 -  | 1,70 ac | 2,50 ac | 2,50 a  |
|                     |                       | 1,50         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,30 -  | 1,70 -  | 2,50 -  | 2,50 -  |
|                     |                       | 1,75         | 0,31 - | 0,37 - | 0,42 - | 0,50 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,30 -  | 1,70 -  | 2,50 -  | -       |
| 2,00                |                       | 0,31 -       | 0,37 - | 0,42 - | 0,50 - | 0,70 - | 0,80 -  | 1,00 -  | 1,30 -  | 1,70 -  | 2,50 -  | -       |         |
| N <sub>R,k,II</sub> | 0,31 -                | 0,37 -       | 0,42 - | 0,50 - | 0,70 - | 0,80 - | 1,00 -  | 1,30 -  | 1,70 -  | 2,50 -  | 2,50 -  |         |         |

#### Self-drilling screw

ZEBRA Pias Ø 4,8 x L, ZEBRA Pias plus Ø 4,8 x L  
with hexagon head

#### Annex 15

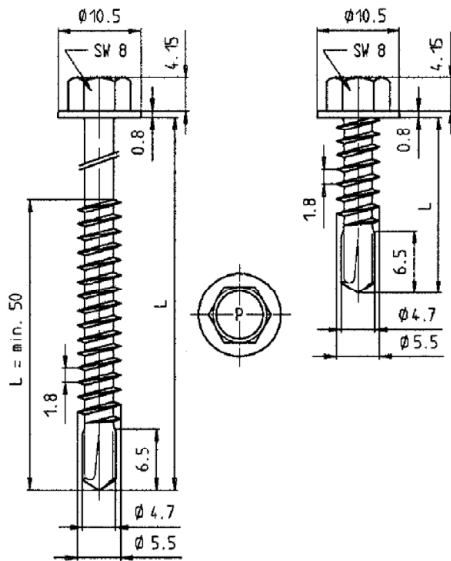


|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Carbon steel; case hardened and galvanized<br/>Washer: steel, zinc coated and with vulcanized EPDM</p> <p>Component I: S280GD to S550GD - EN 10346<br/>Component II: S235 to S355 - EN 10025-1<br/>S280GD to S550GD - EN 10346<br/>HX300LAD to HX460LAD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 4.40</math> mm</p> <p><b>Timber substructures</b><br/>no performance determined</p> |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                       | Component II        |         |         |         |         |         |         |         |         |         |         |         |
|-------------------------|-----------------------|---------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                         |                       | t II [mm]           |         |         |         |         |         |         |         |         |         |         |         |
|                         |                       | 0,40                | 0,50    | 0,55    | 0,63    | 0,75    | 0,88    | 1,00    | 1,25    | 1,50    | 2,00    | 3,00    |         |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,40                | 0,54 ac | 0,54 ac | 0,54 ac | 0,54 ac | 0,54 ac | 0,54 ac | 1,52 ac | 1,52 ac | 1,52 ac | 1,52 ac | 1,52 ac |
|                         |                       | 0,50                | 0,54 -  | 0,75 ac | 0,75 ac | 0,75 ac | 0,75 ac | 0,75 ac | 1,52 ac | 1,52 ac | 1,52 ac | 1,52 ac | 1,52 ac |
|                         |                       | 0,55                | 0,54 -  | 0,75 -  | 0,85 ac | 0,85 ac | 0,85 ac | 0,85 ac | 1,52 ac | 1,52 ac | 1,52 ac | 1,52 ac | 1,52 ac |
|                         |                       | 0,63                | 0,54 -  | 0,75 -  | 0,85 -  | 1,00 -  | 1,30 ac | 1,40 ac | 1,60 ac | 1,80 ac | 2,00 ac | 2,40 ac | 2,80 ab |
|                         |                       | 0,75                | 0,54 -  | 0,75 -  | 0,85 -  | 1,00 -  | 1,30 ac | 1,50 ac | 1,70 ac | 2,10 ac | 2,40 ac | 2,90 ac | 2,90 ac |
|                         |                       | 0,88                | 0,54 -  | 0,75 -  | 0,85 -  | 1,00 -  | 1,40 -  | 1,60 ac | 1,80 ac | 2,40 ac | 2,70 ac | 3,50 ac | 3,50 ac |
|                         |                       | 1,00                | 0,54 -  | 0,75 -  | 0,85 -  | 1,00 -  | 1,40 -  | 1,60 ac | 2,00 ac | 2,60 ac | 3,10 -  | 4,10 -  | 4,10 a  |
|                         |                       | 1,13                | 0,54 -  | 0,75 -  | 0,85 -  | 1,00 -  | 1,40 -  | 1,70 -  | 2,10 -  | 2,90 -  | 3,50 -  | 4,03 -  | 4,30 -  |
|                         |                       | 1,25                | 0,54 -  | 0,75 -  | 0,85 -  | 1,00 -  | 1,50 -  | 1,80 -  | 2,20 -  | 3,00 -  | 3,50 -  | 4,30 -  | 5,10 -  |
|                         |                       | 1,50                | 0,54 -  | 0,75 -  | 0,85 -  | 1,00 -  | 1,60 -  | 2,10 -  | 2,50 -  | 3,20 -  | 3,50 -  | 4,30 -  | - -     |
|                         | 1,75                  | 0,54 -              | 0,75 -  | 0,85 -  | 1,00 -  | 1,60 -  | 2,10 -  | 2,50 -  | 3,20 -  | 3,50 -  | 4,30 -  | - -     |         |
|                         | 2,00                  | 0,54 -              | 0,75 -  | 0,85 -  | 1,00 -  | 1,60 -  | 2,10 -  | 2,50 -  | 3,20 -  | 3,50 -  | 4,30 -  | - -     |         |
|                         | N <sub>R,k</sub> [kN] | 0,40                | 0,31 -  | 0,37 -  | 0,46 -  | 0,60 -  | 0,70 ac | 0,80 ac | 1,00 ac | 1,30 ac | 1,50 ac | 1,70 ac | 1,71 -  |
|                         |                       | 0,50                | 0,31 -  | 0,37 -  | 0,46 -  | 0,60 -  | 0,70 ac | 0,80 ac | 1,00 ac | 1,30 ac | 1,50 ac | 1,70 ac | 2,00 ab |
|                         |                       | 0,55                | 0,31 -  | 0,37 -  | 0,46 -  | 0,60 -  | 0,70 ac | 0,80 ac | 1,00 ac | 1,30 ac | 1,50 ac | 1,70 ac | 2,00 ab |
|                         |                       | 0,63                | 0,31 -  | 0,37 -  | 0,46 -  | 0,60 -  | 0,70 ac | 0,80 ac | 1,00 ac | 1,30 ac | 1,50 ac | 1,70 ac | 2,00 ab |
|                         |                       | 0,75                | 0,31 -  | 0,37 -  | 0,46 -  | 0,60 -  | 0,70 ac | 0,80 ac | 1,00 ac | 1,30 ac | 1,50 ac | 1,70 ac | 2,00 ac |
|                         |                       | 0,88                | 0,31 -  | 0,37 -  | 0,46 -  | 0,60 -  | 0,70 -  | 0,80 ac | 1,00 ac | 1,30 ac | 1,50 ac | 1,70 ac | 2,00 ac |
|                         |                       | 1,00                | 0,31 -  | 0,37 -  | 0,46 -  | 0,60 -  | 0,70 -  | 0,80 ac | 1,00 ac | 1,30 ac | 1,50 -  | 1,70 -  | 2,00 a  |
|                         |                       | 1,13                | 0,31 -  | 0,37 -  | 0,46 -  | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,30 -  | 1,50 -  | 1,70 -  | 2,00 -  |
|                         |                       | 1,25                | 0,31 -  | 0,37 -  | 0,46 -  | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,30 -  | 1,50 -  | 1,70 -  | 2,00 -  |
|                         |                       | 1,50                | 0,31 -  | 0,37 -  | 0,46 -  | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,30 -  | 1,50 -  | 1,70 -  | - -     |
|                         |                       | 1,75                | 0,31 -  | 0,37 -  | 0,46 -  | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,30 -  | 1,50 -  | 1,70 -  | - -     |
|                         |                       | 2,00                | 0,31 -  | 0,37 -  | 0,46 -  | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,30 -  | 1,50 -  | 1,70 -  | - -     |
|                         |                       | N <sub>R,k,II</sub> | 0,31 -  | 0,37 -  | 0,46 -  | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,30    | 1,50 -  | 1,70    | 2,00    |

|                                                                                                                                                                |                        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <p><b>Self-drilling screw</b></p> <p>ZEBRA Pias Ø 4,8 x L, ZEBRA Pias plus Ø 4,8 x L<br/>with hexagon head and sealing washer <math>\geq \phi 16</math> mm</p> | <p><b>Annex 16</b></p> |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|





#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 5.25$  mm

#### Timber substructures

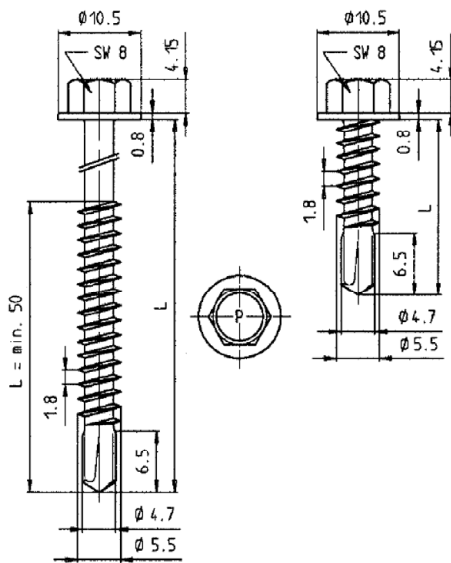
no performance determined

|                         |                       | Component II        |        |         |         |         |         |         |         |         |
|-------------------------|-----------------------|---------------------|--------|---------|---------|---------|---------|---------|---------|---------|
|                         |                       | t II [mm]           |        |         |         |         |         |         |         |         |
|                         |                       | 0,63                | 0,75   | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |         |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,63                | 1,40 - | 1,50 ac | 1,50 ac | 1,50 ac | 1,50 ac | 1,70 ac | 1,90 ac | 2,40 ac |
|                         |                       | 0,75                | 1,40 - | 1,60 ac | 1,70 ac | 1,80 ac | 1,90 ac | 2,10 ac | 2,50 ac | 2,80 ac |
|                         |                       | 0,88                | 1,40 - | 1,70 -  | 1,90 ac | 2,10 ac | 2,30 ac | 2,50 ac | 2,70 ac | 3,30 ac |
|                         |                       | 1,00                | 1,40 - | 1,80 -  | 2,00 -  | 2,20 -  | 2,50 -  | 2,70 ac | 3,00 ac | 3,60 ac |
|                         |                       | 1,13                | 1,50 - | 1,80 -  | 2,10 -  | 2,30 -  | 2,60 -  | 2,90 -  | 3,40 -  | 4,00 -  |
|                         |                       | 1,25                | 1,50 - | 1,90 -  | 2,20 -  | 2,50 -  | 2,80 -  | 3,10 -  | 3,60 -  | 4,40 -  |
|                         |                       | 1,50                | 1,60 - | 2,00 -  | 2,40 -  | 2,70 -  | 3,10 -  | 3,50 -  | 4,30 -  | 5,10 -  |
|                         |                       | 1,75                | 1,60 - | 2,00 -  | 2,40 -  | 2,70 -  | 3,10 -  | 3,50 -  | 4,30 -  | 5,10 -  |
|                         |                       | 2,00                | 1,60 - | 2,00 -  | 2,40 -  | 2,70 -  | 3,10 -  | 3,50 -  | 4,30 -  | 5,10 -  |
|                         | N <sub>R,k</sub> [kN] | 0,63                | 0,40 - | 0,50 ac | 0,60 ac | 0,80 ac | 0,90 ac | 1,10 ac | 1,74 ac | 1,90 ac |
|                         |                       | 0,75                | 0,40 - | 0,50 ac | 0,60 ac | 0,80 ac | 0,90 ac | 1,10 ac | 1,74 ac | 2,30 ac |
|                         |                       | 0,88                | 0,40 - | 0,50 -  | 0,60 ac | 0,80 ac | 0,90 ac | 1,10 ac | 1,74 ac | 2,63 ac |
|                         |                       | 1,00                | 0,40 - | 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 ac | 1,74 ac | 2,63 ac |
|                         |                       | 1,13                | 0,40 - | 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,74 -  | 2,63 -  |
|                         |                       | 1,25                | 0,40 - | 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,74 -  | 2,63 -  |
|                         |                       | 1,50                | 0,40 - | 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,74 -  | 2,63 -  |
|                         |                       | 1,75                | 0,40 - | 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,74 -  | 2,63 -  |
|                         |                       | 2,00                | 0,40 - | 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,74 -  | 2,63 -  |
|                         |                       | N <sub>R,k,II</sub> | 0,40 - | 0,50 -  | 0,60    | 0,80 -  | 0,90 -  | 1,10 -  | 1,74 -  | 2,63    |

#### Self-drilling screw

ZEBRA Pias Ø 5,5 x L, ZEBRA Pias plus Ø 5,5 x L  
with hexagon head

#### Annex 17



#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 5.25$  mm

#### Timber substructures

no performance determined

|                         |                | Component II |         |                 |
|-------------------------|----------------|--------------|---------|-----------------|
|                         |                | t II [mm]    |         |                 |
|                         |                | 2,50         | 3,00    | 4,00            |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] | 0,63         | 2,40 ac | 2,40 - 2,40 -   |
|                         |                | 0,75         | 2,85 ac | 2,90 - 2,90 -   |
|                         |                | 0,88         | 3,35 ac | 3,40 - 3,50 -   |
|                         |                | 1,00         | 3,75 ac | 3,90 - 4,20 -   |
|                         |                | 1,13         | 4,30 -  | 4,80 - 5,20 -   |
|                         |                | 1,25         | 4,90 -  | 5,40 - 6,00 -   |
|                         |                | 1,50         | 5,70 -  | 6,30 - - -      |
|                         |                | 1,75         | 5,70 -  | 6,30 - - -      |
|                         |                | 2,00         | 5,70 -  | 6,30 - - -      |
|                         | $N_{R,k}$ [kN] | 0,63         | 1,90 ac | 1,90 ac 1,90 ac |
|                         |                | 0,75         | 2,30 ac | 2,30 ac 2,30 ac |
|                         |                | 0,88         | 2,65 ac | 2,90 ac 2,90 a  |
|                         |                | 1,00         | 2,85 ac | 3,30 ac 3,30 a  |
|                         |                | 1,13         | 3,20 -  | 4,00 a 4,00 a   |
|                         |                | 1,25         | 3,40 -  | 4,40 - 4,40 a   |
|                         |                | 1,50         | 3,60 -  | 4,80 - - -      |
|                         |                | 1,75         | 3,60 -  | 4,80 - - -      |
|                         |                | 2,00         | 3,60 -  | 4,80 - - -      |
|                         | $N_{R,k,II}$   | 3,60 -       | 4,80 -  | 4,80 -          |

#### Self-drilling screw

ZEBRA Pias Ø 5,5 x L, ZEBRA Pias plus Ø 5,5 x L  
with hexagon head

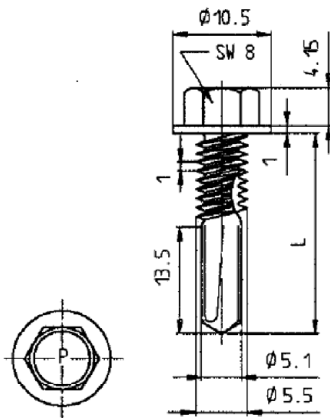
#### Annex 18

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Carbon steel; case hardened and galvanized<br/>Washer: steel, zinc coated and with vulcanized EPDM</p> <p>Component I: S280GD to S550GD - EN 10346<br/>Component II: S235 to S355 - EN 10025-1<br/>S280GD to S550GD - EN 10346<br/>HX300LAD to HX460LAD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 5.25</math> mm</p> <p><b>Timber substructures</b><br/>no performance determined</p> |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                       | Component II |         |         |         |         |         |         |         |         |
|-------------------------|-----------------------|--------------|---------|---------|---------|---------|---------|---------|---------|---------|
|                         |                       | t II [mm]    |         |         |         |         |         |         |         |         |
|                         |                       | 0,63         | 0,75    | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |         |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,40         | 0,66 ac | 0,66 ac | 0,66 ac | 0,66 ac | 0,66 ac | 0,66 ac | 1,53 ac | 1,53 ac |
|                         |                       | 0,50         | 0,97 ac | 0,97 ac | 0,97 ac | 0,97 ac | 0,97 ac | 0,97 ac | 1,53 ac | 1,53 ac |
|                         |                       | 0,55         | 0,98 ac | 0,98 ac | 0,98 ac | 0,98 ac | 0,98 ac | 0,98 ac | 1,53 ac | 1,53 ac |
|                         |                       | 0,63         | 1,00 -  | 1,20 -  | 1,30 -  | 1,40 ac | 1,60 ac | 1,70 ac | 2,00 ac | 2,40 ac |
|                         |                       | 0,75         | 1,00 -  | 1,20 -  | 1,40 -  | 1,60 -  | 1,80 ac | 2,00 ac | 2,40 ac | 2,60 ac |
|                         |                       | 0,88         | 1,00 -  | 1,20 -  | 1,40 -  | 1,60 -  | 1,90 -  | 2,20 ac | 2,90 ac | 3,60 ac |
|                         |                       | 1,00         | 1,00 -  | 1,20 -  | 1,40 -  | 1,70 -  | 2,00 -  | 2,40 -  | 3,10 -  | 3,80 -  |
|                         |                       | 1,13         | 1,00 -  | 1,20 -  | 1,40 -  | 1,70 -  | 2,10 -  | 2,50 -  | 3,20 -  | 4,00 -  |
|                         |                       | 1,25         | 1,00 -  | 1,20 -  | 1,50 -  | 1,80 -  | 2,10 -  | 2,50 -  | 3,30 -  | 4,20 -  |
|                         |                       | 1,50         | 1,00 -  | 1,20 -  | 1,50 -  | 1,80 -  | 2,30 -  | 2,70 -  | 3,60 -  | 4,70 -  |
|                         |                       | 1,75         | 1,00 -  | 1,20 -  | 1,50 -  | 1,80 -  | 2,30 -  | 2,70 -  | 3,60 -  | 4,70 -  |
|                         |                       | 2,00         | 1,00 -  | 1,20 -  | 1,50 -  | 1,80 -  | 2,30 -  | 2,70 -  | 3,60 -  | 4,70 -  |
|                         | N <sub>R,k</sub> [kN] | 0,40         | 0,40 -  | 0,60 -  | 0,70 -  | 0,80 ac | 1,00 ac | 1,20 ac | 1,73 ac | 1,51 ac |
|                         |                       | 0,50         | 0,40 -  | 0,60 -  | 0,70 -  | 0,80 ac | 1,00 ac | 1,20 ac | 1,73 ac | 1,73 ac |
|                         |                       | 0,55         | 0,40 -  | 0,60 -  | 0,70 -  | 0,80 ac | 1,00 ac | 1,20 ac | 1,74 ac | 2,18 ac |
|                         |                       | 0,63         | 0,40 -  | 0,60 -  | 0,70 -  | 0,80 ac | 1,00 ac | 1,20 ac | 1,74 ac | 2,63 ac |
|                         |                       | 0,75         | 0,40 -  | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 ac | 1,20 ac | 1,74 ac | 2,63 ac |
|                         |                       | 0,88         | 0,40 -  | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,74 -  | 2,63 -  |
|                         |                       | 1,00         | 0,40 -  | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,74 -  | 2,63 -  |
|                         |                       | 1,13         | 0,40 -  | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,74 -  | 2,63 -  |
|                         |                       | 1,25         | 0,40 -  | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,74 -  | 2,63 -  |
|                         |                       | 1,50         | 0,40 -  | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,74 -  | 2,63 -  |
|                         |                       | 1,75         | 0,40 -  | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,74 -  | 2,63 -  |
|                         |                       | 2,00         | 0,40 -  | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,74 -  | 2,63 -  |
| N <sub>R,k,II</sub>     | 0,40 -                | 0,60 -       | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,74 -  | 2,63 -  |         |         |

|                                                                                                  |  |          |
|--------------------------------------------------------------------------------------------------|--|----------|
| Self-drilling screw                                                                              |  | Annex 19 |
| ZEBRA Pias Ø 5,5 x L, ZEBRA Pias plus Ø 5,5 x L<br>with hexagon head and sealing washer ≥ Ø16 mm |  |          |

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p><b>Materials</b></p> <p>Fastener: Carbon steel; case hardened and galvanized<br/>Washer: steel, zinc coated and with vulcanized EPDM</p> <p>Component I: S280GD to S550GD - EN 10346<br/>Component II: S235 to S355 - EN 10025-1<br/>S280GD to S550GD - EN 10346<br/>HX300LAD to HX460LAD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 5.25</math> mm</p> <p><b>Timber substructures</b><br/>no performance determined</p> |                        |         |              |         |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---------|--------------|---------|--|--|--|-----------|--|--|--|--|------|------|------|--------------------------------|----------------------------------|------|---------|---------|---------|--|------|---------|---------|---------|--|------|---------|---------|---------|--|------|---------|---------|---------|--|------|---------|---------|---------|--|------|---------|---------|---------|--|------|---------|---------|--------|--|------|--------|--------|--------|--|------|--------|--------|--------|--|------|--------|--------|-----|--|------|--------|--------|-----|--|------|--------|--------|-----|----------------------------------|--|------|---------|---------|---------|--|------|---------|---------|---------|--|------|---------|---------|---------|--|------|---------|---------|---------|--|------|---------|---------|--------|--|------|--------|--------|--------|--|------|--------|--------|--------|--|------|--------|--------|--------|--|------|--------|--------|--------|--|------|--------|--------|-----|--|------|--------|--------|-----|--|------|--------|--------|-----|--|--------------------------------|--------|--------|--------|
| <table><tr><th colspan="2"></th><th colspan="3">Component II</th></tr><tr><th colspan="2"></th><th colspan="3">t II [mm]</th></tr><tr><th colspan="2"></th><th>2,50</th><th>3,00</th><th>4,00</th></tr><tr><td rowspan="12"><b>Component I</b><br/>t I [mm]</td><td><b><math>V_{R,k}</math> [kN]</b></td><td>0,40</td><td>1,53 ac</td><td>1,53 ac</td><td>1,53 ac</td></tr><tr><td></td><td>0,50</td><td>1,53 ac</td><td>1,53 ac</td><td>1,53 ac</td></tr><tr><td></td><td>0,55</td><td>1,53 ac</td><td>1,53 ac</td><td>1,53 ac</td></tr><tr><td></td><td>0,63</td><td>2,55 ac</td><td>2,70 ac</td><td>2,70 ac</td></tr><tr><td></td><td>0,75</td><td>2,80 ac</td><td>3,00 ac</td><td>3,30 ac</td></tr><tr><td></td><td>0,88</td><td>3,75 ac</td><td>3,90 ac</td><td>3,90 ac</td></tr><tr><td></td><td>1,00</td><td>4,10 ac</td><td>4,40 ac</td><td>4,40 a</td></tr><tr><td></td><td>1,13</td><td>4,45 -</td><td>4,90 -</td><td>5,10 a</td></tr><tr><td></td><td>1,25</td><td>4,70 -</td><td>5,20 -</td><td>5,70 -</td></tr><tr><td></td><td>1,50</td><td>5,30 -</td><td>5,90 -</td><td>- -</td></tr><tr><td></td><td>1,75</td><td>5,30 -</td><td>5,90 -</td><td>- -</td></tr><tr><td></td><td>2,00</td><td>5,30 -</td><td>5,90 -</td><td>- -</td></tr><tr><td rowspan="12"><b><math>N_{R,k}</math> [kN]</b></td><td></td><td>0,40</td><td>1,51 ac</td><td>1,51 ac</td><td>1,51 ac</td></tr><tr><td></td><td>0,50</td><td>1,73 ac</td><td>1,73 ac</td><td>1,73 ac</td></tr><tr><td></td><td>0,55</td><td>2,18 ac</td><td>2,18 ac</td><td>2,18 ac</td></tr><tr><td></td><td>0,63</td><td>3,20 ac</td><td>3,20 ac</td><td>3,20 ac</td></tr><tr><td></td><td>0,75</td><td>3,45 ac</td><td>3,80 ac</td><td>3,80 a</td></tr><tr><td></td><td>0,88</td><td>3,45 -</td><td>4,50 -</td><td>4,50 a</td></tr><tr><td></td><td>1,00</td><td>3,45 -</td><td>4,50 -</td><td>5,10 -</td></tr><tr><td></td><td>1,13</td><td>3,45 -</td><td>4,50 -</td><td>5,60 -</td></tr><tr><td></td><td>1,25</td><td>3,45 -</td><td>4,50 -</td><td>6,20 -</td></tr><tr><td></td><td>1,50</td><td>3,45 -</td><td>4,50 -</td><td>- -</td></tr><tr><td></td><td>1,75</td><td>3,45 -</td><td>4,50 -</td><td>- -</td></tr><tr><td></td><td>2,00</td><td>3,45 -</td><td>4,50 -</td><td>- -</td></tr><tr><td></td><td><b><math>N_{R,k,II}</math></b></td><td>3,45 -</td><td>4,50 -</td><td>6,20 -</td></tr></table> |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                        |         | Component II |         |  |  |  | t II [mm] |  |  |  |  | 2,50 | 3,00 | 4,00 | <b>Component I</b><br>t I [mm] | <b><math>V_{R,k}</math> [kN]</b> | 0,40 | 1,53 ac | 1,53 ac | 1,53 ac |  | 0,50 | 1,53 ac | 1,53 ac | 1,53 ac |  | 0,55 | 1,53 ac | 1,53 ac | 1,53 ac |  | 0,63 | 2,55 ac | 2,70 ac | 2,70 ac |  | 0,75 | 2,80 ac | 3,00 ac | 3,30 ac |  | 0,88 | 3,75 ac | 3,90 ac | 3,90 ac |  | 1,00 | 4,10 ac | 4,40 ac | 4,40 a |  | 1,13 | 4,45 - | 4,90 - | 5,10 a |  | 1,25 | 4,70 - | 5,20 - | 5,70 - |  | 1,50 | 5,30 - | 5,90 - | - - |  | 1,75 | 5,30 - | 5,90 - | - - |  | 2,00 | 5,30 - | 5,90 - | - - | <b><math>N_{R,k}</math> [kN]</b> |  | 0,40 | 1,51 ac | 1,51 ac | 1,51 ac |  | 0,50 | 1,73 ac | 1,73 ac | 1,73 ac |  | 0,55 | 2,18 ac | 2,18 ac | 2,18 ac |  | 0,63 | 3,20 ac | 3,20 ac | 3,20 ac |  | 0,75 | 3,45 ac | 3,80 ac | 3,80 a |  | 0,88 | 3,45 - | 4,50 - | 4,50 a |  | 1,00 | 3,45 - | 4,50 - | 5,10 - |  | 1,13 | 3,45 - | 4,50 - | 5,60 - |  | 1,25 | 3,45 - | 4,50 - | 6,20 - |  | 1,50 | 3,45 - | 4,50 - | - - |  | 1,75 | 3,45 - | 4,50 - | - - |  | 2,00 | 3,45 - | 4,50 - | - - |  | <b><math>N_{R,k,II}</math></b> | 3,45 - | 4,50 - | 6,20 - |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Component II           |         |              |         |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
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| <b>Component I</b><br>t I [mm]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b><math>V_{R,k}</math> [kN]</b>                                                                                                                                                                                                                                                                                                                                                                                                                   | 0,40                   | 1,53 ac | 1,53 ac      | 1,53 ac |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1,00                   | 4,10 ac | 4,40 ac      | 4,40 a  |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
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|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1,25                   | 4,70 -  | 5,20 -       | 5,70 -  |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1,50                   | 5,30 -  | 5,90 -       | - -     |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1,75                   | 5,30 -  | 5,90 -       | - -     |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2,00                   | 5,30 -  | 5,90 -       | - -     |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
| <b><math>N_{R,k}</math> [kN]</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0,40                   | 1,51 ac | 1,51 ac      | 1,51 ac |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0,50                   | 1,73 ac | 1,73 ac      | 1,73 ac |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0,55                   | 2,18 ac | 2,18 ac      | 2,18 ac |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0,63                   | 3,20 ac | 3,20 ac      | 3,20 ac |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0,75                   | 3,45 ac | 3,80 ac      | 3,80 a  |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 0,88                   | 3,45 -  | 4,50 -       | 4,50 a  |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1,00                   | 3,45 -  | 4,50 -       | 5,10 -  |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1,13                   | 3,45 -  | 4,50 -       | 5,60 -  |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1,25                   | 3,45 -  | 4,50 -       | 6,20 -  |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1,50                   | 3,45 -  | 4,50 -       | - -     |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1,75                   | 3,45 -  | 4,50 -       | - -     |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2,00                   | 3,45 -  | 4,50 -       | - -     |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b><math>N_{R,k,II}</math></b>                                                                                                                                                                                                                                                                                                                                                                                                                     | 3,45 -                 | 4,50 -  | 6,20 -       |         |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |
| <p><b>Self-drilling screw</b></p> <p>ZEBRA Pias Ø 5,5 x L, ZEBRA Pias plus Ø 5,5 x L<br/>with hexagon head and sealing washer ≥ Ø16 mm</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <p><b>Annex 20</b></p> |         |              |         |  |  |  |           |  |  |  |  |      |      |      |                                |                                  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |                                  |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |         |  |      |         |         |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |        |  |      |        |        |     |  |      |        |        |     |  |      |        |        |     |  |                                |        |        |        |



#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 13.50$  mm

#### Timber substructures

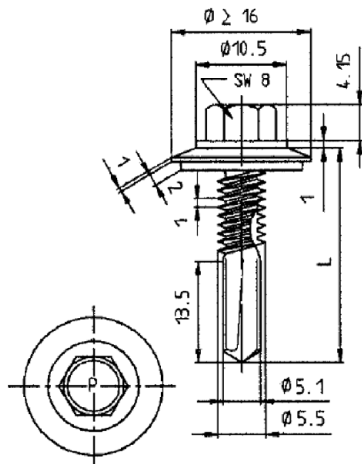
no performance determined

|                         |                | Component II |         |         |         |         |           |           |           |         |   |
|-------------------------|----------------|--------------|---------|---------|---------|---------|-----------|-----------|-----------|---------|---|
|                         |                | t II [mm]    |         |         |         |         |           |           |           |         |   |
|                         |                | 2,00         | 3,00    | 4,00    | 5,00    | 6,00    | 8,00      | 10,0      | 12,0      |         |   |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] |              |         |         |         |         |           |           |           |         |   |
|                         | 0,63           | -            | -       | -       | 3,26 ac | 3,26 ac | 2,60 abcd | 2,60 abcd | 2,60 abcd | 2,60 ac |   |
|                         | 0,75           | -            | -       | -       | 4,42 ac | 4,42 ac | 2,90 abcd | 2,90 abcd | 2,90 abcd | 2,90 ac |   |
|                         | 0,88           | -            | -       | -       | 5,13 ac | 5,13 ac | 3,30 abcd | 3,30 abcd | 3,30 abcd | 3,30 a  |   |
|                         | 1,00           | -            | -       | -       | 5,79 ac | 5,79 ac | 3,70 abcd | 3,70 abcd | 3,70 ac   | 3,70 a  |   |
|                         | 1,13           | -            | -       | -       | 6,67 ac | 6,67 ac | 6,67 ac   | 6,67 ac   | 6,67 ac   | 6,67 ac |   |
|                         | 1,25           | -            | -       | -       | 7,48 ac | 7,48 ac | 7,48 ac   | 7,48 ac   | 7,48 ac   | 7,48 ac |   |
|                         | 1,50           | 6,18 ac      | 7,67 ac | 9,16 ac | 9,16 ac | 9,16 ac | 9,16 ac   | 9,16 ac   | 9,16 ac   | 9,16 ac |   |
|                         | 1,75           | 6,68 ac      | 7,92 ac | 9,16 ac | 9,16 ac | 9,16 ac | 9,16 ac   | 9,16 ac   | 9,16 ac   | -       | - |
|                         | 2,00           | 7,17 ac      | 8,17 ac | 9,16 ac | 9,16 ac | 9,16 ac | 9,16 ac   | 9,16 ac   | 9,16 ac   | -       | - |
|                         | 3,00           | 7,17 ac      | 9,00 ac | 9,16 ac | 9,16 ac | 9,16 ac | 9,16 ac   | 9,16 ac   | 9,16 ac   | -       | - |
|                         | $N_{R,k}$ [kN] |              |         |         |         |         |           |           |           |         |   |
|                         | 0,63           | -            | -       | -       | 1,60 ac | 1,60 ac | 1,60 abcd | 1,60 abcd | 1,60 abcd | 1,60 ac |   |
|                         | 0,75           | -            | -       | -       | 2,10 ac | 2,10 ac | 2,10 abcd | 2,10 abcd | 2,10 abcd | 2,10 ac |   |
|                         | 0,88           | -            | -       | -       | 2,60 ac | 2,60 ac | 2,60 abcd | 2,60 abcd | 2,60 abcd | 2,60 a  |   |
|                         | 1,00           | -            | -       | -       | 3,10 ac | 3,10 ac | 3,10 abcd | 3,10 abcd | 3,10 abcd | 3,10 a  |   |
|                         | 1,13           | -            | -       | -       | 3,60 ac | 3,60 ac | 3,60 ac   | 3,60 ac   | 3,60 ac   | 3,60 ac |   |
|                         | 1,25           | -            | -       | -       | 4,10 ac | 4,10 ac | 4,10 ac   | 4,10 ac   | 4,10 ac   | 4,10 ac |   |
|                         | 1,50           | -            | -       | -       | 5,20 ac | 5,20 ac | 5,20 ac   | 5,20 ac   | 5,20 ac   | 5,20 ac |   |
|                         | 1,75           | -            | -       | -       | 5,20 ac | 5,20 ac | 5,20 ac   | 5,20 ac   | 5,20 ac   | -       | - |
|                         | 2,00           | -            | -       | -       | 5,20 ac | 5,20 ac | 5,20 ac   | 5,20 ac   | 5,20 ac   | -       | - |
|                         | $N_{R,k,II}$   | -            | -       | -       | 6,26 -  | 7,36 -  | 7,36 -    | 7,36 -    | 7,36 -    | 7,36 -  |   |

#### Self-drilling screw

ZEBRA Pias Ø 5,5 -12 x L, ZEBRA Pias plus Ø 5,5 -12 x L  
with hexagon head and extra-long drill bit

#### Annex 21



#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: steel, zinc coated and with vulcanized EPDM

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 13.50$  mm

#### Timber substructures

no performance determined

|                         |                | Component II |         |         |         |         |         |
|-------------------------|----------------|--------------|---------|---------|---------|---------|---------|
|                         |                | t II [mm]    |         |         |         |         |         |
|                         |                | 4,00         | 5,00    | 6,00    | 8,00    | 10,0    | 12,0    |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] |              |         |         |         |         |         |
|                         | 0,63           | 2,89 ac      | 2,89 ac | 2,89 ac | 2,89 ac | 2,89 ac | 2,89 ac |
|                         | 0,75           | 3,58 ac      | 3,58 ac | 3,58 ac | 3,58 ac | 3,58 ac | 3,58 ac |
|                         | 0,88           | 4,37 ac      | 4,37 ac | 4,37 ac | 4,37 ac | 4,37 ac | 4,37 ac |
|                         | 1,00           | 5,10 ac      | 5,10 ac | 5,10 ac | 5,10 ac | 5,10 ac | 5,10 ac |
|                         | 1,13           | 5,52 ac      | 5,52 ac | 5,52 ac | 5,52 ac | 5,52 ac | 5,52 ac |
|                         | 1,25           | 5,91 ac      | 5,91 ac | 5,91 ac | 5,91 ac | 5,91 ac | 5,91 ac |
|                         | 1,50           | 6,72 ac      | 6,72 ac | 6,72 ac | 6,72 ac | 6,72 ac | 6,72 ac |
|                         | 1,75           | 6,72 -       | 6,72 -  | 6,72 -  | 6,72 -  | 6,72 -  | - -     |
|                         | 2,00           | 6,72 -       | 6,72 -  | 6,72 -  | 6,72 -  | 6,72 -  | - -     |
|                         | $N_{R,k}$ [kN] |              |         |         |         |         |         |
|                         | 0,50           | 1,89 ac      | 1,89 ac | 1,89 ac | 1,89 ac | 1,89 ac | 1,89 ac |
|                         | 0,55           | 2,39 ac      | 2,39 ac | 2,39 ac | 2,39 ac | 2,39 ac | 2,39 ac |
|                         | 0,63           | 3,50 ac      | 3,50 ac | 3,50 ac | 3,50 ac | 3,50 ac | 3,50 ac |
|                         | 0,75           | 4,00 ac      | 4,00 ac | 4,00 ac | 4,00 ac | 4,00 ac | 4,00 ac |
|                         | 0,88           | 4,60 ac      | 4,60 ac | 4,60 ac | 4,60 ac | 4,60 ac | 4,60 a  |
|                         | 1,00           | 5,00 ac      | 5,00 ac | 5,00 ac | 5,00 ac | 5,00 ac | 5,00 a  |
|                         | 1,13           | 5,60 ac      | 5,60 ac | 5,60 ac | 5,60 ac | 5,60 ac | 5,60 a  |
|                         | 1,25           | 6,00 ac      | 6,00 ac | 6,00 ac | 6,00 ac | 6,00 ac | 6,00 a  |
|                         | 1,50           | 6,26 ac      | 7,00 ac | 7,00 ac | 7,00 ac | 7,00 ac | 7,00 a  |
|                         | 1,75           | 6,26 -       | 7,00 -  | 7,00 -  | 7,00 -  | 7,00 -  | - -     |
|                         | 2,00           | 6,26 -       | 7,00 -  | 7,00 -  | 7,00 -  | 7,00 -  | - -     |
|                         | $N_{R,k,II}$   | 6,26 -       | 7,36 -  | 7,36 -  | 7,36 -  | 7,36 -  | 7,36 -  |

#### Self-drilling screw

ZEBRA Pias Ø 5,5 -12 x L, ZEBRA Pias plus Ø 5,5 -12 x L  
with hexagon head, sealing washer  $\geq \phi 16$  mm and extra-long drill bit

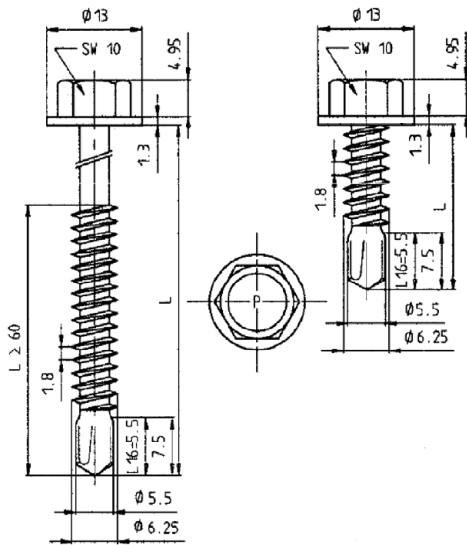
#### Annex 22

|  |                                                                                                                                                                                                                                                                                                                                                                                                             |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Carbon steel; case hardened and galvanized<br/>Washer: none</p> <p>Component I: S280GD to S550GD - EN 10346<br/>Component II: S235 to S355 - EN 10025-1<br/>S280GD to S550GD - EN 10346<br/>HX300LAD to HX460LAD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 6.00</math> mm</p> <p><b>Timber substructures</b><br/>no performance determined</p> |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|             |                       | Component II        |         |         |         |         |         |         |         |         |
|-------------|-----------------------|---------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|             |                       | t II [mm]           |         |         |         |         |         |         |         |         |
|             |                       | 0,63                | 0,75    | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |         |
| Component I | V <sub>R,k</sub> [kN] | 0,40                | - -     | - -     | - -     | - -     | - -     | - -     | 1,64 ac | 1,64 ac |
|             |                       | 0,50                | - -     | - -     | - -     | - -     | - -     | - -     | 1,76 ac | 1,76 ac |
|             |                       | 0,63                | 0,80 ac | 1,10 ac | 1,40 ac | 1,70 ac | 1,90 ac | 2,00 ac | 2,20 ac | 2,60 ac |
|             |                       | 0,75                | 1,00 ac | 1,30 ac | 1,50 ac | 1,80 ac | 2,20 ac | 2,40 ac | 2,60 ac | 3,20 ac |
|             |                       | 0,88                | 1,20 ac | 1,50 ac | 1,70 ac | 2,00 ac | 2,40 ac | 2,80 ac | 3,00 ac | 3,70 ac |
|             |                       | 1,00                | 1,30 -  | 1,60 ac | 1,90 ac | 2,10 ac | 2,80 ac | 3,00 ac | 3,40 ac | 4,00 ac |
|             |                       | 1,13                | 1,40 -  | 1,70 -  | 2,00 -  | 2,30 -  | 3,00 -  | 3,40 -  | 3,70 -  | 4,40 ac |
|             |                       | 1,25                | 1,50 -  | 1,80 -  | 2,10 -  | 2,50 -  | 3,20 -  | 3,50 -  | 4,00 -  | 4,90 -  |
|             |                       | 1,50                | 1,60 -  | 2,00 -  | 2,40 -  | 2,80 -  | 3,30 -  | 3,80 -  | 4,60 -  | 5,80 -  |
|             |                       | 1,75                | 1,60 -  | 2,00 -  | 2,40 -  | 2,80 -  | 3,30 -  | 3,80 -  | 4,60 -  | 5,80 -  |
|             |                       | 2,00                | 1,60 -  | 2,00 -  | 2,40 -  | 2,80 -  | 3,30 -  | 3,80 -  | 4,60 -  | 5,80 -  |
|             | N <sub>R,k</sub> [kN] | 0,40                | 0,60 ac | 0,70 ac | 0,80 ac | 1,00 ac | 1,08 ac | 1,08 ac | 1,08 ac | 1,08 ac |
|             |                       | 0,50                | 0,60 ac | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,38 ac | 1,38 ac | 1,38 ac |
|             |                       | 0,63                | 0,60 ac | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,40 ac | 1,90 ac | 2,40 ac |
|             |                       | 0,75                | 0,60 ac | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,40 ac | 1,90 ac | 2,70 ac |
|             |                       | 0,88                | 0,60 ac | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,40 ac | 1,90 ac | 2,70 ac |
|             |                       | 1,00                | 0,60 -  | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,40 ac | 1,90 ac | 2,70 ac |
|             |                       | 1,13                | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,40 -  | 1,90 -  | 2,70 ac |
|             |                       | 1,25                | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,40 -  | 1,90 -  | 2,70 -  |
|             |                       | 1,50                | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,40 -  | 1,90 -  | 2,70 -  |
|             |                       | 1,75                | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,40 -  | 1,90 -  | 2,70 -  |
|             |                       | 2,00                | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,40 -  | 1,90 -  | 2,70 -  |
|             |                       | N <sub>R,k,II</sub> | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,40 -  | 1,90 -  | 2,70 -  |

|                                                                       |  |          |
|-----------------------------------------------------------------------|--|----------|
| Self-drilling screw                                                   |  | Annex 23 |
| ZEBRA Pias Ø 6,3 x L, ZEBRA Pias plus Ø 6,3 x L,<br>with hexagon head |  |          |





## Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: none

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 6.00$  mm

## Timber substructures

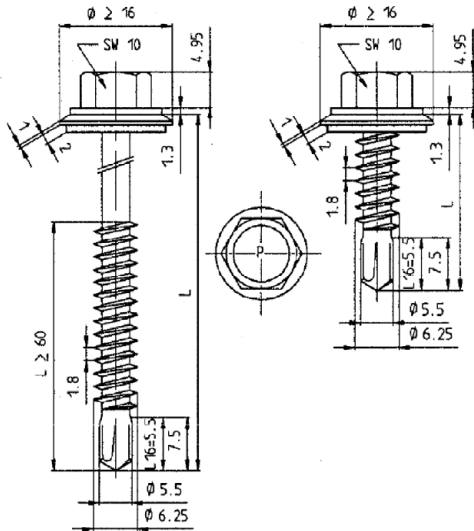
no performance determined

|                         |                       | Component II |         |         |         |         |
|-------------------------|-----------------------|--------------|---------|---------|---------|---------|
|                         |                       | t II [mm]    |         |         |         |         |
|                         |                       | 2,50         | 3,00    | 4,00    | 5,00    |         |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,40         | 1,64 ac | 1,64 ac | 1,64 ac | 1,64 ac |
|                         |                       | 0,50         | 1,76 ac | 1,76 ac | 1,76 ac | 1,76 ac |
|                         |                       | 0,63         | 2,60 ac | 2,60 ac | 2,60 ac | 2,60 -  |
|                         |                       | 0,75         | 3,20 ac | 3,20 ac | 3,20 ac | 3,20 -  |
|                         |                       | 0,88         | 3,70 ac | 3,70 ac | 3,70 ac | 3,70 -  |
|                         |                       | 1,00         | 4,40 ac | 4,40 ac | 4,80 ac | 4,80 -  |
|                         |                       | 1,13         | 5,05 ac | 5,05 ac | 5,80 ac | - -     |
|                         |                       | 1,25         | 5,55 -  | 6,20 -  | 6,60 a  | - -     |
|                         |                       | 1,50         | 6,75 -  | 7,70 -  | 8,50 a  | - -     |
|                         |                       | 1,75         | 6,75 -  | 7,70 -  | - -     | - -     |
|                         |                       | 2,00         | 6,75 -  | 7,70 -  | - -     | - -     |
|                         | N <sub>R,k</sub> [kN] | 0,40         | 1,08 ac | 1,08 ac | 1,08 ac | 1,08 ac |
|                         |                       | 0,50         | 1,38 ac | 1,38 ac | 1,38 ac | 1,38 ac |
|                         |                       | 0,63         | 2,40 ac | 2,40 ac | 2,40 ac | 2,40 ac |
|                         |                       | 0,75         | 2,85 ac | 3,00 ac | 3,00 ac | 3,00 ac |
|                         |                       | 0,88         | 3,30 ac | 3,90 ac | 3,90 ac | 3,90 ac |
|                         |                       | 1,00         | 3,50 ac | 4,30 ac | 4,30 ac | 4,30 ac |
|                         |                       | 1,13         | 3,70 ac | 4,70 ac | 5,00 ac | - -     |
|                         |                       | 1,25         | 3,70 -  | 4,70 -  | 5,70 -  | - -     |
|                         |                       | 1,50         | 3,70 -  | 4,70 -  | 6,60 -  | - -     |
|                         |                       | 1,75         | 3,70 -  | 4,70 -  | - -     | - -     |
|                         |                       | 2,00         | 3,70 -  | 4,70 -  | - -     | - -     |
| N <sub>R,k,II</sub>     | 3,70 -                | 4,70 -       | 6,60 -  | 6,60 -  |         |         |

### Self-drilling screw

ZEBRA Pias Ø 6,3 x L, ZEBRA Pias plus Ø 6,3 x L  
with hexagon head

## Annex 24



#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: steel, zinc coated and with vulcanized EPDM

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 6.00$  mm

#### Timber substructures

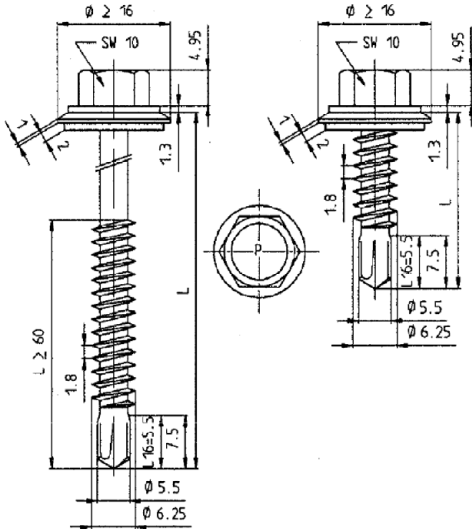
no performance determined

|             |                | Component II |             |             |         |         |         |         |         |
|-------------|----------------|--------------|-------------|-------------|---------|---------|---------|---------|---------|
|             |                | t II [mm]    |             |             |         |         |         |         |         |
|             |                | 0,63         | 0,75        | 0,88        | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |
| Component I | $V_{R,k}$ [kN] | 0,63         | 1,20 - 1,50 | 1,60 - 1,80 | ac      | 2,00 ac | 2,20 ac | 2,60 ac | 2,90 ac |
|             |                | 0,75         | 1,20 - 1,50 | 1,60 - 1,90 | ac      | 2,10 ac | 2,30 ac | 2,80 ac | 3,20 ac |
|             |                | 0,88         | 1,20 - 1,50 | 1,70 - 2,00 | ac      | 2,20 ac | 2,50 ac | 3,10 ac | 3,50 ac |
|             |                | 1,00         | 1,20 - 1,50 | 1,70 - 2,00 | ac      | 2,30 ac | 2,60 ac | 3,70 ac | 3,90 ac |
|             |                | 1,13         | 1,20 - 1,50 | 1,80 - 2,00 | ac      | 2,30 ac | 3,00 ac | 3,80 ac | 4,20 ac |
|             |                | 1,25         | 1,20 - 1,50 | 1,80 - 2,10 | ac      | 2,50 ac | 3,00 ac | 3,90 ac | 4,60 ac |
|             |                | 1,50         | 1,20 - 1,50 | 1,80 - 2,30 | ac      | 2,70 ac | 3,20 ac | 4,20 ac | 5,00 ac |
|             |                | 1,75         | 1,20 - 1,50 | 1,80 - 2,30 | ac      | 2,70 ac | 3,20 ac | 4,20 ac | 5,00 ac |
|             |                | 2,00         | 1,20 - 1,50 | 1,80 - 2,30 | ac      | 2,70 ac | 3,20 ac | 4,20 ac | 5,00 ac |
|             | $N_{R,k}$ [kN] | 0,50         | 0,60 ac     | 0,80 ac     | 0,90 ac | 1,10 ac | 1,30 ac | 1,50 ac | 1,57 ac |
|             |                | 0,55         | 0,60 ac     | 0,80 ac     | 0,90 ac | 1,10 ac | 1,30 ac | 1,50 ac | 1,90 ac |
|             |                | 0,63         | 0,60 ac     | 0,80 ac     | 0,90 ac | 1,10 ac | 1,30 ac | 1,50 ac | 1,90 ac |
|             |                | 0,75         | 0,60 ac     | 0,80 ac     | 0,90 ac | 1,10 ac | 1,30 ac | 1,50 ac | 1,90 ac |
|             |                | 0,88         | 0,60 ac     | 0,80 ac     | 0,90 ac | 1,10 ac | 1,30 ac | 1,50 ac | 1,90 ac |
|             |                | 1,00         | 0,60 ac     | 0,80 ac     | 0,90 ac | 1,10 ac | 1,30 ac | 1,50 ac | 1,90 ac |
|             |                | 1,13         | 0,60 ac     | 0,80 ac     | 0,90 ac | 1,10 ac | 1,30 ac | 1,50 ac | 1,90 ac |
|             |                | 1,25         | 0,60 ac     | 0,80 ac     | 0,90 ac | 1,10 ac | 1,30 ac | 1,50 ac | 1,90 ac |
|             |                | 1,50         | 0,60 ac     | 0,80 ac     | 0,90 ac | 1,10 ac | 1,30 ac | 1,50 ac | 1,90 ac |
|             |                | 1,75         | 0,60 ac     | 0,80 ac     | 0,90 ac | 1,10 ac | 1,30 ac | 1,50 ac | 1,90 ac |
|             |                | 2,00         | 0,60 ac     | 0,80 ac     | 0,90 ac | 1,10 ac | 1,30 ac | 1,50 ac | 1,90 ac |
|             |                | $N_{R,k,II}$ | 0,60 ac     | 0,80 ac     | 0,90 ac | 1,10 ac | 1,30 ac | 1,50 ac | 1,90 ac |

#### Self-drilling screw

ZEBRA Pias Ø 6,3 x L, ZEBRA Pias plus Ø 6,3 x L  
with hexagon head sealing washer  $\geq \text{Ø}16$  mm

#### Annex 25

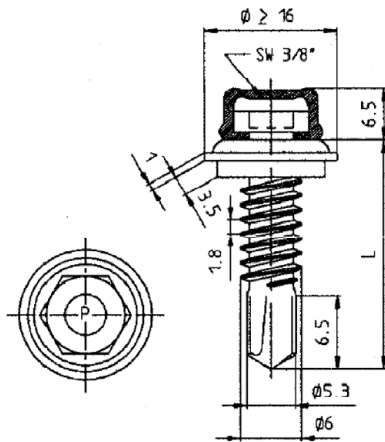
|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Carbon steel; case hardened and galvanized<br/>Washer: steel, zinc coated and with vulcanized EPDM</p> <p>Component I: S280GD to S550GD - EN 10346<br/>Component II: S235 to S355 - EN 10025-1<br/>S280GD to S550GD - EN 10346<br/>HX300LAD to HX460LAD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 6.00</math> mm</p> <p><b>Timber substructures</b><br/>no performance determined</p> |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|             |                       | Component II        |         |         |         |        |
|-------------|-----------------------|---------------------|---------|---------|---------|--------|
|             |                       | t II [mm]           |         |         |         |        |
|             |                       | 2,50                | 3,00    | 4,00    | 5,00    |        |
| Component I | V <sub>R,k</sub> [kN] | 0,63                | 2,90 ac | 2,90 ac | 2,90 ac | 2,90 a |
|             |                       | 0,75                | 3,25 ac | 3,30 ac | 3,40 ac | 3,40 a |
|             |                       | 0,88                | 3,65 ac | 3,80 ac | 4,00 ac | 4,00 a |
|             |                       | 1,00                | 4,05 ac | 4,20 ac | 4,50 a  | 4,50 a |
|             |                       | 1,13                | 4,40 -  | 4,60 -  | 5,00    | - -    |
|             |                       | 1,25                | 4,90 -  | 5,20 -  | 5,60    | - -    |
|             |                       | 1,50                | 5,40 -  | 5,80 -  | 6,60    | - -    |
|             |                       | 1,75                | 5,40 -  | 5,80 -  | 6,60    | - -    |
|             |                       | 2,00                | 5,40 -  | 5,80 -  | 6,60    | -      |
|             | N <sub>R,k</sub> [kN] | 0,50                | 1,57 ac | 1,57 ac | 1,57 ac | 1,57 a |
|             |                       | 0,55                | 1,98 ac | 1,98 ac | 1,98 ac | 1,98 a |
|             |                       | 0,63                | 2,90 ac | 2,90 ac | 2,90 ac | 2,90 a |
|             |                       | 0,75                | 3,15 ac | 3,60 ac | 3,60 ac | 3,60 a |
|             |                       | 0,88                | 3,55 ac | 4,40 ac | 4,40 ac | 4,40 a |
|             |                       | 1,00                | 3,65 ac | 4,60 ac | 5,10 a  | 5,10 a |
|             |                       | 1,13                | 3,65 -  | 4,60 -  | 5,80    | - -    |
|             |                       | 1,25                | 3,65 -  | 4,60 -  | 6,60 -  | - -    |
|             |                       | 1,50                | 3,65 -  | 4,60 -  | 6,60 -  | - -    |
|             |                       | 1,75                | 3,65 -  | 4,60 -  | 6,60 -  | - -    |
|             |                       | 2,00                | 3,65 -  | 4,60 -  | 6,60 -  | - -    |
|             |                       | N <sub>R,k,II</sub> | 3,65 -  | 4,60 -  | 6,60 -  | -      |

**Self-drilling screw**

ZEBRA Pias Ø 6,3 x L, ZEBRA Pias plus Ø 6,3 x L  
with hexagon head sealing washer  $\geq \phi 16$  mm

**Annex 26**



#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: Stainless steel A2 or A4 – EN ISO 3506  
with vulcanized EPDM

Component I: S280GD to S320GD - EN 10346

Component II: S235 – EN 10025-1  
S280GD to S320GD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 5.00$  mm

#### Timber substructures

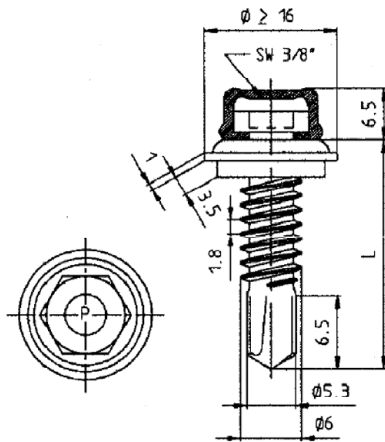
no performance determined

|             |                       | Component II        |         |         |         |         |         |         |         |         |
|-------------|-----------------------|---------------------|---------|---------|---------|---------|---------|---------|---------|---------|
|             |                       | t II [mm]           |         |         |         |         |         |         |         |         |
|             |                       | 0,63                | 0,75    | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |         |
| Component I | V <sub>R,k</sub> [kN] | 0,63                | 0,60 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,40 ac | 1,60 ac | 2,10 ac | 2,60 ac |
|             |                       | 0,75                | 0,70 ac | 1,00 ac | 1,30 ac | 1,50 ac | 1,80 ac | 1,90 ac | 2,40 ac | 2,80 ac |
|             |                       | 0,88                | 0,90 ac | 1,20 ac | 1,50 ac | 1,80 ac | 2,20 ac | 2,30 ac | 2,70 ac | 3,10 ac |
|             |                       | 1,00                | 1,00 ac | 1,30 ac | 1,70 -  | 2,00 -  | 2,40 -  | 2,60 -  | 3,00 ac | 3,40 ac |
|             |                       | 1,13                | 1,20 ac | 1,50 -  | 1,90 -  | 2,30 -  | 2,60 -  | 2,90 -  | 3,20 -  | 3,60 -  |
|             |                       | 1,25                | 1,30 -  | 1,60 -  | 2,00 -  | 2,40 -  | 2,70 -  | 2,90 -  | 3,40 -  | 3,80 -  |
|             |                       | 1,50                | 1,60 -  | 1,90 -  | 2,20 -  | 2,50 -  | 2,80 -  | 3,00 -  | 3,60 -  | 4,30 -  |
|             |                       | 1,75                | 1,60 -  | 1,90 -  | 2,20 -  | 2,50 -  | 2,80 -  | 3,00 -  | 3,60 -  | 4,30 -  |
|             |                       | 2,00                | 1,60 -  | 1,90 -  | 2,20 -  | 2,50 -  | 2,80 -  | 3,00 -  | 3,60 -  | 4,30    |
|             | N <sub>R,k</sub> [kN] | 0,50                | 0,50 ac | 0,60 ac | 0,80 ac | 0,90 ac | 1,03 ac | 1,03 ac | 1,03 ac | 1,03 ac |
|             |                       | 0,55                | 0,50 ac | 0,60 ac | 0,80 ac | 0,90 ac | 1,10 ac | 1,30 ac | 1,30 ac | 1,30 ac |
|             |                       | 0,63                | 0,50 ac | 0,60 ac | 0,80 ac | 0,90 ac | 1,10 ac | 1,30 ac | 1,60 ac | 1,90 ac |
|             |                       | 0,75                | 0,50 ac | 0,60 ac | 0,80 ac | 0,90 ac | 1,10 ac | 1,30 ac | 1,60 ac | 2,40 ac |
|             |                       | 0,88                | 0,50 ac | 0,60 ac | 0,80 ac | 0,90 ac | 1,10 ac | 1,30 ac | 1,60 ac | 2,40 ac |
|             |                       | 1,00                | 0,50 ac | 0,60 ac | 0,80 -  | 0,90 -  | 1,10 -  | 1,30 -  | 1,60 ac | 2,40 ac |
|             |                       | 1,13                | 0,50 ac | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,30 -  | 1,60 -  | 2,40 -  |
|             |                       | 1,25                | 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,30 -  | 1,60 -  | 2,40 -  |
|             |                       | 1,50                | 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,30 -  | 1,60 -  | 2,40 -  |
|             |                       | 1,75                | 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,30 -  | 1,60 -  | 2,40 -  |
|             |                       | 2,00                | 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,30 -  | 1,60 -  | 2,40 -  |
|             |                       | N <sub>R,k,II</sub> | 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,30 -  | 1,60 -  | 2,40 -  |

#### Self-drilling screw

ZEBRA Pias Ø 6,0 x L, ZEBRA Pias plus Ø 6,0 x L  
with stainless steel protection cap and sealing washer  $\geq \text{Ø}16$  mm

#### Annex 27



#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: Stainless steel A2 or A4 – EN ISO 3506  
with vulcanized EPDM

Component I: S280GD to S320GD - EN 10346

Component II: S235 – EN 10025-1  
S280GD to S320GD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 5.00$  mm

#### Timber substructures

no performance determined

|                         |                | Component II |           |         |
|-------------------------|----------------|--------------|-----------|---------|
|                         |                | t II [mm]    |           |         |
|                         |                | 2,50         | 3,00      | 4,00    |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] |              |           |         |
|                         | 0,63           | 2,65 ac      | 2,70 abcd | 2,80 ac |
|                         | 0,75           | 2,95 ac      | 3,10 ac   | 3,40 a  |
|                         | 0,88           | 3,35 ac      | 3,60 ac   | 4,10 a  |
|                         | 1,00           | 3,70 ac      | 4,00 ac   | 4,60 a  |
|                         | 1,13           | 4,00 -       | 4,40 a    | 5,30 a  |
|                         | 1,25           | 4,30 -       | 4,80 -    | - -     |
|                         | 1,50           | 5,00 -       | 5,70 -    | - -     |
|                         | 1,75           | 5,00 -       | 5,70 -    | - -     |
|                         | 2,00           | 5,00 -       | 5,70 -    | - -     |
|                         | $N_{R,k}$ [kN] |              |           |         |
|                         | 0,50           | 1,03 ac      | 1,03 abcd | 1,03 ac |
|                         | 0,55           | 1,30 ac      | 1,30 abcd | 1,30 ac |
|                         | 0,63           | 1,90 ac      | 1,90 abcd | 1,90 ac |
|                         | 0,75           | 2,50 ac      | 2,60 ac   | 2,60 a  |
|                         | 0,88           | 3,00 ac      | 3,60 ac   | 3,60 a  |
|                         | 1,00           | 3,40 ac      | 4,40 ac   | 4,40 a  |
|                         | 1,13           | 3,40 -       | 4,40 a    | 5,80 a  |
|                         | 1,25           | 3,40 -       | 4,40 -    | - -     |
|                         | 1,50           | 3,40 -       | 4,40 -    | - -     |
|                         | 1,75           | 3,40 -       | 4,40 -    | - -     |
|                         | 2,00           | 3,40 -       | 4,40 -    | - -     |
| $N_{R,k,II}$            |                | 3,40 -       | 4,40 -    | 5,80 -  |

#### Self-drilling screw

ZEBRA Pias Ø 6,0 x L, ZEBRA Pias plus Ø 6,0 x L  
with stainless steel protection cap and sealing washer  $\geq \text{Ø} 16$  mm

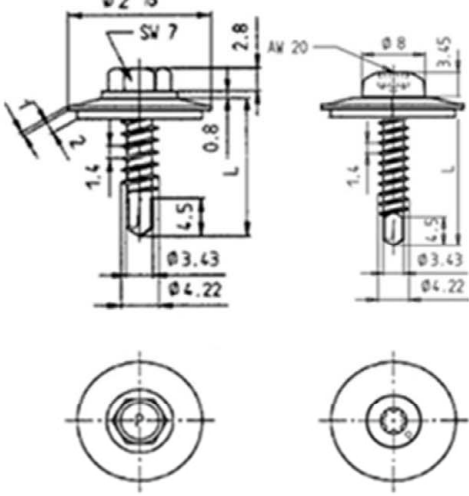
#### Annex 28

|  |                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><u>Materials</u></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: None</p> <p>Component I: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p>Component II: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> |
|  | <p><u>Drilling-capacity</u> <math>\Sigma(t_i) \leq 4.50 \text{ mm}</math></p>                                                                                                                                                                                                                                                                                                                                           |
|  | <p><u>Timber substructures</u></p> <p>no performance determined</p>                                                                                                                                                                                                                                                                                                                                                     |

|                                                                                                                                     |              |        |        |        |
|-------------------------------------------------------------------------------------------------------------------------------------|--------------|--------|--------|--------|
| <div>Component I, t I [mm]<br/>Aluminum alloy with<br/><math>R_m \geq 165 \text{ N/mm}^2</math><br/><math>V_{R,k}</math> [kN]</div> | 0,50         | 0,84 - | 0,84 - | 0,84 - |
|                                                                                                                                     | 0,80         | 1,91 - | 1,91 - | 1,91 - |
|                                                                                                                                     | 1,00         | 2,04 - | 2,04 - | 2,04 - |
|                                                                                                                                     | 1,20         | 2,26 - | 2,26 - | 2,26 - |
|                                                                                                                                     | 1,50         | 2,58 - | 2,58 - | 2,58 - |
|                                                                                                                                     | $N_{R,k,II}$ | 1,26   | 1,77   | 2,28   |

|                                                                                                                                     |              |        |        |        |
|-------------------------------------------------------------------------------------------------------------------------------------|--------------|--------|--------|--------|
| <div>Component I, t I [mm]<br/>Aluminum alloy with<br/><math>R_m \geq 215 \text{ N/mm}^2</math><br/><math>V_{R,k}</math> [kN]</div> | 0,50         | 1,09 - | 1,09 - | 1,09 - |
|                                                                                                                                     | 0,80         | 2,49 - | 2,49 - | 2,49 - |
|                                                                                                                                     | 1,00         | 2,66 - | 2,66 - | 2,66 - |
|                                                                                                                                     | 1,20         | 2,93 - | 2,93 - | 2,93 - |
|                                                                                                                                     | 1,50         | 3,34 - | 3,34 - | 3,34 - |
|                                                                                                                                     | $N_{R,k,II}$ | 1,65   | 2,32   | 2,99   |

|                                                                                        |                 |
|----------------------------------------------------------------------------------------|-----------------|
| <b>Self-drilling screw</b>                                                             | <b>Annex 29</b> |
| ZEBRA Pias A2 Ø 4,2 x L, ZEBRA Pias A2 plus Ø 4,2 x L<br>with hexagon head or pan head |                 |

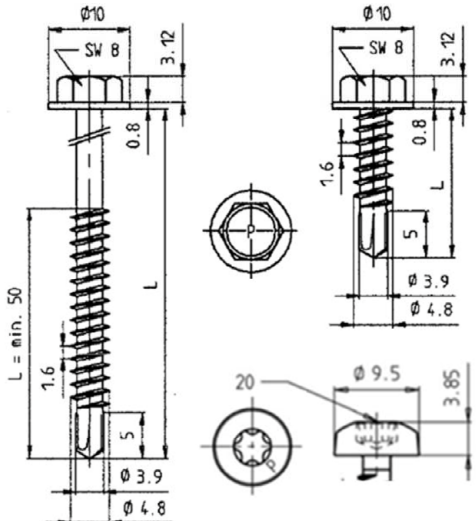
|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><u>Materials</u></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM</p> <p>Component I: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p>Component II: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p><u>Drilling-capacity</u> <math>\Sigma(t_i) \leq 4.50 \text{ mm}</math></p> <p><u>Timber substructures</u><br/>no performance determined</p> |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                              |              | Component II, Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$ |        |        |  |
|----------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------|--------|--------|--|
|                                                                                              |              | t II [mm]                                                       |        |        |  |
|                                                                                              |              | 2,00                                                            | 2,50   | 3,00   |  |
| Component I, t I [mm]<br>Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,50         | 0,84 -                                                          | 0,84 - | 0,84 - |  |
|                                                                                              | 0,80         | 1,91 -                                                          | 1,91 - | 1,91 - |  |
|                                                                                              | 1,00         | 2,04 -                                                          | 2,04 - | 2,04 - |  |
|                                                                                              | 1,20         | 2,26 -                                                          | 2,26 - | 2,26 - |  |
|                                                                                              | 1,50         | 2,58 -                                                          | 2,58 - | 2,58 - |  |
|                                                                                              | $N_{R,k,II}$ | 1,26                                                            | 1,77   | 2,28   |  |

|                                                                                              |              | Component II, Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$ |        |        |  |
|----------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------|--------|--------|--|
|                                                                                              |              | t II [mm]                                                       |        |        |  |
|                                                                                              |              | 2,00                                                            | 2,50   | 3,00   |  |
| Component I, t I [mm]<br>Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,50         | 1,09 -                                                          | 1,09 - | 1,09 - |  |
|                                                                                              | 0,80         | 2,49 -                                                          | 2,49 - | 2,49 - |  |
|                                                                                              | 1,00         | 2,66 -                                                          | 2,66 - | 2,66 - |  |
|                                                                                              | 1,20         | 2,93 -                                                          | 2,93 - | 2,93 - |  |
|                                                                                              | 1,50         | 3,34 -                                                          | 3,34 - | 3,34 - |  |
|                                                                                              | $N_{R,k,II}$ | 1,65                                                            | 2,32   | 2,99   |  |

|                                                                                                                    |          |
|--------------------------------------------------------------------------------------------------------------------|----------|
| Self-drilling screw                                                                                                | Annex 30 |
| ZEBRA Pias A2 Ø 4,2 x L, ZEBRA Pias A2 plus Ø 4,2 x L<br>with hexagon head or pan head and sealing washer ≥ Ø16 mm |          |

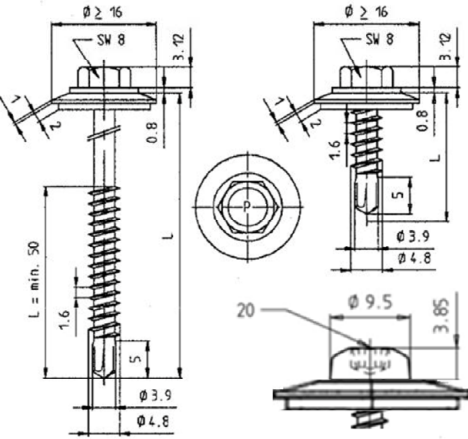


|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506</p> <p>Washer: None</p> <p>Component I: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p>Component II: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> |
|                                                                                   | <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 4.50 \text{ mm}</math></p>                                                                                                                                                                                                                                                                                                                                              |
|                                                                                   | <p><b>Timber substructures</b></p> <p>no performance determined</p>                                                                                                                                                                                                                                                                                                                                                        |

|                                                                                                                                     |              |      |   |      |   |      |   |
|-------------------------------------------------------------------------------------------------------------------------------------|--------------|------|---|------|---|------|---|
| <div>Component I, t I [mm]<br/>Aluminum alloy with<br/><math>R_m \geq 165 \text{ N/mm}^2</math><br/><math>V_{R,k}</math> [kN]</div> | 0,50         | 0,78 | - | 0,78 | - | 0,78 | - |
|                                                                                                                                     | 0,80         | 1,70 | - | 1,70 | - | 1,70 | - |
|                                                                                                                                     | 1,00         | 1,71 | - | 1,71 | - | 1,71 | - |
|                                                                                                                                     | 1,20         | 1,95 | - | 1,95 | - | 1,95 | - |
|                                                                                                                                     | 1,50         | 2,31 | - | 2,73 | - | 3,14 | - |
|                                                                                                                                     | $N_{R,k,II}$ | 1,06 |   | 1,58 |   | 2,09 |   |

|                                                                                                                                     |              |      |   |      |   |      |   |
|-------------------------------------------------------------------------------------------------------------------------------------|--------------|------|---|------|---|------|---|
| <div>Component I, t I [mm]<br/>Aluminum alloy with<br/><math>R_m \geq 215 \text{ N/mm}^2</math><br/><math>V_{R,k}</math> [kN]</div> | 0,50         | 1,02 | - | 1,02 | - | 1,02 | - |
|                                                                                                                                     | 0,80         | 2,22 | - | 2,22 | - | 2,22 | - |
|                                                                                                                                     | 1,00         | 2,23 | - | 2,23 | - | 2,23 | - |
|                                                                                                                                     | 1,20         | 2,53 | - | 2,53 | - | 2,53 | - |
|                                                                                                                                     | 1,50         | 2,99 | - | 3,53 | - | 4,07 | - |
|                                                                                                                                     | $N_{R,k,II}$ | 1,39 |   | 2,07 |   | 2,74 |   |

|                                                                                        |                 |
|----------------------------------------------------------------------------------------|-----------------|
| <b>Self-drilling screw</b>                                                             | <b>Annex 31</b> |
| ZEBRA Pias A2 Ø 4,8 x L, ZEBRA Pias A2 plus Ø 4,8 x L<br>with hexagon head or pan head |                 |

|                                                                                   |                                                                                                                                                                                                                                                             |  |  |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|
|  | <u>Materials</u>                                                                                                                                                                                                                                            |  |  |
|                                                                                   | Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM                                                                                                                             |  |  |
|                                                                                   | Component I: Aluminum alloy<br>with $R_m \geq 165 \text{ N/mm}^2$ – EN 573<br>with $R_m \geq 215 \text{ N/mm}^2$ – EN 573<br><br>Component II: Aluminum alloy<br>with $R_m \geq 165 \text{ N/mm}^2$ – EN 573<br>with $R_m \geq 215 \text{ N/mm}^2$ – EN 573 |  |  |
| <u>Drilling-capacity</u> $\Sigma(t_i) \leq 4.50 \text{ mm}$                       |                                                                                                                                                                                                                                                             |  |  |
| <u>Timber substructures</u><br>no performance determined                          |                                                                                                                                                                                                                                                             |  |  |

|                                                                                                   |              |      |   |      |   |      |   |
|---------------------------------------------------------------------------------------------------|--------------|------|---|------|---|------|---|
| Component I, t I [mm]<br>, Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,50         | 0,78 | - | 0,78 | - | 0,78 | - |
|                                                                                                   | 0,80         | 1,70 | - | 1,70 | - | 1,70 | - |
|                                                                                                   | 1,00         | 1,71 | - | 1,71 | - | 1,71 | - |
|                                                                                                   | 1,20         | 1,95 | - | 1,95 | - | 1,95 | - |
|                                                                                                   | 1,50         | 2,31 | - | 2,73 | - | 3,14 | - |
|                                                                                                   | $N_{R,k,II}$ | 1,06 |   | 1,58 |   | 2,09 |   |

|                                                                                                   |              |      |   |      |   |      |   |
|---------------------------------------------------------------------------------------------------|--------------|------|---|------|---|------|---|
| Component I, t I [mm]<br>, Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,50         | 1,02 | - | 1,02 | - | 1,02 | - |
|                                                                                                   | 0,80         | 2,22 | - | 2,22 | - | 2,22 | - |
|                                                                                                   | 1,00         | 2,23 | - | 2,23 | - | 2,23 | - |
|                                                                                                   | 1,20         | 2,53 | - | 2,53 | - | 2,53 | - |
|                                                                                                   | 1,50         | 2,99 | - | 3,53 | - | 4,07 | - |
|                                                                                                   | $N_{R,k,II}$ | 1,39 |   | 2,07 |   | 2,74 |   |

|                                                                                                                                        |  |          |
|----------------------------------------------------------------------------------------------------------------------------------------|--|----------|
| Self-drilling screw                                                                                                                    |  | Annex 32 |
| ZEBRA Pias A2 Ø 4,8 x L, ZEBRA Pias A2 plus Ø 4,8 x L<br>with hexagon head or pan head and sealing washer $\geq \text{Ø}16 \text{ mm}$ |  |          |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: None</p> <p>Component I: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p>Component II: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 6.00 \text{ mm}</math></p> <p><b>Timber substructures</b><br/>no performance determined</p> |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                 |              | Component II, Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|--------------------------------------------------------------------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                                                          |        |        |        |
|                                                                                                 |              | 2,00                                                               | 2,50   | 3,00   | 4,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,50         | 0,67 -                                                             | 0,67 - | 0,67 - | 0,67 - |
|                                                                                                 | 0,80         | 1,55 -                                                             | 1,55 - | 1,55 - | 1,55 - |
|                                                                                                 | 1,00         | 2,01 -                                                             | 2,01 - | 2,01 - | 2,01 - |
|                                                                                                 | 1,20         | 2,21 -                                                             | 2,21 - | 2,21 - | 2,21 - |
|                                                                                                 | 1,50         | 2,50 -                                                             | 3,04 - | 3,58 - | 3,58 - |
|                                                                                                 | 2,00         | 2,50 -                                                             | 3,04 - | 3,58 - | 3,58 - |
|                                                                                                 | $N_{R,k,II}$ | 1,32                                                               | 1,94   | 2,55   | 4,39   |

|                                                                                                 |              | Component II, Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|--------------------------------------------------------------------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                                                          |        |        |        |
|                                                                                                 |              | 2,00                                                               | 2,50   | 3,00   | 4,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,50         | 0,88 -                                                             | 0,88 - | 0,88 - | 0,88 - |
|                                                                                                 | 0,80         | 2,02 -                                                             | 2,02 - | 2,02 - | 2,02 - |
|                                                                                                 | 1,00         | 2,62 -                                                             | 2,62 - | 2,62 - | 2,62 - |
|                                                                                                 | 1,20         | 2,87 -                                                             | 2,87 - | 2,87 - | 2,87 - |
|                                                                                                 | 1,50         | 3,24 -                                                             | 3,95 - | 4,65 - | 4,65 - |
|                                                                                                 | 2,00         | 3,24 -                                                             | 3,95 - | 4,65 - | 4,65 - |
|                                                                                                 | $N_{R,k,II}$ | 1,72                                                               | 2,54   | 3,35   | 5,26   |

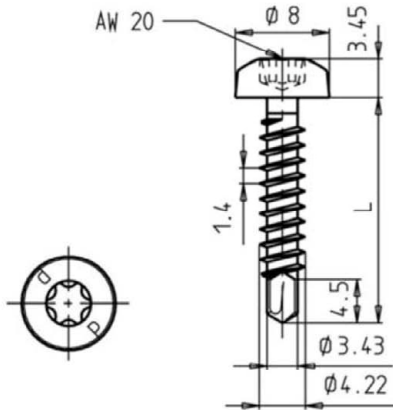
|                                                                            |  |          |
|----------------------------------------------------------------------------|--|----------|
|                                                                            |  |          |
| Self-drilling screw                                                        |  | Annex 33 |
| ZEBRA Pias A2 Ø 6,3 x L, ZEBRA Pias A2 plus Ø 6,3 x L<br>with hexagon head |  |          |

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: Stainless steel A2, A4 or A5 – EN ISO 35063506 with vulcanized EPDM</p> <p>Component I: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p>Component II: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 6.00 \text{ mm}</math></p> <p><b>Timber substructures</b><br/>no performance determined</p> |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                        |              | Component II, Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ |        |        |        |
|----------------------------------------------------------------------------------------|--------------|--------------------------------------------------------------------|--------|--------|--------|
|                                                                                        |              | $t_{II} [\text{mm}]$                                               |        |        |        |
|                                                                                        |              | 2,00                                                               | 2,50   | 3,00   | 4,00   |
| Component I, $t_I [\text{mm}]$<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ | 0,50         | 0,67 -                                                             | 0,67 - | 0,67 - | 0,67 - |
|                                                                                        | 0,80         | 1,55 -                                                             | 1,55 - | 1,55 - | 1,55 - |
|                                                                                        | 1,00         | 2,01 -                                                             | 2,01 - | 2,01 - | 2,01 - |
|                                                                                        | 1,20         | 2,21 -                                                             | 2,21 - | 2,21 - | 2,21 - |
|                                                                                        | 1,50         | 2,50 -                                                             | 3,04 - | 3,58 - | 3,58 - |
|                                                                                        | 2,00         | 2,50 -                                                             | 3,04 - | 3,58 - | 3,58 - |
|                                                                                        | $N_{R,k,II}$ | 1,32                                                               | 1,94   | 2,55   | 4,39   |

|                                                                                        |              | Component II, Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ |        |        |        |
|----------------------------------------------------------------------------------------|--------------|--------------------------------------------------------------------|--------|--------|--------|
|                                                                                        |              | $t_{II} [\text{mm}]$                                               |        |        |        |
|                                                                                        |              | 2,00                                                               | 2,50   | 3,00   | 4,00   |
| Component I, $t_I [\text{mm}]$<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ | 0,50         | 0,88 -                                                             | 0,88 - | 0,88 - | 0,88 - |
|                                                                                        | 0,80         | 2,02 -                                                             | 2,02 - | 2,02 - | 2,02 - |
|                                                                                        | 1,00         | 2,62 -                                                             | 2,62 - | 2,62 - | 2,62 - |
|                                                                                        | 1,20         | 2,87 -                                                             | 2,87 - | 2,87 - | 2,87 - |
|                                                                                        | 1,50         | 3,24 -                                                             | 3,95 - | 4,65 - | 4,65 - |
|                                                                                        | 2,00         | 3,24 -                                                             | 3,95 - | 4,65 - | 4,65 - |
|                                                                                        | $N_{R,k,II}$ | 1,72                                                               | 2,54   | 3,35   | 5,26   |

|                                                                                                                                                                              |  |                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------|
| <p><b>Self-drilling screw</b></p> <p>ZEBRA Pias A2 Ø 6,3 x L, ZEBRA Pias A2 plus Ø 6,3 x L<br/>with hexagon head and sealing washer <math>\geq \phi 16 \text{ mm}</math></p> |  | <p><b>Annex 34</b></p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------|



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 3.00$  mm

#### Timber substructures

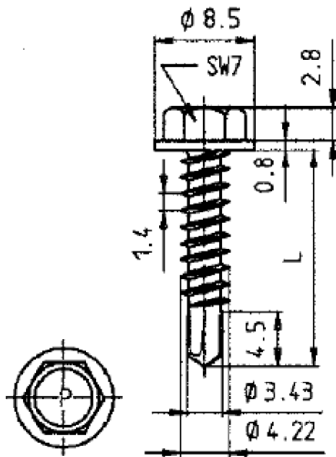
no performance determined

|                         |                | Component II |        |        |        |        |        |         |         |         |         |
|-------------------------|----------------|--------------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                         |                | t II [mm]    |        |        |        |        |        |         |         |         |         |
|                         |                | 0,50         | 0,55   | 0,63   | 0,75   | 0,88   | 1,00   | 1,13    | 1,25    | 1,50    | 2,00    |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] | 0,50         | 0,78 - | 0,78 - | 0,78 - | 0,78 - | 0,98 - | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 ac |
|                         |                | 0,55         | 0,78 - | 0,90 - | 0,90 - | 0,90 - | 1,04 - | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 ac |
|                         |                | 0,63         | 0,78 - | 0,90 - | 1,08 - | 1,08 - | 1,13 - | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 a  |
|                         |                | 0,75         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,37 - | 1,37 ac | 1,37 ac | 1,37 ac | 1,37 a  |
|                         |                | 0,88         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,88 - | 1,88 ac | 1,88 ac | 1,88 ac | 2,09 a  |
|                         |                | 1,00         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,88 - | 2,38 ac | 2,38 ac | 2,38 a  | 2,80 -  |
|                         |                | 1,13         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,88 - | 2,38 -  | 2,38 -  | 2,38 -  | 2,80 -  |
|                         |                | 1,25         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,88 - | 2,38 -  | 2,38 -  | 2,38 -  | 2,80 -  |
|                         |                | 1,50         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,88 - | 2,38 -  | 2,38 -  | 2,38 -  | 2,80 -  |
|                         |                | 1,75         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,88 - | 2,38 -  | 2,38 -  | 2,38 -  | 2,80 -  |
|                         |                | 2,00         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,88 - | 2,38 -  | 2,38 -  | 2,38 -  | 2,80 -  |
|                         | $N_{R,k}$ [kN] | 0,50         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 - | 1,02 ac | 1,02 ac | 1,02 ac | 1,02 ac |
|                         |                | 0,55         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 - | 1,08 ac | 1,12 ac | 1,12 ac | 1,12 ac |
|                         |                | 0,63         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 - | 1,08 ac | 1,28 ac | 1,29 ac | 1,29 a  |
|                         |                | 0,75         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 - | 1,08 ac | 1,28 ac | 1,49 ac | 1,85 ac |
|                         |                | 0,88         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 - | 1,08 ac | 1,28 ac | 1,49 ac | 1,89 a  |
|                         |                | 1,00         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 - | 1,08 ac | 1,28 ac | 1,49 a  | 1,89 -  |
|                         |                | 1,13         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 - | 1,08 -  | 1,28 -  | 1,49 -  | 1,89 -  |
|                         |                | 1,25         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 - | 1,08 -  | 1,28 -  | 1,49 -  | 1,89 -  |
|                         |                | 1,50         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 - | 1,08 -  | 1,28 -  | 1,49 -  | 1,89 -  |
|                         |                | 1,75         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 - | 1,08 -  | 1,28 -  | 1,49 -  | 1,89 -  |
|                         |                | 2,00         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 - | 1,08 -  | 1,28 -  | 1,49 -  | 1,89 -  |
|                         | $N_{R,k,II}$   | 0,29 -       | 0,33 - | 0,40 - | 0,68 - | 0,96 - | 1,08 - | 1,28 -  | 1,49 -  | 1,89 -  | 2,77 -  |

#### Self-drilling screw

ZEBRA Piasta Ø 4,2 x L, ZEBRA Piasta plus Ø 4,2 x L  
with pan head with AW or RW drive

#### Annex 35



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 3.00$  mm

#### Timber substructures

no performance determined

|                         |                | Component II |        |        |        |        |         |         |         |         |         |
|-------------------------|----------------|--------------|--------|--------|--------|--------|---------|---------|---------|---------|---------|
|                         |                | t II [mm]    |        |        |        |        |         |         |         |         |         |
|                         |                | 0,50         | 0,55   | 0,63   | 0,75   | 0,88   | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] | 0,50         | 0,78 - | 0,78 - | 0,78 - | 0,78 - | 0,98 -  | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 ac |
|                         |                | 0,55         | 0,78 - | 0,90 - | 0,90 - | 0,90 - | 1,04 -  | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 ac |
|                         |                | 0,63         | 0,78 - | 0,90 - | 1,08 - | 1,08 - | 1,13 -  | 1,17 ac | 1,17 ac | 1,17 ac | 1,17 a  |
|                         |                | 0,75         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,37 -  | 1,37 ac | 1,37 ac | 1,37 ac | 1,37 a  |
|                         |                | 0,88         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,88 -  | 1,88 ac | 1,88 ac | 1,88 ac | 2,09 a  |
|                         |                | 1,00         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,88 -  | 2,38 ac | 2,38 ac | 2,38 a  | 2,80 -  |
|                         |                | 1,13         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,88 -  | 2,38 -  | 2,38 -  | 2,38 -  | 2,80 -  |
|                         |                | 1,25         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,88 -  | 2,38 -  | 2,38 -  | 2,38 -  | 2,80 -  |
|                         |                | 1,50         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,88 -  | 2,38 -  | 2,38 -  | 2,38 -  | 2,80 -  |
|                         |                | 1,75         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,88 -  | 2,38 -  | 2,38 -  | 2,38 -  | -       |
|                         |                | 2,00         | 0,78 - | 0,90 - | 1,08 - | 1,37 - | 1,88 -  | 2,38 -  | -       | -       | -       |
|                         | $N_{R,k}$ [kN] | 0,50         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,92 ac | 0,92 ac | 0,92 ac | 0,92 ac | 0,92 ac |
|                         |                | 0,55         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 -  | 1,08 ac | 1,16 ac | 1,16 ac | 1,16 ac |
|                         |                | 0,63         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 -  | 1,08 ac | 1,28 ac | 1,49 ac | 1,70 a  |
|                         |                | 0,75         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 -  | 1,08 ac | 1,28 ac | 1,49 ac | 1,89 ac |
|                         |                | 0,88         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 -  | 1,08 ac | 1,28 ac | 1,49 ac | 1,89 a  |
|                         |                | 1,00         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 -  | 1,08 ac | 1,28 ac | 1,49 a  | 1,89 -  |
|                         |                | 1,13         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 -  | 1,08 -  | 1,28 -  | 1,49 -  | 1,89 -  |
|                         |                | 1,25         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 -  | 1,08 -  | 1,28 -  | 1,49 -  | 1,89 -  |
|                         |                | 1,50         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 -  | 1,08 -  | 1,28 -  | 1,49 -  | 1,89 -  |
|                         |                | 1,75         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 -  | 1,08 -  | 1,28 -  | 1,49 -  | -       |
|                         |                | 2,00         | 0,29 - | 0,33 - | 0,40 - | 0,68 - | 0,96 -  | 1,08 -  | -       | -       | -       |
|                         | $N_{R,k,II}$   | 0,29 -       | 0,33 - | 0,40 - | 0,68 - | 0,96 - | 1,08 -  | 1,28 -  | 1,49 -  | 1,89 -  | 2,40 -  |

#### Self-drilling screw

ZEBRA Piasta Ø 4,2 x L, ZEBRA Piasta plus Ø 4,2 x L  
with hexagon head

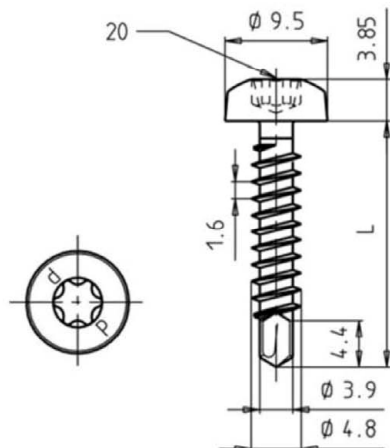
Annex 36

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM</p> <p>Component I: S280GD to S550GD - EN 10346<br/>Component II: S235 to S355 - EN 10025-1<br/>S280GD to S550GD - EN 10346<br/>HX300LAD to HX460LAD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 3.00</math> mm</p> <p><b>Timber substructures</b><br/>no performance determined</p> |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                | Component II |         |         |         |         |         |         |         |         |         |         |
|-------------------------|----------------|--------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                         |                | t II [mm]    |         |         |         |         |         |         |         |         |         |         |
|                         |                | 0,40         | 0,50    | 0,55    | 0,63    | 0,75    | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] | 0,40         | 0,55 ac | 0,55 ac | 0,55 ac | 0,55 ac | 0,55 ac | 0,55 ac | 1,29 ac | 1,29 ac | 1,29 ac | 1,29 ac |
|                         |                | 0,50         | 0,55 -  | 0,70 ac | 0,70 ac | 0,70 ac | 0,70 ac | 0,70 ac | 1,29 ac | 1,29 ac | 1,29 ac | 1,29 ac |
|                         |                | 0,55         | 0,55 -  | 0,70 -  | 0,83 ac | 0,83 ac | 0,83 ac | 0,83 ac | 1,29 ac | 1,29 ac | 1,29 ac | 1,29 ac |
|                         |                | 0,63         | 0,55 -  | 0,70 -  | 0,83 -  | 1,05 -  | 1,10 ac | 1,20 ac | 1,30 ac | 1,40 ac | 1,50 ac | 1,70 ac |
|                         |                | 0,75         | 0,55 -  | 0,70 -  | 0,83 -  | 1,05 -  | 1,79 -  | 1,79 -  | 1,79 -  | 1,79 -  | 2,00 ac | 2,40 a  |
|                         |                | 0,88         | 0,55 -  | 0,70 -  | 0,83 -  | 1,05 -  | 1,79 -  | 2,23 -  | 2,23 -  | 2,23 -  | 2,23 -  | 2,90 a  |
|                         |                | 1,00         | 0,55 -  | 0,70 -  | 0,83 -  | 1,05 -  | 1,79 -  | 2,23 -  | 2,64 -  | 2,64 -  | 2,64 -  | 3,30 -  |
|                         |                | 1,13         | 0,55 -  | 0,70 -  | 0,83 -  | 1,05 -  | 1,79 -  | 2,23 -  | 2,64 -  | 2,78 -  | 2,78 -  | 3,60 -  |
|                         |                | 1,25         | 0,55 -  | 0,70 -  | 0,83 -  | 1,05 -  | 1,79 -  | 2,23 -  | 2,64 -  | 2,78 -  | 2,90 -  | 3,60 -  |
|                         |                | 1,50         | 0,55 -  | 0,70 -  | 0,83 -  | 1,10 -  | 1,79 -  | 2,23 -  | 2,64 -  | 2,78 -  | 3,10 -  | 3,60 -  |
|                         |                | 1,75         | 0,55 -  | 0,70 -  | 0,83 -  | 1,10 -  | 1,79 -  | 2,23 -  | 2,64 -  | 2,78 -  | 3,10 -  | -       |
|                         |                | 2,00         | 0,55 -  | 0,70 -  | 0,83 -  | 1,10 -  | 1,79 -  | 2,23 -  | 2,64 -  | -       | -       | -       |
|                         | $N_{R,k}$ [kN] | 0,40         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,32 ac | 1,32 ac |
|                         |                | 0,50         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,32 ac | 1,32 ac |
|                         |                | 0,55         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,40 ac | 1,64 ac |
|                         |                | 0,63         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,40 ac | 1,70 ac |
|                         |                | 0,75         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,40 -  | 1,70 ac |
|                         |                | 0,88         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,40 -  | 1,70 -  |
|                         |                | 1,00         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,40 -  | 1,70 -  |
|                         |                | 1,13         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,40 -  | 1,70 -  |
|                         |                | 1,25         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,40 -  | 1,70 -  |
|                         |                | 1,50         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,40 -  | 1,70 -  |
|                         |                | 1,75         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,40 -  | -       |
|                         |                | 2,00         | 0,25 -  | 0,36 -  | 0,41 -  | 0,50 -  | 0,60 -  | 0,80 -  | 1,00 -  | -       | -       | -       |
| $N_{R,k,II}$            |                | 0,25         | -       | 0,36    | -       | 0,41    | -       | 0,50    | -       | 0,60    | -       | 0,80    |

|                                                                                                                                                                    |  |                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------|
| <p><b>Self-drilling screw</b></p> <p>ZEBRA Piasta Ø 4,2 x L, ZEBRA Piasta plus Ø 4,2 x L<br/>with hexagon head and sealing washer <math>\geq \phi 16</math> mm</p> |  | <p><b>Annex 37</b></p> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|------------------------|





#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 4.40$  mm

#### Timber substructures

no performance determined

|                         |                | Component II |        |        |        |        |        |        |         |                      |                      |                      |
|-------------------------|----------------|--------------|--------|--------|--------|--------|--------|--------|---------|----------------------|----------------------|----------------------|
|                         |                | t II [mm]    |        |        |        |        |        |        |         |                      |                      |                      |
|                         |                | 0,40         | 0,50   | 0,55   | 0,63   | 0,75   | 0,88   | 1,00   | 1,25    | 1,50                 | 2,00                 | 3,00                 |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] | 0,40         | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 -  | 0,75 -               | 0,75 -               | 0,75 -               |
|                         |                | 0,50         | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 1,29 ac | 1,29 ac              | 1,29 ac              | 1,29 ac              |
|                         |                | 0,55         | 0,75 - | 0,75 - | 0,93 - | 0,93 - | 0,93 - | 0,93 - | 1,29 ac | 1,29 ac              | 1,29 ac              | 1,29 ac              |
|                         |                | 0,63         | 0,75 - | 0,75 - | 0,93 - | 1,23 - | 1,23 - | 1,23 - | 1,29 ac | 1,29 ac              | 1,29 ac              | 1,29 ac              |
|                         |                | 0,75         | 0,75 - | 0,75 - | 0,93 - | 1,23 - | 1,68 - | 1,68 - | 1,68 -  | 1,68 -               | 1,68 -               | 1,68 a               |
|                         |                | 0,88         | 0,75 - | 0,75 - | 0,93 - | 1,23 - | 1,68 - | 2,18 - | 2,18 -  | 2,18 -               | 2,25 -               | 2,71 a               |
|                         |                | 1,00         | 0,75 - | 0,75 - | 0,93 - | 1,23 - | 1,68 - | 2,18 - | 2,63 -  | 2,63 -               | 3,09 -               | 4,01 -               |
|                         |                | 1,25         | 0,75 - | 0,75 - | 0,93 - | 1,23 - | 1,68 - | 2,18 - | 2,63 -  | 3,23 -               | 3,23 -               | 4,73 -               |
|                         |                | 1,50         | 0,75 - | 0,75 - | 0,93 - | 1,23 - | 1,68 - | 2,18 - | 2,63 -  | 3,23 -               | 3,82 -               | 5,44 -               |
|                         |                | 1,75         | 0,75 - | 0,75 - | 0,93 - | 1,23 - | 1,68 - | 2,18 - | 2,63 -  | 3,23 -               | 3,82 -               | -                    |
|                         |                | 2,00         | 0,75 - | 0,75 - | 0,93 - | 1,23 - | 1,68 - | 2,18 - | 2,63 -  | 3,23 -               | 3,82 -               | -                    |
|                         | $N_{R,k}$ [kN] | 0,40         | 0,31 - | 0,37 - | 0,37 - | 0,37 - | 0,55 - | 0,76 - | 0,95 -  | 1,24 -               | 1,24 -               | 1,24 -               |
|                         |                | 0,50         | 0,31 - | 0,37 - | 0,37 - | 0,37 - | 0,55 - | 0,76 - | 0,95 -  | 1,24 -               | 1,24 -               | 1,24 -               |
|                         |                | 0,55         | 0,31 - | 0,37 - | 0,37 - | 0,37 - | 0,55 - | 0,76 - | 0,95 -  | 1,28 <sup>a</sup> ac | 1,28 <sup>b</sup> ac | 1,28 <sup>b</sup> ac |
|                         |                | 0,63         | 0,31 - | 0,37 - | 0,37 - | 0,37 - | 0,55 - | 0,76 - | 0,95 -  | 1,35 ac              | 1,43 <sup>b</sup> ac | 1,43 <sup>b</sup> ac |
|                         |                | 0,75         | 0,31 - | 0,37 - | 0,37 - | 0,37 - | 0,55 - | 0,76 - | 0,95 -  | 1,35 ac              | 1,89 ac              | 1,92 ac              |
|                         |                | 0,88         | 0,31 - | 0,37 - | 0,37 - | 0,37 - | 0,55 - | 0,76 - | 0,95 -  | 1,35 -               | 1,89 -               | 2,40 a               |
|                         |                | 1,00         | 0,31 - | 0,37 - | 0,37 - | 0,37 - | 0,55 - | 0,76 - | 0,95 -  | 1,35 -               | 1,89 -               | 2,70 a               |
|                         |                | 1,25         | 0,31 - | 0,37 - | 0,37 - | 0,37 - | 0,55 - | 0,76 - | 0,95 -  | 1,35 -               | 1,89 -               | 2,96 -               |
|                         |                | 1,50         | 0,31 - | 0,37 - | 0,37 - | 0,37 - | 0,55 - | 0,76 - | 0,95 -  | 1,35 -               | 1,89 -               | 2,96 -               |
|                         |                | 1,75         | 0,31 - | 0,37 - | 0,37 - | 0,37 - | 0,55 - | 0,76 - | 0,95 -  | 1,35 -               | 1,89 -               | -                    |
|                         |                | 2,00         | 0,31 - | 0,37 - | 0,37 - | 0,37 - | 0,55 - | 0,76 - | 0,95 -  | 1,35 -               | 1,89 -               | -                    |
|                         | $N_{R,k,II}$   | 0,31 -       | 0,37 - | 0,37 - | 0,37 - | 0,55 - | 0,76 - | 0,95 - | 1,35 -  | 1,89 -               | 2,96 -               | 4,03 -               |

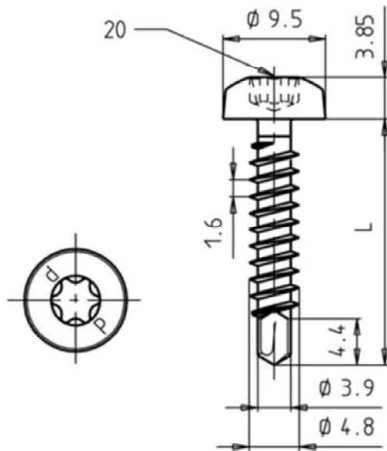
Index a: If seal washers  $\geq \varnothing 12$  mm are used  $N_{Rk}$  [kN] = 1,35 kN.

Index b: If seal washers  $\geq \varnothing 12$  mm are used  $N_{Rk}$  [kN] = 1,52 kN.

#### Self-drilling screw

ZEBRA Piasta  $\varnothing 4,8 \times L$ , ZEBRA Piasta plus  $\varnothing 4,8 \times L$   
with pan head with AW or RW drive

#### Annex 38



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: None

Component I: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 4.20 \text{ mm}$

#### Timber substructures

no performance determined

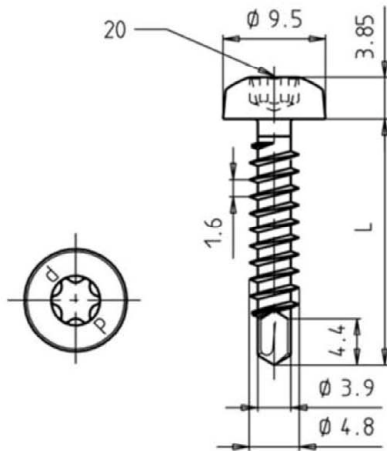
|                                                                               |                | Component II, steel sheet |        |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------|----------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                                                               |                | t II [mm]                 |        |        |        |        |        |        |        |        |
|                                                                               |                | 0,50                      | 0,63   | 0,75   | 0,88   | 1,00   | 1,25   | 1,50   | 2,00   | 3,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,70                      | 0,58 - | 0,58 - | 0,58 - | 0,58 - | 0,95 - | 1,05 - | 1,05 - | 1,05 - |
|                                                                               |                | 0,80                      | 0,77 - | 0,77 - | 0,77 - | 0,84 - | 1,06 - | 1,21 - | 1,41 - | 1,41 - |
|                                                                               |                | 0,90                      | 0,97 - | 0,97 - | 0,97 - | 1,10 - | 1,18 - | 1,37 - | 1,76 - | 1,76 - |
|                                                                               |                | 1,00                      | 0,97 - | 0,97 - | 0,97 - | 1,10 - | 1,18 - | 1,29 - | 1,50 - | 2,13 - |
|                                                                               |                | 1,20                      | 0,97 - | 0,97 - | 0,97 - | 1,10 - | 1,18 - | 1,50 - | 1,75 - | 2,24 - |
|                                                                               | $N_{R,k,II}$   |                           | 0,32   | 0,36   | 0,55   | 0,76   | 0,95   | 1,35   | 2,89   | 4,58   |

|                                                                               |                | Component II, steel sheet |        |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------|----------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                                                               |                | t II [mm]                 |        |        |        |        |        |        |        |        |
|                                                                               |                | 0,50                      | 0,63   | 0,75   | 0,88   | 1,00   | 1,25   | 1,50   | 2,00   | 3,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,70                      | 0,76 - | 0,76 - | 0,76 - | 0,76 - | 1,24 - | 1,37 - | 1,37 - | 1,37 - |
|                                                                               |                | 0,80                      | 0,99 - | 0,99 - | 0,99 - | 1,09 - | 1,13 - | 1,37 - | 1,57 - | 1,83 - |
|                                                                               |                | 0,90                      | 1,23 - | 1,23 - | 1,23 - | 1,42 - | 1,50 - | 1,50 - | 1,76 - | 2,29 - |
|                                                                               |                | 1,00                      | 1,23 - | 1,23 - | 1,23 - | 1,42 - | 1,50 - | 1,68 - | 1,95 - | 2,50 - |
|                                                                               |                | 1,20                      | 1,23 - | 1,23 - | 1,23 - | 1,42 - | 1,50 - | 1,96 - | 2,27 - | 3,74 - |
|                                                                               | $N_{R,k,II}$   |                           | 0,32   | 0,36   | 0,55   | 0,76   | 0,95   | 1,35   | 2,89   | 4,58   |

#### Self-drilling screw

ZEBRA Piasta Ø 4,8 x L, ZEBRA Piasta plus Ø 4,8 x L  
with pan head with AW or RW drive

#### Annex 39



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: None

Component I: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Component II: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Drilling-capacity  $\Sigma(t_i) \leq 5.20 \text{ mm}$

#### Timber substructures

no performance determined

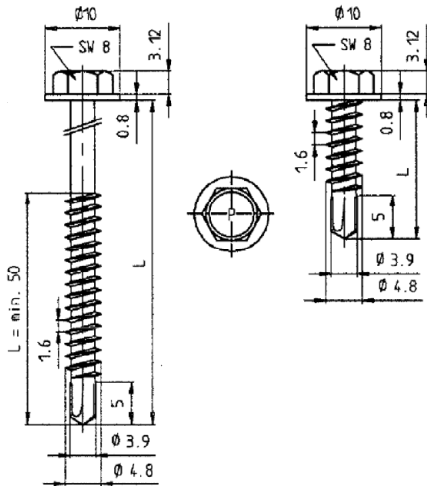
|                                                                               |                | Component II, Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$ |      |      |      |      |      |      |      |
|-------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------|------|------|------|------|------|------|------|
|                                                                               |                | t II [mm]                                                       |      |      |      |      |      |      |      |
|                                                                               |                | 0,70                                                            | 0,80 | 0,90 | 1,00 | 1,20 | 1,50 | 2,00 | 3,00 |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,70                                                            | 0,80 | 0,90 | 1,00 | 1,20 | 1,50 | 2,00 | 3,00 |
|                                                                               |                | 0,54                                                            | 0,62 | 0,71 | 0,79 | 0,95 | 0,99 | 1,06 | 1,06 |
|                                                                               |                | 0,54                                                            | 0,73 | 0,91 | 0,98 | 1,12 | 1,22 | 1,40 | 1,40 |
|                                                                               |                | 0,54                                                            | 0,83 | 1,12 | 1,18 | 1,29 | 1,46 | 1,74 | 1,74 |
|                                                                               |                | 0,54                                                            | 0,83 | 1,12 | 1,24 | 1,36 | 1,55 | 1,87 | 1,87 |
|                                                                               |                | 0,54                                                            | 0,83 | 1,12 | 1,31 | 1,50 | 1,74 | 2,13 | 2,13 |
| $N_{R,k,II}$                                                                  |                | 0,16                                                            | 0,25 | 0,35 | 0,42 | 0,56 | 0,73 | 1,07 | 3,31 |

|                                                                               |                | Component II, Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$ |      |      |      |      |      |      |      |
|-------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------|------|------|------|------|------|------|------|
|                                                                               |                | t II [mm]                                                       |      |      |      |      |      |      |      |
|                                                                               |                | 0,70                                                            | 0,80 | 0,90 | 1,00 | 1,20 | 1,50 | 2,00 | 3,00 |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,70                                                            | 0,80 | 0,90 | 1,00 | 1,20 | 1,50 | 2,00 | 3,00 |
|                                                                               |                | 0,71                                                            | 0,81 | 0,92 | 1,03 | 1,24 | 1,29 | 1,38 | 1,38 |
|                                                                               |                | 0,71                                                            | 0,95 | 1,19 | 1,28 | 1,46 | 1,60 | 1,82 | 1,82 |
|                                                                               |                | 0,71                                                            | 1,09 | 1,48 | 1,54 | 1,68 | 1,90 | 2,26 | 2,26 |
|                                                                               |                | 0,71                                                            | 1,09 | 1,46 | 1,62 | 1,77 | 2,02 | 2,43 | 2,43 |
|                                                                               |                | 0,71                                                            | 1,09 | 1,46 | 1,71 | 1,96 | 2,26 | 2,77 | 2,77 |
| $N_{R,k,II}$                                                                  |                | 0,21                                                            | 0,33 | 0,45 | 0,54 | 0,73 | 0,93 | 1,40 | 4,31 |

#### Self-drilling screw

ZEBRA Piasta Ø 4,8 x L, ZEBRA Piasta plus Ø 4,8 x L  
with pan head with AW or RW drive

**Annex 40**



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 4.40$  mm

#### Timber substructures

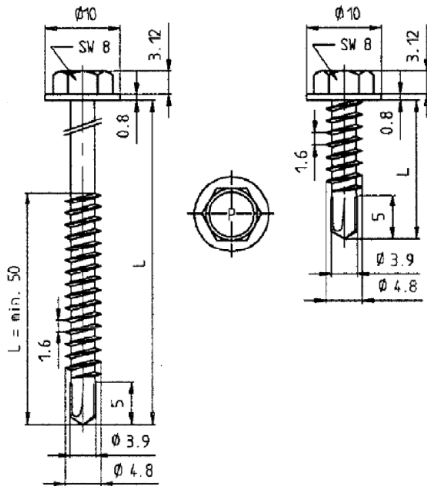
no performance determined

|                         |                       | Component II |        |        |        |        |         |         |         |         |         |         |         |
|-------------------------|-----------------------|--------------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|---------|
|                         |                       | t II [mm]    |        |        |        |        |         |         |         |         |         |         |         |
|                         |                       | 0,40         | 0,50   | 0,55   | 0,63   | 0,75   | 0,88    | 1,00    | 1,25    | 1,50    | 2,00    | 3,00    |         |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,40         | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 -  | 0,75 -  | 0,75 -  | 0,75 -  | 0,75 -  | 0,75 -  | 0,75 -  |
|                         |                       | 0,50         | 0,75 - | 0,95 - | 0,95 - | 0,95 - | 0,95 -  | 0,95 -  | 0,95 -  | 0,95 -  | 0,95 -  | 0,95 -  | 0,95 -  |
|                         |                       | 0,55         | 0,75 - | 0,95 - | 1,04 - | 1,04 - | 1,04 -  | 1,04 -  | 1,04 -  | 1,04 -  | 1,04 -  | 1,04 -  | 1,04 -  |
|                         |                       | 0,63         | 0,75 - | 0,95 - | 1,04 - | 1,20 - | 1,40 ac | 1,50 ac | 1,70 ac | 2,00 ac | 2,30 ac | 2,40 ac | 2,40 ac |
|                         |                       | 0,75         | 0,75 - | 0,95 - | 1,04 - | 1,30 - | 1,50 ac | 1,70 ac | 1,90 ac | 2,20 ac | 2,50 ac | 3,00 ac | 3,00 ac |
|                         |                       | 0,88         | 0,75 - | 0,95 - | 1,04 - | 1,40 - | 1,70 -  | 1,90 ac | 2,10 ac | 2,50 ac | 2,80 ac | 3,40 ac | 3,40 ac |
|                         |                       | 1,00         | 0,75 - | 0,95 - | 1,04 - | 1,40 - | 1,80 -  | 2,00 -  | 2,30 ac | 2,70 ac | 3,10 ac | 3,70 ac | 2,10 ac |
|                         |                       | 1,25         | 0,75 - | 0,95 - | 1,04 - | 1,50 - | 1,90 -  | 2,30 -  | 2,70 -  | 3,30 -  | 3,70 ac | 4,40 ac | 4,80 a  |
|                         |                       | 1,50         | 0,75 - | 0,95 - | 1,04 - | 1,50 - | 2,00 -  | 2,40 -  | 3,00 -  | 3,90 -  | 4,50 -  | 5,00 -  | - -     |
|                         |                       | 1,75         | 0,75 - | 0,95 - | 1,04 - | 1,50 - | 2,00 -  | 2,40 -  | 3,00 -  | 3,90 -  | 4,50 -  | 5,00 -  | - -     |
|                         | 2,00                  | 0,75 -       | 0,95 - | 1,04 - | 1,50 - | 2,00 - | 2,40 -  | 3,00 -  | 3,90 -  | 4,50 -  | 5,00 -  | - -     |         |
|                         | N <sub>R,k</sub> [kN] | 0,40         | 0,28 - | 0,32 - | 0,34 - | 0,36 - | 0,55 -  | 0,76 -  | 0,95 -  | 1,08 -  | 1,08 -  | 1,08 -  | 1,08 -  |
|                         |                       | 0,50         | 0,28 - | 0,32 - | 0,34 - | 0,36 - | 0,55 -  | 0,76 -  | 0,95 -  | 1,33 -  | 1,33 -  | 1,33 -  | 1,33 -  |
|                         |                       | 0,55         | 0,28 - | 0,32 - | 0,34 - | 0,36 - | 0,55 -  | 0,76 -  | 0,95 -  | 1,35 -  | 1,63 -  | 1,63 -  | 1,63 -  |
|                         |                       | 0,63         | 0,28 - | 0,32 - | 0,34 - | 0,36 - | 0,55 ac | 0,76 ac | 0,95 ac | 1,35 ac | 2,10 ac | 2,10 ac | 2,10 ac |
|                         |                       | 0,75         | 0,28 - | 0,32 - | 0,34 - | 0,36 - | 0,55 ac | 0,76 ac | 0,95 ac | 1,35 ac | 2,30 ac | 2,30 ac | 2,30 ac |
|                         |                       | 0,88         | 0,28 - | 0,32 - | 0,34 - | 0,36 - | 0,55 -  | 0,76 ac | 0,95 ac | 1,35 ac | 2,50 ac | 2,50 ac | 2,50 ac |
|                         |                       | 1,00         | 0,28 - | 0,32 - | 0,34 - | 0,36 - | 0,55 -  | 0,76 -  | 0,95 ac | 1,35 ac | 2,50 ac | 2,50 ac | 2,50 ac |
|                         |                       | 1,25         | 0,28 - | 0,32 - | 0,34 - | 0,36 - | 0,55 -  | 0,76 -  | 0,95 -  | 1,35 -  | 2,50 ac | 2,50 ac | 2,50 a  |
|                         |                       | 1,50         | 0,28 - | 0,32 - | 0,34 - | 0,36 - | 0,55 -  | 0,76 -  | 0,95 -  | 1,35 -  | 2,89 -  | 2,50 -  | 2,50 -  |
|                         |                       | 1,75         | 0,28 - | 0,32 - | 0,34 - | 0,36 - | 0,55 -  | 0,76 -  | 0,95 -  | 1,35 -  | 2,89 -  | 2,50 -  | -       |
| 2,00                    |                       | 0,28 -       | 0,32 - | 0,34 - | 0,36 - | 0,55 - | 0,76 -  | 0,95 -  | 1,35 -  | 2,89 -  | 2,50 -  | -       |         |
| N <sub>R,k,II</sub>     | 0,28 -                | 0,32 -       | 0,34 - | 0,36 - | 0,55 - | 0,76 - | 0,95 -  | 1,35 -  | 2,89 -  | 2,96 -  | 4,58 -  |         |         |

#### Self-drilling screw

ZEBRA Piasta Ø 4,8 x L, ZEBRA Piasta plus Ø 4,8 x L  
with hexagon head

#### Annex 41



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: None

Component I: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 3.90 \text{ mm}$

#### Timber substructures

no performance determined

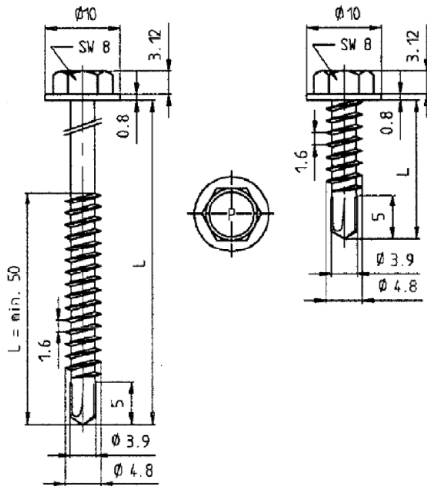
|                                                                               |                | Component II, steel sheet |        |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------|----------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                                                               |                | t II [mm]                 |        |        |        |        |        |        |        |        |
|                                                                               |                | 0,50                      | 0,63   | 0,75   | 0,88   | 1,00   | 1,25   | 1,50   | 2,00   | 3,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,70                      | 0,58 - | 0,58 - | 0,58 - | 0,58 - | 0,95 - | 1,05 - | 1,05 - | 1,05 - |
|                                                                               |                | 0,80                      | 0,77 - | 0,77 - | 0,77 - | 0,84 - | 1,06 - | 1,21 - | 1,41 - | 1,41 - |
|                                                                               |                | 0,90                      | 0,97 - | 0,97 - | 0,97 - | 1,10 - | 1,18 - | 1,37 - | 1,76 - | 1,76 - |
|                                                                               |                | 1,00                      | 0,97 - | 0,97 - | 0,97 - | 1,10 - | 1,18 - | 1,29 - | 1,50 - | 2,13 - |
|                                                                               |                | 1,20                      | 0,97 - | 0,97 - | 0,97 - | 1,10 - | 1,18 - | 1,50 - | 1,75 - | 2,24 - |
|                                                                               | $N_{R,k,II}$   |                           | 0,32   | 0,36   | 0,55   | 0,76   | 0,95   | 1,35   | 2,89   | 4,58   |

|                                                                               |                | Component II, steel sheet |        |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------|----------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                                                               |                | t II [mm]                 |        |        |        |        |        |        |        |        |
|                                                                               |                | 0,50                      | 0,63   | 0,75   | 0,88   | 1,00   | 1,25   | 1,50   | 2,00   | 3,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,70                      | 0,76 - | 0,76 - | 0,76 - | 0,76 - | 1,24 - | 1,37 - | 1,37 - | 1,37 - |
|                                                                               |                | 0,80                      | 0,99 - | 0,99 - | 0,99 - | 1,09 - | 1,13 - | 1,37 - | 1,57 - | 1,83 - |
|                                                                               |                | 0,90                      | 1,23 - | 1,23 - | 1,23 - | 1,42 - | 1,50 - | 1,50 - | 1,76 - | 2,29 - |
|                                                                               |                | 1,00                      | 1,23 - | 1,23 - | 1,23 - | 1,42 - | 1,50 - | 1,68 - | 1,95 - | 2,50 - |
|                                                                               |                | 1,20                      | 1,23 - | 1,23 - | 1,23 - | 1,42 - | 1,50 - | 1,96 - | 2,27 - | 3,74 - |
|                                                                               | $N_{R,k,II}$   |                           | 0,32   | 0,36   | 0,55   | 0,76   | 0,95   | 1,35   | 2,89   | 4,58   |

#### Self-drilling screw

ZEBRA Piasta Ø 4,8 x L, ZEBRA Piasta plus Ø 4,8 x L  
with hexagon head

#### Annex 42



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: None

Component I: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Component II: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Drilling-capacity  $\Sigma(t_i) \leq 5.20 \text{ mm}$

#### Timber substructures

no performance determined

|                                                                               |                | Component II, Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$ |             |      |      |      |      |      |      |      |
|-------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------|-------------|------|------|------|------|------|------|------|
|                                                                               |                | t II [mm]                                                       |             |      |      |      |      |      |      |      |
|                                                                               |                | 0,70                                                            | 0,80        | 0,90 | 1,00 | 1,20 | 1,50 | 2,00 | 3,00 | 4,00 |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,70                                                            | 0,54 - 0,62 | 0,71 | 0,79 | 0,95 | 0,99 | 1,06 | 1,06 | 1,06 |
|                                                                               |                | 0,80                                                            | 0,54 - 0,73 | 0,91 | 0,98 | 1,12 | 1,22 | 1,40 | 1,40 | 1,40 |
|                                                                               |                | 0,90                                                            | 0,54 - 0,83 | 1,12 | 1,18 | 1,29 | 1,46 | 1,74 | 1,74 | 1,74 |
|                                                                               |                | 1,00                                                            | 0,54 - 0,83 | 1,12 | 1,24 | 1,36 | 1,55 | 1,87 | 1,87 | 1,87 |
|                                                                               |                | 1,20                                                            | 0,54 - 0,83 | 1,12 | 1,31 | 1,50 | 1,74 | 2,13 | 2,13 | 2,13 |
|                                                                               | $N_{R,k,II}$   |                                                                 | 0,16        | 0,25 | 0,35 | 0,42 | 0,56 | 0,73 | 1,07 | 3,31 |

|                                                                               |                | Component II, Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$ |      |      |      |      |      |      |      |      |
|-------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------|------|------|------|------|------|------|------|------|
|                                                                               |                | t II [mm]                                                       |      |      |      |      |      |      |      |      |
|                                                                               |                | 0,70                                                            | 0,80 | 0,90 | 1,00 | 1,20 | 1,50 | 2,00 | 3,00 | 4,00 |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,70                                                            | 0,71 | 0,81 | 0,92 | 1,03 | 1,24 | 1,29 | 1,38 | 1,38 |
|                                                                               |                | 0,80                                                            | 0,71 | 0,95 | 1,19 | 1,28 | 1,46 | 1,60 | 1,82 | 1,82 |
|                                                                               |                | 0,90                                                            | 0,71 | 1,09 | 1,48 | 1,54 | 1,68 | 1,90 | 2,26 | 2,26 |
|                                                                               |                | 1,00                                                            | 0,71 | 1,09 | 1,46 | 1,62 | 1,77 | 2,02 | 2,43 | 2,43 |
|                                                                               |                | 1,20                                                            | 0,71 | 1,09 | 1,46 | 1,71 | 1,96 | 2,26 | 2,77 | 2,77 |
|                                                                               | $N_{R,k,II}$   |                                                                 | 0,21 | 0,33 | 0,45 | 0,54 | 0,73 | 0,93 | 1,40 | 4,31 |

#### Self-drilling screw

ZEBRA Piasta Ø 4,8 x L, ZEBRA Piasta plus Ø 4,8 x L  
with hexagon head

#### Annex 43

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM</p> <p>Component I: S280GD to S550GD - EN 10346<br/>Component II: S235 to S355 - EN 10025-1<br/>S280GD to S550GD - EN 10346<br/>HX300LAD to HX460LAD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 4.40</math> mm</p> <p><b>Timber substructures</b><br/>no performance determined</p> |
|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

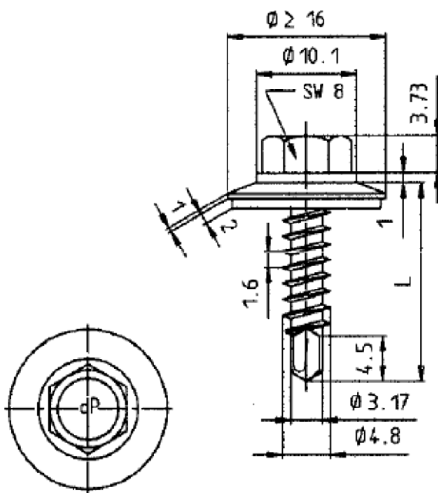
|                         |                       | Component II |         |         |         |         |         |         |         |         |         |         |         |
|-------------------------|-----------------------|--------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                         |                       | t II [mm]    |         |         |         |         |         |         |         |         |         |         |         |
|                         |                       | 0,40         | 0,50    | 0,55    | 0,63    | 0,75    | 0,88    | 1,00    | 1,25    | 1,50    | 2,00    | 3,00    |         |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,40         | 0,54 ac | 0,54 ac | 0,54 ac | 0,54 ac | 0,54 ac | 0,54 ac | 1,52 ac | 1,52 ac | 1,52 ac | 1,52 ac | 1,52 ac |
|                         |                       | 0,50         | 0,54 -  | 0,75 ac | 0,75 ac | 0,75 ac | 0,75 ac | 0,75 ac | 1,52 ac | 1,52 ac | 1,52 ac | 1,52 ac | 1,52 ac |
|                         |                       | 0,55         | 0,54 -  | 0,75 -  | 0,85 ac | 0,85 ac | 0,85 ac | 0,85 ac | 1,52 ac | 1,52 ac | 1,52 ac | 1,52 ac | 1,52 ac |
|                         |                       | 0,63         | 0,54 -  | 0,75 -  | 0,85 -  | 1,00 -  | 1,20 ac | 1,40 ac | 1,60 ac | 2,00 ac | 2,40 ac | 2,40 ac | 2,40 ac |
|                         |                       | 0,75         | 0,54 -  | 0,75 -  | 0,85 -  | 1,00 -  | 1,30 ac | 1,60 ac | 1,80 ac | 2,20 ac | 2,50 ac | 2,60 ac | 2,70 ac |
|                         |                       | 0,88         | 0,54 -  | 0,75 -  | 0,85 -  | 1,10 -  | 1,40 -  | 1,70 -  | 2,00 -  | 2,50 ac | 2,70 ac | 2,90 ac | 3,10 ac |
|                         |                       | 1,00         | 0,54 -  | 0,75 -  | 0,85 -  | 1,10 -  | 1,50 -  | 1,80 -  | 2,20 -  | 2,70 -  | 2,90 ac | 3,00 ac | 3,40 ac |
|                         |                       | 1,13         | 0,54 -  | 0,75 -  | 0,85 -  | 1,10 -  | 1,50 -  | 1,90 -  | 2,30 -  | 2,80 -  | 3,00 ac | 3,20 ac | 3,80 a  |
|                         |                       | 1,25         | 0,54 -  | 0,75 -  | 0,85 -  | 1,20 -  | 1,50 -  | 1,90 -  | 2,30 -  | 2,90 -  | 3,10 a  | 3,50 a  | 4,20 a  |
|                         |                       | 1,50         | 0,54 -  | 0,75 -  | 0,85 -  | 1,20 -  | 1,60 -  | 2,00 -  | 2,30 -  | 3,20 -  | 3,40    | 4,00 -  | - -     |
|                         | 1,75                  | 0,54 -       | 0,75 -  | 0,85 -  | 1,20 -  | 1,60 -  | 2,00 -  | 2,30 -  | 3,20 -  | 3,40    | 4,00 -  | - -     |         |
|                         | 2,00                  | 0,54 -       | 0,75 -  | 0,85 -  | 1,20 -  | 1,60 -  | 2,00 -  | 2,30 -  | 3,20 -  | 3,40    | 4,00 -  | - -     |         |
|                         | N <sub>R,k</sub> [kN] | 0,40         | 0,28 -  | 0,32 -  | 0,34 -  | 0,40 -  | 0,50 ac | 0,70 ac | 0,80 ac | 1,20 ac | 1,52 ac | 1,52 ac | 1,52 ac |
|                         |                       | 0,50         | 0,28 -  | 0,32 -  | 0,34 -  | 0,40 -  | 0,50 ac | 0,70 ac | 0,80 ac | 1,20 ac | 1,57 ac | 1,57 ac | 1,57 ac |
|                         |                       | 0,55         | 0,28 -  | 0,32 -  | 0,34 -  | 0,40 -  | 0,50 ac | 0,70 ac | 0,80 ac | 1,20 ac | 1,60 ac | 1,98 ac | 1,98 ac |
|                         |                       | 0,63         | 0,28 -  | 0,32 -  | 0,34 -  | 0,40 -  | 0,50 ac | 0,70 ac | 0,80 ac | 1,20 ac | 1,60 ac | 2,90 ac | 2,90 ac |
|                         |                       | 0,75         | 0,28 -  | 0,32 -  | 0,34 -  | 0,40 -  | 0,50 ac | 0,70 ac | 0,80 ac | 1,20 ac | 1,60 ac | 2,50 ac | 3,40 ac |
|                         |                       | 0,88         | 0,28 -  | 0,32 -  | 0,34 -  | 0,40 -  | 0,50 -  | 0,70 -  | 0,80 -  | 1,20 ac | 1,60 ac | 2,50 ac | 4,00 ac |
|                         |                       | 1,00         | 0,28 -  | 0,32 -  | 0,34 -  | 0,40 -  | 0,50 -  | 0,70 -  | 0,80 -  | 1,20 -  | 1,60 ac | 2,50 ac | 4,60 ac |
|                         |                       | 1,13         | 0,28 -  | 0,32 -  | 0,34 -  | 0,40 -  | 0,50 -  | 0,70 -  | 0,80 -  | 1,20 -  | 1,60 ac | 2,50 ac | 4,60 a  |
|                         |                       | 1,25         | 0,28 -  | 0,32 -  | 0,34 -  | 0,40 -  | 0,50 -  | 0,70 -  | 0,80 -  | 1,20 -  | 1,60 a  | 2,50 a  | 4,60 a  |
|                         |                       | 1,50         | 0,28 -  | 0,32 -  | 0,34 -  | 0,40 -  | 0,50 -  | 0,70 -  | 0,80 -  | 1,20 -  | 1,60 -  | 2,50 -  | - -     |
|                         |                       | 1,75         | 0,28 -  | 0,32 -  | 0,34 -  | 0,40 -  | 0,50 -  | 0,70 -  | 0,80 -  | 1,20 -  | 1,60 -  | 2,50 -  | - -     |
|                         |                       | 2,00         | 0,28 -  | 0,32 -  | 0,34 -  | 0,40 -  | 0,50 -  | 0,70 -  | 0,80 -  | 1,20 -  | 1,60 -  | 2,50 -  | - -     |
| N <sub>R,k,II</sub>     |                       | 0,28 -       | 0,32 -  | 0,34 -  | 0,40 -  | 0,50 -  | 0,70 -  | 0,80 -  | 1,20 -  | 1,60 -  | 2,50 -  | 4,60 -  |         |

Self-drilling screw

ZEBRA Piasta Ø 4,8 x L, ZEBRA Piasta plus Ø 4,8 x L  
with hexagon head and sealing washer ≥ Ø16 mm

Annex 44





#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: S280GD to S320GD - EN 10346

Component II: S235 – EN 10025-1  
S280GD to S320GD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 3.00$  mm

#### Timber substructures

no performance determined

|                         |                | Component II |             |             |             |             |             |             |             |             |             |
|-------------------------|----------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                         |                | t II [mm]    |             |             |             |             |             |             |             |             |             |
|                         |                | 0,40         | 0,50        | 0,55        | 0,63        | 0,75        | 0,88        | 1,00        | 1,13        | 1,25        | 1,50        |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] | 0,40         | 0,55 - 0,55 | 0,55 - 0,55 | 0,55 - 0,55 | 0,55 - 0,55 | 0,55 - 0,55 | 0,55 - 0,55 | 0,55 - 0,55 | 0,55 - 0,55 | 0,55 - 0,55 |
|                         |                | 0,50         | 0,55 - 0,83 | 0,83 - 0,83 | 0,83 - 0,83 | 0,83 - 0,83 | 0,83 - 0,83 | 0,83 - 0,83 | 0,83 - 0,83 | 0,83 - 0,83 | 0,83 - 0,83 |
|                         |                | 0,55         | 0,55 - 0,83 | 0,97 - 0,97 | 0,97 - 0,97 | 0,97 - 0,97 | 0,97 - 0,97 | 0,97 - 0,97 | 0,97 - 0,97 | 0,97 - 0,97 | 0,97 - 0,97 |
|                         |                | 0,63         | 0,55 - 0,83 | 0,97 - 1,40 | 1,40 - 1,60 | 1,60 - 1,70 | 1,70 - 1,80 | 1,80 - 1,90 | 1,90 - 2,00 | 2,00 - 2,20 | 2,20 - 2,40 |
|                         |                | 0,75         | 0,55 - 0,83 | 0,97 - 1,40 | 1,40 - 1,70 | 1,70 - 1,90 | 1,90 - 2,10 | 2,10 - 2,30 | 2,30 - 2,40 | 2,40 - 2,60 | 2,60 - 2,90 |
|                         |                | 0,88         | 0,55 - 0,83 | 0,97 - 1,50 | 1,50 - 1,80 | 1,80 - 2,10 | 2,10 - 2,40 | 2,40 - 2,70 | 2,70 - 2,90 | 2,90 - 3,30 | 3,30 - 3,60 |
|                         |                | 1,00         | 0,55 - 0,83 | 0,97 - 1,50 | 1,50 - 2,00 | 2,00 - 2,30 | 2,30 - 2,70 | 2,70 - 3,00 | 3,00 - 3,30 | 3,30 - 3,60 | 3,60 - 3,90 |
|                         |                | 1,13         | 0,55 - 0,83 | 0,97 - 1,50 | 1,50 - 2,00 | 2,00 - 2,40 | 2,40 - 2,80 | 2,80 - 3,20 | 3,20 - 3,60 | 3,60 - 3,90 | 3,90 - 4,30 |
|                         |                | 1,25         | 0,55 - 0,83 | 0,97 - 1,60 | 1,60 - 2,10 | 2,10 - 2,50 | 2,50 - 3,10 | 3,10 - 3,40 | 3,40 - 3,80 | 3,80 - 4,30 | 4,30 - 4,80 |
|                         |                | 1,50         | 0,55 - 0,83 | 0,97 - 1,60 | 1,60 - 2,20 | 2,20 - 2,50 | 2,50 - 3,20 | 3,20 - 3,80 | 3,80 - 4,30 | 4,30 - 4,80 | 4,80 - 5,30 |
|                         |                | 1,75         | 0,55 - 0,83 | 0,97 - 1,60 | 1,60 - 2,20 | 2,20 - 2,50 | 2,50 - 3,20 | 3,20 - 3,80 | 3,80 - 4,30 | 4,30 - 4,80 | 4,80 - 5,30 |
|                         |                | 2,00         | 0,55 - 0,83 | 0,97 - 1,60 | 1,60 - 2,20 | 2,20 - 2,50 | 2,50 - 3,20 | 3,20 - 3,80 | 3,80 - 4,30 | 4,30 - 4,80 | 4,80 - 5,30 |
|                         | $N_{R,k}$ [kN] | 0,40         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00 | 1,00 - 1,20 | 1,20 - 1,33 | 1,33 - 1,35 | 1,35 - 1,35 | 1,35 - 1,35 |
|                         |                | 0,50         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00 | 1,00 - 1,20 | 1,20 - 1,35 | 1,35 - 1,35 | 1,35 - 1,35 | 1,35 - 1,35 |
|                         |                | 0,55         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00 | 1,00 - 1,20 | 1,20 - 1,50 | 1,50 - 1,71 | 1,71 - 1,71 | 1,71 - 1,71 |
|                         |                | 0,63         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00 | 1,00 - 1,20 | 1,20 - 1,50 | 1,50 - 1,80 | 1,80 - 2,50 | 2,50 - 2,50 |
|                         |                | 0,75         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00 | 1,00 - 1,20 | 1,20 - 1,50 | 1,50 - 1,80 | 1,80 - 2,50 | 2,50 - 2,50 |
|                         |                | 0,88         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00 | 1,00 - 1,20 | 1,20 - 1,50 | 1,50 - 1,80 | 1,80 - 2,50 | 2,50 - 2,50 |
|                         |                | 1,00         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00 | 1,00 - 1,20 | 1,20 - 1,50 | 1,50 - 1,80 | 1,80 - 2,50 | 2,50 - 2,50 |
|                         |                | 1,13         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00 | 1,00 - 1,20 | 1,20 - 1,50 | 1,50 - 1,80 | 1,80 - 2,50 | 2,50 - 2,50 |
|                         |                | 1,25         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00 | 1,00 - 1,20 | 1,20 - 1,50 | 1,50 - 1,80 | 1,80 - 2,50 | 2,50 - 2,50 |
|                         |                | 1,50         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00 | 1,00 - 1,20 | 1,20 - 1,50 | 1,50 - 1,80 | 1,80 - 2,50 | 2,50 - 2,50 |
|                         |                | 1,75         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00 | 1,00 - 1,20 | 1,20 - 1,50 | 1,50 - 1,80 | 1,80 - 2,50 | 2,50 - 2,50 |
|                         |                | 2,00         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00 | 1,00 - 1,20 | 1,20 - 1,50 | 1,50 - 1,80 | 1,80 - 2,50 | 2,50 - 2,50 |
|                         | $N_{R,k,II}$   | 0,28         | 0,32 - 0,34 | 0,60 - 0,80 | 0,80 - 1,00 | 1,00 - 1,20 | 1,20 - 1,50 | 1,50 - 1,80 | 1,80 - 2,50 | 2,50 - 2,50 | 2,50 - 2,50 |

#### Self-drilling screw

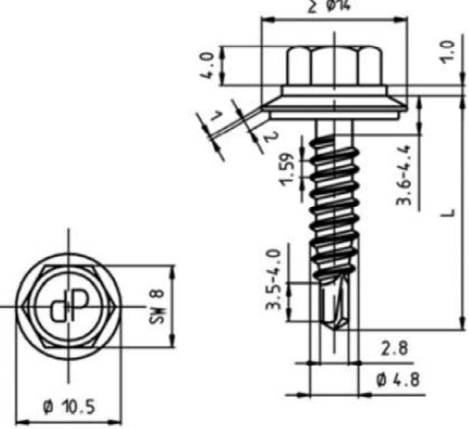
ZEBRA Piasta Ø 4,8 r x L, ZEBRA Piasta plus Ø 4,8 r x L  
with hexagon head and sealing washer  $\geq \phi 16$  mm

#### Annex 45

|  |                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM</p> <p>Component I: S280GD to S320GD - EN 10346<br/>Component II: S235 – EN 10025-1<br/>S280GD to S320GD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 2.75</math> mm</p> <p><b>Timber substructures</b><br/>no performance determined</p> |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                       | Component II |        |        |        |        |        |        |         |         |         |         |
|-------------------------|-----------------------|--------------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                         |                       | t II [mm]    |        |        |        |        |        |        |         |         |         |         |
|                         |                       | 0,40         | 0,50   | 0,55   | 0,63   | 0,75   | 0,88   | 1,00   | 1,13    | 1,25    | 1,50    | 2,00    |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,40         | 0,55 - | 0,55 - | 0,55 - | 0,55 - | 0,55 - | 0,55 - | 0,55 -  | 0,55 -  | 0,55 -  | 0,55 -  |
|                         |                       | 0,50         | 0,55 - | 0,83 - | 0,83 - | 0,83 - | 0,83 - | 0,83 - | 0,83 -  | 0,83 -  | 0,83 -  | 0,83 -  |
|                         |                       | 0,55         | 0,55 - | 0,83 - | 0,97 - | 0,97 - | 0,97 - | 0,97 - | 0,97 -  | 0,97 -  | 0,97 -  | 0,97 -  |
|                         |                       | 0,63         | 0,55 - | 0,83 - | 0,97 - | 1,20 - | 1,50 - | 1,60 - | 1,60 ac | 1,60 ac | 1,60 ac | 1,60 ac |
|                         |                       | 0,75         | 0,55 - | 0,83 - | 0,97 - | 1,20 - | 1,80 - | 1,90 - | 2,00 -  | 2,10 -  | 2,30 ac | 2,30 ac |
|                         |                       | 0,88         | 0,55 - | 0,83 - | 0,97 - | 1,40 - | 1,80 - | 2,20 - | 2,50 -  | 2,50 -  | 2,60 -  | 2,70 -  |
|                         |                       | 1,00         | 0,55 - | 0,83 - | 0,97 - | 1,60 - | 1,80 - | 2,40 - | 2,90 -  | 2,90 -  | 3,00 -  | 3,10 -  |
|                         |                       | 1,13         | 0,55 - | 0,83 - | 0,97 - | 1,70 - | 1,80 - | 2,40 - | 2,90 -  | 2,90 -  | 3,30 -  | 3,40 -  |
|                         |                       | 1,25         | 0,55 - | 0,83 - | 0,97 - | 1,80 - | 1,80 - | 2,40 - | 3,10 -  | 3,10 -  | 3,60 -  | 3,60 -  |
|                         |                       | 1,50         | 0,55 - | 0,83 - | 0,97 - | 1,80 - | 1,80 - | 2,70 - | 3,50 -  | 3,50 -  | 3,60 -  | -       |
|                         |                       | 1,75         | 0,55 - | 0,83 - | 0,97 - | 1,80 - | 1,80 - | 2,70 - | 3,50 -  | -       | -       | -       |
|                         |                       | 2,00         | 0,55 - | 0,83 - | 0,97 - | 1,80 - | 1,80 - | -      | -       | -       | -       | -       |
|                         | N <sub>R,k</sub> [kN] | 0,40         | 0,38 - | 0,50 - | 0,58 - | 0,70 - | 1,00 - | 1,10 - | 1,33 -  | 1,33 -  | 1,33 -  | 1,33 -  |
|                         |                       | 0,50         | 0,38 - | 0,50 - | 0,58 - | 0,70 - | 1,00 - | 1,10 - | 1,40 -  | 1,47 -  | 1,47 -  | 1,47 -  |
|                         |                       | 0,55         | 0,38 - | 0,50 - | 0,58 - | 0,70 - | 1,00 - | 1,10 - | 1,40 -  | 1,75 -  | 1,75 -  | 1,75 -  |
|                         |                       | 0,63         | 0,38 - | 0,50 - | 0,58 - | 0,70 - | 1,00 - | 1,10 - | 1,40 ac | 1,60 ac | 1,70 ac | 2,20 ac |
|                         |                       | 0,75         | 0,38 - | 0,50 - | 0,58 - | 0,70 - | 1,00 - | 1,10 - | 1,40 -  | 1,60 -  | 1,70 -  | 2,70 ac |
|                         |                       | 0,88         | 0,38 - | 0,50 - | 0,58 - | 0,70 - | 1,00 - | 1,10 - | 1,40 -  | 1,60 -  | 1,70 -  | 2,70 -  |
|                         |                       | 1,00         | 0,38 - | 0,50 - | 0,58 - | 0,70 - | 1,00 - | 1,10 - | 1,40 -  | 1,60 -  | 1,70 -  | 2,70 -  |
|                         |                       | 1,13         | 0,38 - | 0,50 - | 0,58 - | 0,70 - | 1,00 - | 1,10 - | 1,40 -  | 1,60 -  | 1,70 -  | 2,70 -  |
|                         |                       | 1,25         | 0,38 - | 0,50 - | 0,58 - | 0,70 - | 1,00 - | 1,10 - | 1,40 -  | 1,60 -  | 1,70 -  | 2,70 -  |
|                         |                       | 1,50         | 0,38 - | 0,50 - | 0,58 - | 0,70 - | 1,00 - | 1,10 - | 1,40 -  | 1,60 -  | 1,70 -  | -       |
|                         |                       | 1,75         | 0,38 - | 0,50 - | 0,58 - | 0,70 - | 1,00 - | 1,10 - | 1,40 -  | -       | -       | -       |
|                         |                       | 2,00         | 0,38 - | 0,50 - | 0,58 - | 0,70 - | 1,00 - | -      | -       | -       | -       | -       |
|                         | N <sub>R,k,II</sub>   | 0,38 -       | 0,50 - | 0,58 - | 0,70 - | 1,00 - | 1,10 - | 1,40 - | 1,60 -  | 1,70 -  | 2,70 -  | 2,70 -  |

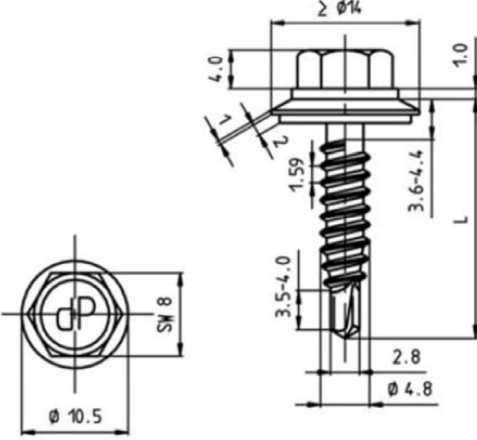
|                                                                                                                 |          |
|-----------------------------------------------------------------------------------------------------------------|----------|
| Self-drilling screw                                                                                             | Annex 46 |
| ZEBRA Piasta H Ø 4,8 x L, ZEBRA Piasta plus H Ø 4,8 x L with undercut, hexagon head and sealing washer ≥ Ø14 mm |          |

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>Materials</b><br>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM<br><br>Component I: Aluminum alloy<br>with $R_m \geq 165 \text{ N/mm}^2$ – EN 573<br>with $R_m \geq 215 \text{ N/mm}^2$ – EN 573<br><br>Component II: S235 to S355 – EN 10025-1<br>S280GD to S320GD - EN 10346 |
|                                                                                   | <b>Drilling-capacity</b> $\Sigma(t_i) \leq 3.00 \text{ mm}$                                                                                                                                                                                                                                                                                                        |
|                                                                                   | <b>Timber substructures</b><br>no performance determined                                                                                                                                                                                                                                                                                                           |

|                                                                               |                | Component II, steel sheet |                                                  |                |         |         |         |         |        |        |
|-------------------------------------------------------------------------------|----------------|---------------------------|--------------------------------------------------|----------------|---------|---------|---------|---------|--------|--------|
|                                                                               |                | t II [mm]                 |                                                  |                |         |         |         |         |        |        |
|                                                                               |                | 0,40                      | 0,50                                             | 0,63           | 0,75    | 0,88    | 1,00    | 1,25    | 1,50   | 2,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,50                      | 0,37 - 0,45 - 0,46 - 0,48 - 0,50 - 0,51 ac       | 0,50 - 0,51 ac | 0,51 ac | 0,51 ac | 0,51 ac | 0,51 ac | 0,51 a | 0,51 a |
|                                                                               |                | 0,60                      | 0,37 - 0,52 - 0,59 - 0,61 - 0,62 - 0,63 ac       | 0,63 ac        | 0,63 ac | 0,63 ac | 0,63 ac | 0,63 ac | 0,63 a | 0,63 a |
|                                                                               |                | 0,70                      | 0,37 - 0,59 - 0,68 - 0,73 - 0,75 - 0,76 ac       | 0,80 ac        | 0,80 ac | 0,80 a  | 0,80 a  | 0,80 a  | 0,80 a | 0,80 a |
|                                                                               |                | 0,80                      | 0,37 - 0,67 - 0,75 - 0,83 - 0,87 - 0,88 a        | 0,96 a         | 0,96 a  | 0,96 a  | 0,96 a  | 0,96 a  | 0,96 a | 0,96 a |
|                                                                               |                | 1,00                      | 0,37 - 0,81 - 0,89 - 0,97 - 1,06 - 1,13 - 1,16 a | 1,17 a         | -       | -       | -       | -       | -      | -      |
|                                                                               |                | 1,20                      | 0,37 - 0,81 - 0,89 - 0,97 - 1,06 - 1,13 - 1,16 a | 1,17 a         | -       | -       | -       | -       | -      | -      |
|                                                                               |                | 1,50                      | 0,37 - 0,81 - 0,89 - 0,97 - 1,06 - 1,13 - 1,16 a | -              | -       | -       | -       | -       | -      | -      |
|                                                                               |                | 2,00                      | 0,37 - 0,81 - 0,89 - 0,97 - 1,06 - 1,13 -        | -              | -       | -       | -       | -       | -      | -      |
|                                                                               | $N_{R,k,II}$   | 0,38                      | 0,50                                             | 0,70           | 1,00    | 1,10    | 1,40    | 1,70    | 2,70   | 2,70   |

|                                                                               |                | Component II, steel sheet |                                                  |         |         |         |         |         |        |        |
|-------------------------------------------------------------------------------|----------------|---------------------------|--------------------------------------------------|---------|---------|---------|---------|---------|--------|--------|
|                                                                               |                | t II [mm]                 |                                                  |         |         |         |         |         |        |        |
|                                                                               |                | 0,40                      | 0,50                                             | 0,63    | 0,75    | 0,88    | 1,00    | 1,25    | 1,50   | 2,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,50                      | 0,48 - 0,58 - 0,60 - 0,63 - 0,65 - 0,66 ac       | 0,66 ac | 0,66 ac | 0,66 ac | 0,66 ac | 0,66 ac | 0,66 a | 0,66 a |
|                                                                               |                | 0,60                      | 0,48 - 0,63 - 0,77 - 0,79 - 0,81 - 0,82 ac       | 0,82 ac | 0,82 ac | 0,82 ac | 0,82 ac | 0,82 ac | 0,82 a | 0,82 a |
|                                                                               |                | 0,70                      | 0,48 - 0,67 - 0,88 - 0,95 - 0,98 - 0,99 ac       | 1,04 ac | 1,04 ac | 1,04 a  | 1,04 a  | 1,04 a  | 1,04 a | 1,04 a |
|                                                                               |                | 0,80                      | 0,48 - 0,72 - 0,91 - 1,00 - 1,13 - 1,15 a        | 1,25 a  | 1,25 a  | 1,25 a  | 1,25 a  | 1,25 a  | 1,25 a | 1,25 a |
|                                                                               |                | 1,00                      | 0,48 - 0,76 - 0,95 - 1,10 - 1,31 - 1,47 - 1,51 a | 1,53 a  | -       | -       | -       | -       | -      | -      |
|                                                                               |                | 1,20                      | 0,48 - 0,81 - 0,98 - 1,14 - 1,31 - 1,47 - 1,51 a | 1,53 a  | -       | -       | -       | -       | -      | -      |
|                                                                               |                | 1,50                      | 0,48 - 0,81 - 0,98 - 1,14 - 1,31 - 1,47 - 1,51 a | -       | -       | -       | -       | -       | -      | -      |
|                                                                               |                | 2,00                      | 0,48 - 0,81 - 0,98 - 1,14 - 1,31 - 1,47 -        | -       | -       | -       | -       | -       | -      | -      |
|                                                                               | $N_{R,k,II}$   | 0,38                      | 0,50                                             | 0,70    | 1,00    | 1,10    | 1,40    | 1,70    | 2,70   | 2,70   |

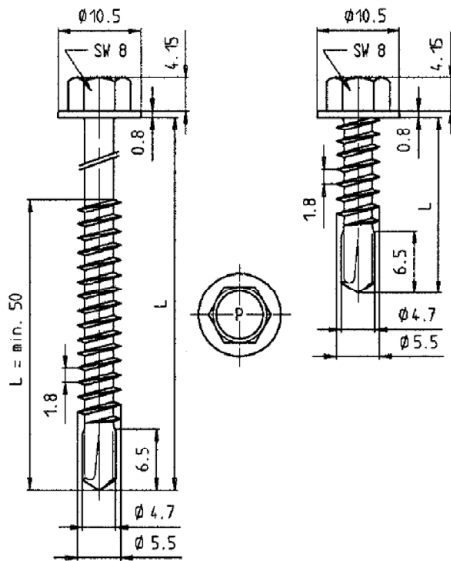
|                                                                                                                    |                 |
|--------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Self-drilling screw</b>                                                                                         | <b>Annex 47</b> |
| ZEBRA Piasta H Ø 4,8 x L, ZEBRA Piasta plus H Ø 4,8 x L<br>with undercut, hexagon head and sealing washer ≥ Ø14 mm |                 |

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><u>Materials</u></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM</p> <p>Component I: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p>Component II: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p><u>Drilling-capacity</u> <math>\Sigma(t_i) \leq 3.20 \text{ mm}</math></p> <p><u>Timber substructures</u><br/>no performance determined</p> |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                               |                | Component II, Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$ |        |        |        |        |        |         |         |         |         |
|-------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                                               |                | t II [mm]                                                       |        |        |        |        |        |         |         |         |         |
|                                                                               |                | 0,50                                                            | 0,60   | 0,70   | 0,80   | 0,90   | 1,00   | 1,20    | 1,50    | 2,00    |         |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,50                                                            | 0,34 - | 0,37 - | 0,41 - | 0,44 - | 0,48 - | 0,52 ac | 0,51 ac | 0,51 ac | 0,51 ac |
|                                                                               |                | 0,60                                                            | 0,35 - | 0,50 - | 0,54 - | 0,56 - | 0,60 - | 0,63 ac | 0,63 ac | 0,63 ac | 0,63 ac |
|                                                                               |                | 0,70                                                            | 0,37 - | 0,52 - | 0,66 - | 0,69 - | 0,73 - | 0,76 ac | 0,80 ac | 0,60 ac | 0,80 a  |
|                                                                               |                | 0,80                                                            | 0,38 - | 0,52 - | 0,67 - | 0,81 - | 0,85 - | 0,88 ac | 0,96 ac | 0,96 ac | 0,96 a  |
|                                                                               |                | 0,90                                                            | 0,40 - | 0,54 - | 0,67 - | 0,83 - | 0,97 - | 1,01 ac | 1,06 ac | 1,06 a  | 1,06 a  |
|                                                                               |                | 1,00                                                            | 0,41 - | 0,55 - | 0,70 - | 0,84 - | 0,99 - | 1,13 ac | 1,15 ac | 1,17 a  | 1,33 a  |
|                                                                               |                | 1,20                                                            | 0,41 - | 0,55 - | 0,70 - | 0,84 - | 0,99 - | 1,13 a  | 1,15 a  | 1,17 a  | 1,60 a  |
|                                                                               |                | 1,50                                                            | 0,41 - | 0,55 - | 0,70 - | 0,84 - | 0,99 - | 1,13 a  | 1,15 a  | 1,17 a  | - -     |
|                                                                               |                | 2,00                                                            | 0,41 - | 0,55 - | 0,70 - | 0,84 - | 0,99 - | 1,13 a  | 1,15 a  | - -     | - -     |
|                                                                               | $N_{R,k,II}$   |                                                                 | 0,17   | 0,25   | 0,33   | 0,41   | 0,46   | 0,50    | 0,83    | 0,99    | 1,30    |

|                                                                               |                | Component II, Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$ |        |        |        |        |        |         |         |         |         |
|-------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
|                                                                               |                | t II [mm]                                                       |        |        |        |        |        |         |         |         |         |
|                                                                               |                | 0,50                                                            | 0,60   | 0,70   | 0,80   | 0,90   | 1,00   | 1,20    | 1,50    | 2,00    |         |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,50                                                            | 0,44 - | 0,48 - | 0,53 - | 0,57 - | 0,63 - | 0,67 ac | 0,67 ac | 0,67 ac | 0,67 ac |
|                                                                               |                | 0,60                                                            | 0,46 - | 0,65 - | 0,70 - | 0,73 - | 0,78 - | 0,82 ac | 0,82 ac | 0,82 ac | 0,82 ac |
|                                                                               |                | 0,70                                                            | 0,48 - | 0,68 - | 0,86 - | 0,90 - | 0,95 - | 0,99 ac | 1,04 ac | 1,04 ac | 1,04 a  |
|                                                                               |                | 0,80                                                            | 0,50 - | 0,68 - | 0,87 - | 1,06 - | 1,11 - | 1,15 ac | 1,25 ac | 1,25 ac | 1,25 a  |
|                                                                               |                | 0,90                                                            | 0,52 - | 0,70 - | 0,87 - | 1,08 - | 1,26 - | 1,32 ac | 1,38 ac | 1,38 a  | 1,38 a  |
|                                                                               |                | 1,00                                                            | 0,54 - | 0,72 - | 0,91 - | 1,09 - | 1,29 - | 1,47 ac | 1,50 ac | 1,53 a  | 1,73 a  |
|                                                                               |                | 1,20                                                            | 0,54 - | 0,72 - | 0,91 - | 1,09 - | 1,29 - | 1,47 a  | 1,50 a  | 1,53 a  | 2,08 a  |
|                                                                               |                | 1,50                                                            | 0,54 - | 0,72 - | 0,91 - | 1,09 - | 1,29 - | 1,47 a  | 1,50 a  | 1,53 a  | - -     |
|                                                                               |                | 2,00                                                            | 0,54 - | 0,72 - | 0,91 - | 1,09 - | 1,29 - | 1,47 a  | 1,50 a  | - -     | - -     |
|                                                                               | $N_{R,k,II}$   |                                                                 | 0,21   | 0,29   | 0,38   | 0,46   | 0,55   | 0,64    | 1,03    | 1,12    | 1,63    |

|                                                                                                                 |          |
|-----------------------------------------------------------------------------------------------------------------|----------|
| Self-drilling screw                                                                                             | Annex 48 |
| ZEBRA Piasta H Ø 4,8 x L, ZEBRA Piasta plus H Ø 4,8 x L with undercut, hexagon head and sealing washer ≥ Ø14 mm |          |



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 5.25$  mm

#### Timber substructures

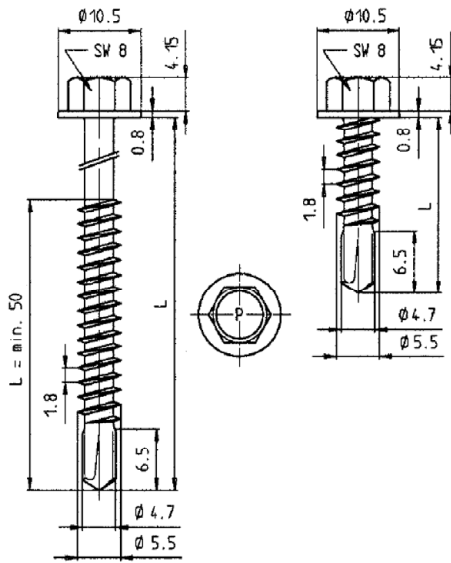
no performance determined

|             |                       | Component II        |             |         |         |         |         |         |         |
|-------------|-----------------------|---------------------|-------------|---------|---------|---------|---------|---------|---------|
|             |                       | t II [mm]           |             |         |         |         |         |         |         |
|             |                       | 0,63                | 0,75        | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |
| Component I | V <sub>R,k</sub> [kN] | 0,63                | 1,40 - 1,50 | ac 1,50 | ac 1,50 | ac 1,50 | ac 1,70 | ac 1,90 | ac 2,40 |
|             |                       | 0,75                | 1,40 - 1,60 | ac 1,70 | ac 1,80 | ac 1,90 | ac 2,10 | ac 2,50 | ac 2,80 |
|             |                       | 0,88                | 1,40 - 1,70 | ac 1,90 | ac 2,10 | ac 2,30 | ac 2,50 | ac 2,70 | ac 3,30 |
|             |                       | 1,00                | 1,40 - 1,80 | ac 2,00 | ac 2,20 | ac 2,50 | ac 2,70 | ac 3,00 | ac 3,60 |
|             |                       | 1,13                | 1,50 - 1,80 | ac 2,10 | ac 2,30 | ac 2,60 | ac 2,90 | ac 3,40 | ac 4,00 |
|             |                       | 1,25                | 1,50 - 1,90 | ac 2,20 | ac 2,50 | ac 2,80 | ac 3,10 | ac 3,60 | ac 4,40 |
|             |                       | 1,50                | 1,60 - 2,00 | ac 2,40 | ac 2,70 | ac 3,10 | ac 3,50 | ac 4,30 | ac 5,10 |
|             |                       | 1,75                | 1,60 - 2,00 | ac 2,40 | ac 2,70 | ac 3,10 | ac 3,50 | ac 4,30 | ac 5,10 |
|             |                       | 2,00                | 1,60 - 2,00 | ac 2,40 | ac 2,70 | ac 3,10 | ac 3,50 | ac 4,30 | ac 5,10 |
|             | N <sub>R,k</sub> [kN] | 0,63                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 1,90 |
|             |                       | 0,75                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,30 |
|             |                       | 0,88                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |
|             |                       | 1,00                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |
|             |                       | 1,13                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |
|             |                       | 1,25                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |
|             |                       | 1,50                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |
|             |                       | 1,75                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |
|             |                       | 2,00                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |
|             |                       | N <sub>R,k,II</sub> | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |

#### Self-drilling screw

ZEBRA Piasta Ø 5,5 x L, ZEBRA Piasta plus Ø 5,5 x L  
with hexagon head

#### Annex 49



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 5.25$  mm

#### Timber substructures

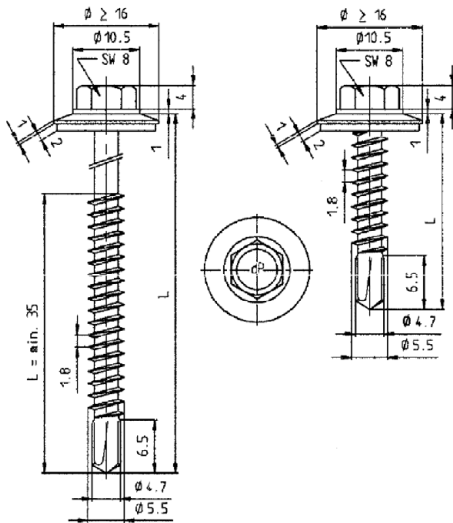
no performance determined

|                         |                | Component II |         |         |
|-------------------------|----------------|--------------|---------|---------|
|                         |                | t II [mm]    |         |         |
|                         |                | 2,50         | 3,00    | 4,00    |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] |              |         |         |
|                         | 0,63           | 2,40 ac      | 2,40 -  | 2,40 -  |
|                         | 0,75           | 2,85 ac      | 2,90 -  | 2,90 -  |
|                         | 0,88           | 3,35 ac      | 3,40 -  | 3,50 -  |
|                         | 1,00           | 3,75 ac      | 3,90 -  | 4,20 -  |
|                         | 1,13           | 4,30 -       | 4,80 -  | 5,20 -  |
|                         | 1,25           | 4,90 -       | 5,40 -  | 6,00 -  |
|                         | 1,50           | 5,70 -       | 6,30 -  | - -     |
|                         | 1,75           | 5,70 -       | 6,30 -  | - -     |
|                         | 2,00           | 5,70 -       | 6,30 -  | - -     |
|                         | $N_{R,k}$ [kN] |              |         |         |
|                         | 0,63           | 1,90 ac      | 1,90 ac | 1,90 ac |
|                         | 0,75           | 2,30 ac      | 2,30 ac | 2,30 ac |
|                         | 0,88           | 2,90 ac      | 2,90 ac | 2,90 a  |
|                         | 1,00           | 3,25 ac      | 3,30 ac | 3,30 a  |
|                         | 1,13           | 3,25 -       | 4,00 a  | 4,00 a  |
|                         | 1,25           | 3,25 -       | 4,30 -  | 4,30 a  |
|                         | 1,50           | 3,25 -       | 4,30 -  | - -     |
|                         | 1,75           | 3,25 -       | 4,30 -  | - -     |
|                         | 2,00           | 3,25 -       | 4,30 -  | - -     |
|                         | $N_{R,k,II}$   | 3,25 -       | 4,30 -  | 4,30 -  |

#### Self-drilling screw

ZEBRA Piasta Ø 5,5 x L, ZEBRA Piasta plus Ø 5,5 x L  
with hexagon head

**Annex 50**



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 5.25$  mm

#### Timber substructures

no performance determined

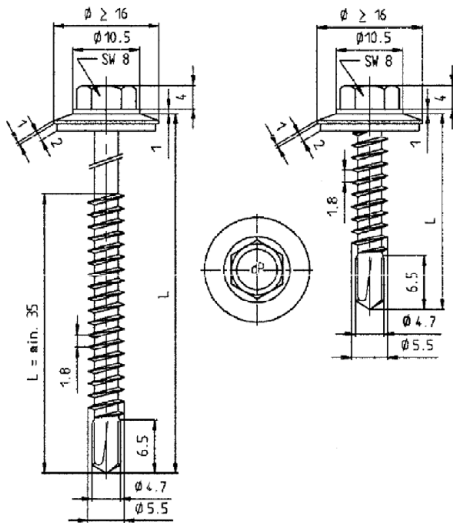
|                         |                | Component II |         |         |         |         |         |         |         |
|-------------------------|----------------|--------------|---------|---------|---------|---------|---------|---------|---------|
|                         |                | t II [mm]    |         |         |         |         |         |         |         |
|                         |                | 0,63         | 0,75    | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] |              |         |         |         |         |         |         |         |
|                         | 0,40           | 0,66 ac      | 0,66 ac | 0,66 ac | 0,66 ac | 0,66 ac | 0,66 ac | 1,53 ac | 1,53 ac |
|                         | 0,50           | 0,97 ac      | 0,97 ac | 0,97 ac | 0,97 ac | 0,97 ac | 0,97 ac | 1,53 ac | 1,53 ac |
|                         | 0,55           | 1,06 ac      | 1,06 ac | 1,06 ac | 1,06 ac | 1,06 ac | 1,06 ac | 1,53 ac | 1,53 ac |
|                         | 0,63           | 1,20 -       | 1,40 ac | 1,60 ac | 1,80 ac | 2,00 ac | 2,10 ac | 2,10 ac | 2,30 ac |
|                         | 0,75           | 1,20 -       | 1,40 ac | 1,70 ac | 1,90 ac | 2,30 ac | 2,30 ac | 2,40 ac | 2,60 ac |
|                         | 0,88           | 1,20 -       | 1,50 ac | 1,80 ac | 2,10 ac | 2,50 ac | 2,60 ac | 2,70 ac | 2,90 ac |
|                         | 1,00           | 1,20 -       | 1,60 -  | 2,00 -  | 2,30 ac | 2,70 ac | 2,80 ac | 2,90 ac | 3,10 ac |
|                         | 1,25           | 1,30 -       | 1,70 -  | 2,20 -  | 2,70 -  | 3,10 -  | 3,20 -  | 3,30 -  | 3,60 -  |
|                         | 1,50           | 1,40 -       | 1,90 -  | 2,40 -  | 2,90 -  | 3,40 -  | 3,50 -  | 3,70 -  | 4,10 -  |
|                         | 1,75           | 1,40 -       | 1,90 -  | 2,40 -  | 2,90 -  | 3,40 -  | 3,50 -  | 3,70 -  | 4,10 -  |
|                         | 2,00           | 1,40 -       | 1,90 -  | 2,40 -  | 2,90 -  | 3,40 -  | 3,50 -  | 3,70 -  | 4,10 -  |
|                         | $N_{R,k}$ [kN] |              |         |         |         |         |         |         |         |
|                         | 0,40           | 0,40 -       | 0,60 ac | 0,70 ac | 0,90 ac | 1,00 ac | 1,20 ac | 1,51 ac | 1,51 ac |
|                         | 0,50           | 0,40 -       | 0,60 ac | 0,70 ac | 0,90 ac | 1,00 ac | 1,20 ac | 1,60 ac | 1,78 ac |
|                         | 0,55           | 0,40 -       | 0,60 ac | 0,70 ac | 0,90 ac | 1,00 ac | 1,20 ac | 1,60 ac | 2,25 ac |
|                         | 0,63           | 0,40 -       | 0,60 ac | 0,70 ac | 0,90 ac | 1,00 ac | 1,20 ac | 1,60 ac | 2,40 ac |
|                         | 0,75           | 0,40 -       | 0,60 ac | 0,70 ac | 0,90 ac | 1,00 ac | 1,20 ac | 1,60 ac | 2,40 ac |
|                         | 0,88           | 0,40 -       | 0,60 ac | 0,70 ac | 0,90 ac | 1,00 ac | 1,20 ac | 1,60 ac | 2,40 ac |
|                         | 1,00           | 0,40 -       | 0,60 -  | 0,70 -  | 0,90 ac | 1,00 ac | 1,20 ac | 1,60 ac | 2,40 ac |
|                         | 1,25           | 0,40 -       | 0,60 -  | 0,70 -  | 0,90 -  | 1,00 -  | 1,20 -  | 1,60 -  | 2,40 -  |
|                         | 1,50           | 0,40 -       | 0,60 -  | 0,70 -  | 0,90 -  | 1,00 -  | 1,20 -  | 1,60 -  | 2,40 -  |
|                         | 1,75           | 0,40 -       | 0,60 -  | 0,70 -  | 0,90 -  | 1,00 -  | 1,20 -  | 1,60 -  | 2,40 -  |
|                         | 2,00           | 0,40 -       | 0,60 -  | 0,70 -  | 0,90 -  | 1,00 -  | 1,20 -  | 1,60 -  | 2,40 -  |
|                         | $N_{R,k,II}$   | 0,40 -       | 0,60 -  | 0,70 -  | 0,90 -  | 1,00 -  | 1,20 -  | 1,60 -  | 2,40 -  |

#### Self-drilling screw

ZEBRA Piasta Ø 5,5 x L, ZEBRA Piasta plus Ø 5,5 x L  
with hexagon head and sealing washer  $\geq \phi 16$  mm

#### Annex 51





#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 5.25$  mm

#### Timber substructures

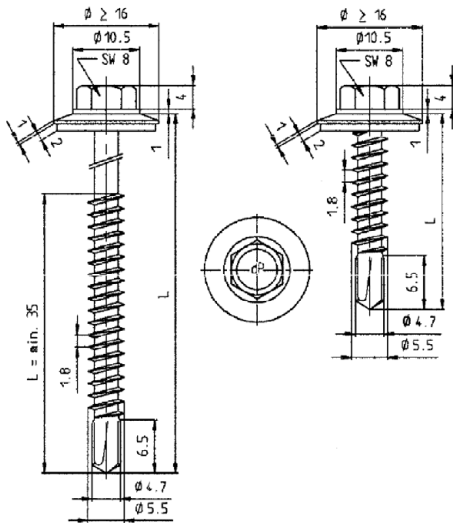
no performance determined

|                         |                | Component II |         |         |
|-------------------------|----------------|--------------|---------|---------|
|                         |                | t II [mm]    |         |         |
|                         |                | 2,50         | 3,00    | 4,00    |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] |              |         |         |
|                         | 0,40           | 1,53 ac      | 1,53 ac | 1,53 ac |
|                         | 0,50           | 1,53 ac      | 1,53 ac | 1,53 ac |
|                         | 0,55           | 1,53 ac      | 1,53 ac | 1,53 ac |
|                         | 0,63           | 2,45 ac      | 2,60 ac | 3,00 ac |
|                         | 0,75           | 2,80 ac      | 3,00 ac | 3,40 ac |
|                         | 0,88           | 3,15 ac      | 3,40 ac | 3,80 a  |
|                         | 1,00           | 3,40 ac      | 3,70 ac | 4,30 a  |
|                         | 1,25           | 4,00 -       | 4,40 -  | 5,10 -  |
|                         | 1,50           | 4,55 -       | 5,00 -  | - -     |
|                         | 1,75           | 4,55 -       | 5,00 -  | - -     |
|                         | 2,00           | 4,55 -       | 5,00 -  | - -     |
|                         | $N_{R,k}$ [kN] |              |         |         |
|                         | 0,40           | 1,51 ac      | 1,51 ac | 1,51 ac |
|                         | 0,50           | 1,78 ac      | 1,78 ac | 1,78 ac |
|                         | 0,55           | 2,25 ac      | 2,25 ac | 2,25 ac |
|                         | 0,63           | 3,30 ac      | 3,30 ac | 3,30 ac |
|                         | 0,75           | 3,25 ac      | 3,50 ac | 3,50 ac |
|                         | 0,88           | 3,25 ac      | 3,70 ac | 3,70 a  |
|                         | 1,00           | 3,25 ac      | 3,90 ac | 3,90 a  |
|                         | 1,25           | 3,25 -       | 4,10 -  | 4,10 -  |
|                         | 1,50           | 3,25 -       | 4,30 -  | - -     |
|                         | 1,75           | 3,25 -       | 4,30 -  | - -     |
|                         | 2,00           | 3,25 -       | 4,30 -  | - -     |
|                         | $N_{R,k,II}$   | 3,25 -       | 4,30 -  | 4,30 -  |

#### Self-drilling screw

ZEBRA Piasta Ø 5,5 x L, ZEBRA Piasta Ø 5,5 x L  
with hexagon head and sealing washer  $\geq \phi 16$  mm

#### Annex 52



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 5.25$  mm

#### Timber substructures

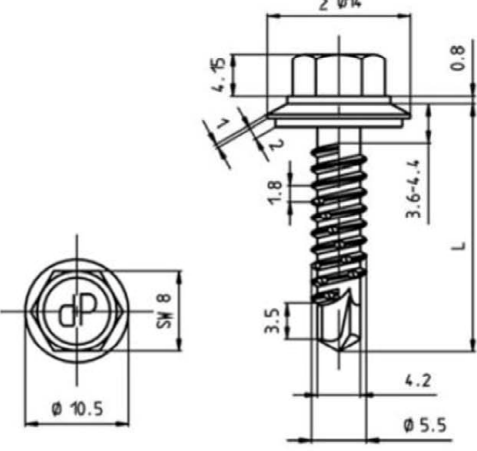
no performance determined

|             |                | Component II |        |        |        |        |        |        |        |
|-------------|----------------|--------------|--------|--------|--------|--------|--------|--------|--------|
|             |                | t II [mm]    |        |        |        |        |        |        |        |
|             |                | 2x0,63       | 2x0,75 | 2x0,88 | 2x1,00 | 2x1,13 | 2x1,25 | 2x1,50 | 2x1,75 |
| Component I | $V_{R,k}$ [kN] | 0,50         | 1,20 - | 1,20 - | 1,20 - | 1,20 - | 1,20 - | 1,20 - | 1,20 - |
|             |                | 0,55         | 1,29 - | 1,29 - | 1,29 - | 1,29 - | 1,29 - | 1,29 - | 1,29 - |
|             |                | 0,63         | 1,44 - | 1,80 - | 1,80 - | 1,80 - | 1,80 - | 1,80 - | 1,80 - |
|             |                | 0,75         | 1,67 - | 2,30 - | 2,30 - | 2,30 - | 2,30 - | 2,30 - | 2,30 - |
|             |                | 0,88         | 1,67 - | 2,30 - | 2,70 - | 2,90 - | 2,90 - | 2,90 - | 2,90 - |
|             |                | 1,00         | 1,67 - | 2,30 - | 2,70 - | 3,10 - | 3,40 - | 3,40 - | 3,40 - |
|             |                | 1,13         | 1,67 - | 2,30 - | 2,70 - | 3,10 - | 3,50 - | 3,80 - | 4,00 - |
|             |                | 1,25         | 1,67 - | 2,30 - | 2,70 - | 3,10 - | 3,50 - | 3,80 - | 4,60 - |
|             |                | 1,50         | 1,67 - | 2,30 - | 2,70 - | 3,10 - | 3,50 - | 3,80 - | 4,60 - |
|             |                | 1,75         | 1,67 - | 2,30 - | 2,70 - | 3,10 - | 3,50 - | 3,80 - | 4,60 - |
|             |                | 2,00         | 1,67 - | 2,30 - | 2,70 - | 3,10 - | 3,50 - | 3,80 - | 4,60 - |
|             | $N_{R,k}$ [kN] | 0,50         | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,57 - | 1,57 - | 1,57 - |
|             |                | 0,55         | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 1,98 - | 1,98 - |
|             |                | 0,63         | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - |
|             |                | 0,75         | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - |
|             |                | 0,88         | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - |
|             |                | 1,00         | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - |
|             |                | 1,13         | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - |
|             |                | 1,25         | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - |
|             |                | 1,50         | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - |
|             |                | 1,75         | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - |
|             |                | 2,00         | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - |
|             |                | $N_{R,k,II}$ | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - |

#### Self-drilling screw

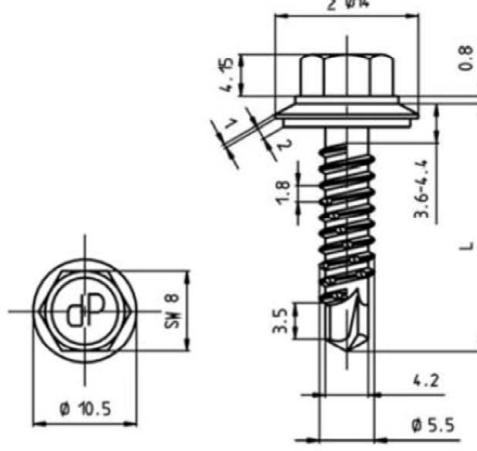
ZEBRA Piasta Ø 5,5 x L, ZEBRA Piasta plus Ø 5,5 x L  
with hexagon head and sealing washer  $\geq \phi 16$  mm

Annex 53

|                                                                                   |                                                                                                                                                       |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>Materials</b>                                                                                                                                      |
|                                                                                   | Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM                       |
|                                                                                   | Component I: S280GD to S550GD - EN 10346<br>Component II: S235 to S355 - EN 10025-1<br>S280GD to S550GD - EN 10346<br>HX300LAD to HX460LAD - EN 10346 |
|                                                                                   | <b>Drilling-capacity</b> $\Sigma(t_i) \leq 4.50$ mm                                                                                                   |
| <b>Timber substructures</b><br>no performance determined                          |                                                                                                                                                       |

|                         |                       | Component II |        |        |        |        |        |        |         |         |         |         |         |
|-------------------------|-----------------------|--------------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|
|                         |                       | t II [mm]    |        |        |        |        |        |        |         |         |         |         |         |
|                         |                       | 0,40         | 0,50   | 0,55   | 0,63   | 0,75   | 0,88   | 1,00   | 1,13    | 1,25    | 1,50    | 2,00    |         |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,40         | 0,61 - | 0,61 - | 0,61 - | 0,61 - | 0,61 - | 0,61 - | 0,61 -  | 0,61 -  | 0,61 -  | 0,61 -  | 0,61 -  |
|                         |                       | 0,50         | 0,61 - | 0,90 - | 0,90 - | 0,90 - | 0,90 - | 0,90 - | 0,90 -  | 0,90 -  | 0,90 -  | 0,90 -  | 0,90 -  |
|                         |                       | 0,55         | 0,61 - | 0,90 - | 0,94 - | 0,94 - | 0,94 - | 0,94 - | 0,94 -  | 0,94 -  | 0,94 -  | 0,94 -  | 0,94 -  |
|                         |                       | 0,63         | 0,61 - | 0,90 - | 0,94 - | 1,00 - | 1,20 - | 1,30 - | 1,40 ac | 1,70 ac | 1,90 ac | 1,90 ac | 1,90 ac |
|                         |                       | 0,75         | 0,61 - | 0,90 - | 0,94 - | 1,00 - | 1,80 - | 1,80 - | 1,80 -  | 2,00 -  | 2,10 -  | 2,40 ac | 2,40 ac |
|                         |                       | 0,88         | 0,61 - | 0,90 - | 0,94 - | 1,20 - | 1,80 - | 2,00 - | 2,20 -  | 2,20 -  | 2,50 -  | 3,10 -  | 3,10 -  |
|                         |                       | 1,00         | 0,61 - | 0,90 - | 0,94 - | 1,40 - | 1,80 - | 2,20 - | 2,60 -  | 2,60 -  | 3,00 -  | 3,70 -  | 3,70 -  |
|                         |                       | 1,13         | 0,61 - | 0,90 - | 0,94 - | 1,40 - | 2,10 - | 2,20 - | 2,60 -  | 2,90 -  | 3,10 -  | 3,60 -  | 4,40 -  |
|                         |                       | 1,25         | 0,61 - | 0,90 - | 0,94 - | 1,40 - | 2,30 - | 2,30 - | 2,60 -  | 3,10 -  | 3,60 -  | 4,10 -  | 5,10 -  |
|                         |                       | 1,50         | 0,61 - | 0,90 - | 0,94 - | 1,40 - | 2,30 - | 2,30 - | 2,60 -  | 3,10 -  | 3,60 -  | 4,10 -  | 5,10 -  |
|                         |                       | 1,75         | 0,61 - | 0,90 - | 0,94 - | 1,40 - | 2,30 - | 2,30 - | 2,60 -  | 3,10 -  | 3,60 -  | 4,10 -  | 5,10 -  |
|                         |                       | 2,00         | 0,61 - | 0,90 - | 0,94 - | 1,40 - | 2,30 - | 2,30 - | 2,60 -  | 3,10 -  | 3,60 -  | 4,10 -  | 5,10 -  |
|                         | N <sub>R,k</sub> [kN] | 0,40         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 1,70 -  | 1,70 -  |
|                         |                       | 0,50         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 1,87 -  | 1,87 -  |
|                         |                       | 0,55         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,07 -  | 2,07 -  |
|                         |                       | 0,63         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 2,40 -  |
|                         |                       | 0,75         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,10 -  |
|                         |                       | 0,88         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,20 -  |
|                         |                       | 1,00         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,30 -  |
|                         |                       | 1,13         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,30 -  |
|                         |                       | 1,25         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,30 -  |
|                         |                       | 1,50         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,30 -  |
|                         |                       | 1,75         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,30 -  |
|                         |                       | 2,00         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,30 -  |
| N <sub>R,k,II</sub>     |                       | 0,28 -       | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 - | 1,10 -  | 1,30 -  | 2,30 -  | 3,30 -  | 3,30 -  |

|                                                                                                                    |                 |
|--------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Self-drilling screw</b>                                                                                         | <b>Annex 54</b> |
| ZEBRA Piasta H Ø 5,5 x L, ZEBRA Piasta plus H Ø 5,5 x L<br>with undercut, hexagon head and sealing washer ≥ Ø14 mm |                 |

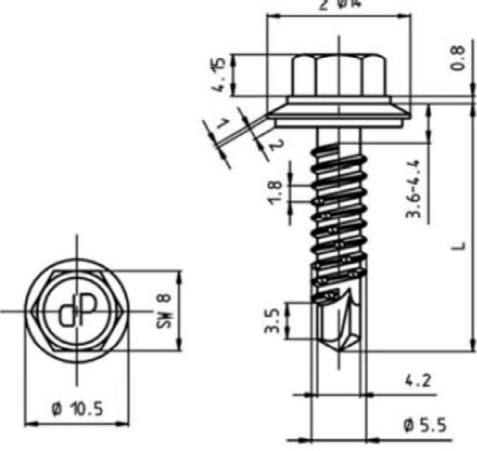
|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM</p> <p>Component I: S280GD to S550GD - EN 10346<br/>Component II: S235 to S355 - EN 10025-1<br/>S280GD to S550GD - EN 10346<br/>HX300LAD to HX460LAD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 4.50</math> mm</p> <p><b>Timber substructures</b><br/>no performance determined</p> |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                | Component II |        |        |        |         |         |         |         |
|-------------------------|----------------|--------------|--------|--------|--------|---------|---------|---------|---------|
|                         |                | t II [mm]    |        |        |        |         |         |         |         |
|                         |                | 2x0,63       | 2x0,75 | 2x0,88 | 2x1,00 | 2x1,13  | 2x1,25  | 2x1,50  | 2x2,00  |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] | 0,50         | 1,29 - | 1,29 - | 1,29 - | 1,29 -  | 1,29 -  | 1,29 -  | 1,29 -  |
|                         |                | 0,55         | 1,38 - | 1,38 - | 1,38 - | 1,38 -  | 1,38 -  | 1,38 -  | 1,38 -  |
|                         |                | 0,63         | 1,53 - | 1,40 - | 1,40 - | 1,40 -  | 1,60 -  | 1,80 ac | 1,80 ac |
|                         |                | 0,75         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 ac | 2,50 ac |
|                         |                | 0,88         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 -  | 2,50 -  |
|                         |                | 1,00         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 -  | 2,50 -  |
|                         |                | 1,13         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 -  | 2,50 -  |
|                         |                | 1,25         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 -  | 2,50 -  |
|                         |                | 1,50         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 -  | 2,50 -  |
|                         |                | 1,75         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 -  | - -     |
|                         |                | 2,00         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 -  | - -     |
|                         | $N_{R,k}$ [kN] | 0,50         | 1,03 - | 1,30 - | 1,87 - | 1,87 -  | 1,87 -  | 1,87 -  | 1,87 -  |
|                         |                | 0,55         | 1,03 - | 1,30 - | 1,90 - | 2,07 -  | 2,07 -  | 2,07 -  | 2,07 -  |
|                         |                | 0,63         | 1,03 - | 1,30 - | 1,90 - | 2,40 ac | 2,40 ac | 2,40 ac | 2,40 ac |
|                         |                | 0,75         | 1,03 - | 1,30 - | 1,90 - | 2,60 ac | 2,80 ac | 3,10 ac | 3,10 ac |
|                         |                | 0,88         | 1,03 - | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | 3,10 -  |
|                         |                | 1,00         | 1,03 - | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | 3,10 -  |
|                         |                | 1,13         | 1,03 - | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | 3,10 -  |
|                         |                | 1,25         | 1,03 - | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | 3,10 -  |
|                         |                | 1,50         | 1,03 - | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | 3,10 -  |
|                         |                | 1,75         | 1,03 - | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | - -     |
|                         |                | 2,00         | 1,03 - | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | - -     |
|                         | $N_{R,k,II}$   | 1,03         | -      | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | 3,10 -  |

**Self-drilling screw**

ZEBRA Piasta H Ø 5,5 x L, ZEBRA Piasta plus H Ø 5,5 x L  
with undercut, hexagon head and sealing washer  $\geq \text{Ø}14$  mm

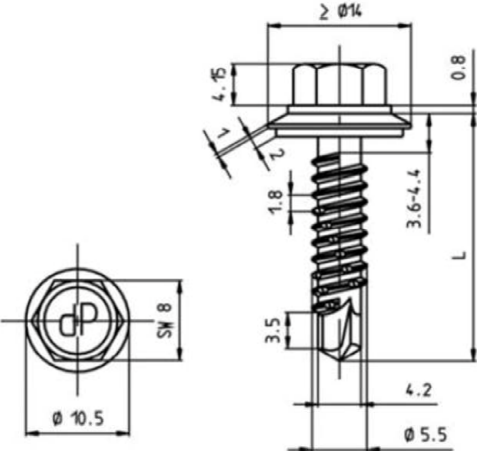
**Annex 55**

|                                                                                   |                                                                                                                                 |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
|  | <u>Materials</u>                                                                                                                |
|                                                                                   | Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM |
|                                                                                   | Component I: Aluminum alloy<br>with $R_m \geq 165 \text{ N/mm}^2$ – EN 573<br>with $R_m \geq 215 \text{ N/mm}^2$ – EN 573       |
|                                                                                   | Component II: S235 to S355 - EN 10025-1<br>S280GD to S550GD - EN 10346<br>HX300LAD to HX460LAD - EN 10346                       |
| <u>Drilling-capacity</u> $\Sigma(t_i) \leq 4.80 \text{ mm}$                       |                                                                                                                                 |
| <u>Timber substructures</u><br>no performance determined                          |                                                                                                                                 |

|                                                                               |                | Component II, steel sheet |               |               |               |               |                 |                 |                 |                 |
|-------------------------------------------------------------------------------|----------------|---------------------------|---------------|---------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|
|                                                                               |                | t II [mm]                 |               |               |               |               |                 |                 |                 |                 |
|                                                                               |                | 0,40                      | 0,50          | 0,63          | 0,75          | 0,88          | 1,00            | 1,25            | 1,50            | 2,00            |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,40                      | 0,20 - 0,20 - | 0,20 - 0,20 - | 0,20 - 0,20 - | 0,20 - 0,20 - | 0,20 - 0,20 -   | 0,20 - 0,20 -   | 0,20 - 0,20 -   | 0,20 - 0,20 -   |
|                                                                               |                | 0,50                      | 0,20 - 0,42 - | 0,43 - 0,43 - | 0,45 - 0,45 - | 0,46 - 0,46 - | 0,47 - 0,47 -   | 0,49 ac 0,49 ac | 0,49 ac 0,49 ac | 0,49 ac 0,49 ac |
|                                                                               |                | 0,70                      | 0,20 - 0,53 - | 0,62 - 0,62 - | 0,68 - 0,68 - | 0,69 - 0,69 - | 0,70 - 0,70 -   | 0,73 ac 0,73 ac | 0,73 ac 0,73 ac | 0,73 ac 0,73 ac |
|                                                                               |                | 0,80                      | 0,20 - 0,59 - | 0,68 - 0,68 - | 0,77 - 0,77 - | 0,81 - 0,81 - | 0,82 - 0,82 -   | 0,85 ac 0,85 ac | 0,85 ac 0,85 ac | 0,85 ac 0,85 ac |
|                                                                               |                | 1,00                      | 0,20 - 0,70 - | 0,79 - 0,79 - | 0,88 - 0,88 - | 0,97 - 0,97 - | 1,05 ac 1,05 ac | 1,13 ac 1,13 ac | 1,26 ac 1,26 ac | 1,26 ac 1,26 ac |
|                                                                               |                | 1,20                      | 0,20 - 0,70 - | 0,81 - 0,81 - | 0,92 - 0,92 - | 1,02 - 1,02 - | 1,13 ac 1,13 ac | 1,22 ac 1,22 ac | 1,26 ac 1,26 ac | 1,41 ac 1,41 ac |
|                                                                               |                | 1,50                      | 0,20 - 0,70 - | 0,81 - 0,81 - | 0,92 - 0,92 - | 1,02 - 1,02 - | 1,13 ac 1,13 ac | 1,22 ac 1,22 ac | 1,26 ac 1,26 ac | 1,63 ac 1,63 ac |
|                                                                               |                | 2,00                      | 0,20 - 0,70 - | 0,81 - 0,81 - | 0,92 - 0,92 - | 1,02 - 1,02 - | 1,13 ac 1,13 ac | 1,22 ac 1,22 ac | 1,26 ac 1,26 ac | 1,63 ac 1,63 ac |
|                                                                               | $N_{R,k,II}$   | 0,28                      | 0,39          | 0,60          | 0,70          | 0,80          | 0,90            | 1,30            | 2,30            | 3,30            |

|                                                                               |                | Component II, steel sheet |               |               |               |               |                 |                 |                 |                 |
|-------------------------------------------------------------------------------|----------------|---------------------------|---------------|---------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|
|                                                                               |                | t II [mm]                 |               |               |               |               |                 |                 |                 |                 |
|                                                                               |                | 0,40                      | 0,50          | 0,63          | 0,75          | 0,88          | 1,00            | 1,25            | 1,50            | 2,00            |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,40                      | 0,24 - 0,24 - | 0,24 - 0,24 - | 0,24 - 0,24 - | 0,24 - 0,24 - | 0,24 - 0,24 -   | 0,24 - 0,24 -   | 0,24 - 0,24 -   | 0,24 - 0,24 -   |
|                                                                               |                | 0,50                      | 0,24 - 0,55 - | 0,56 - 0,56 - | 0,59 - 0,59 - | 0,60 - 0,60 - | 0,61 - 0,61 -   | 0,64 ac 0,64 ac | 0,64 ac 0,64 ac | 0,64 ac 0,64 ac |
|                                                                               |                | 0,70                      | 0,24 - 0,61 - | 0,75 - 0,75 - | 0,86 - 0,86 - | 0,91 - 0,91 - | 0,91 - 0,91 -   | 0,95 ac 0,95 ac | 0,95 ac 0,95 ac | 0,95 ac 0,95 ac |
|                                                                               |                | 0,80                      | 0,24 - 0,64 - | 0,81 - 0,81 - | 0,98 - 0,98 - | 1,06 - 1,06 - | 1,07 - 1,07 -   | 1,11 ac 1,11 ac | 1,11 ac 1,11 ac | 1,11 ac 1,11 ac |
|                                                                               |                | 1,00                      | 0,24 - 0,70 - | 0,81 - 0,81 - | 1,04 - 1,04 - | 1,21 - 1,21 - | 1,37 ac 1,37 ac | 1,47 ac 1,47 ac | 1,64 ac 1,64 ac | 1,64 ac 1,64 ac |
|                                                                               |                | 1,20                      | 0,24 - 0,70 - | 0,89 - 0,89 - | 1,07 - 1,07 - | 1,26 - 1,26 - | 1,47 ac 1,47 ac | 1,59 ac 1,59 ac | 1,64 ac 1,64 ac | 1,84 ac 1,84 ac |
|                                                                               |                | 1,50                      | 0,24 - 0,70 - | 0,89 - 0,89 - | 1,07 - 1,07 - | 1,26 - 1,26 - | 1,47 ac 1,47 ac | 1,59 ac 1,59 ac | 1,64 ac 1,64 ac | 2,12 ac 2,12 ac |
|                                                                               |                | 2,00                      | 0,24 - 0,70 - | 0,89 - 0,89 - | 1,07 - 1,07 - | 1,26 - 1,26 - | 1,47 ac 1,47 ac | 1,59 ac 1,59 ac | 1,64 ac 1,64 ac | 2,12 ac 2,12 ac |
|                                                                               | $N_{R,k,II}$   | 0,28                      | 0,39          | 0,60          | 0,70          | 0,80          | 0,90            | 1,30            | 2,30            | 3,30            |

|                                                                                                                                        |                 |
|----------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Self-drilling screw</b>                                                                                                             | <b>Annex 56</b> |
| ZEBRA Piasta H Ø 5,5 x L, ZEBRA Piasta plus H Ø 5,5 x L<br>with undercut, hexagon head and sealing washer $\geq \text{Ø}14 \text{ mm}$ |                 |

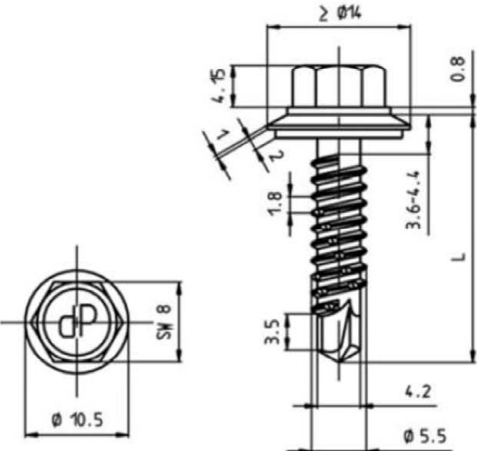
|                                                                                   |                                                                                                                                 |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
|  | <u>Materials</u>                                                                                                                |
|                                                                                   | Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM |
|                                                                                   | Component I: Aluminum alloy<br>with $R_m \geq 165 \text{ N/mm}^2$ – EN 573<br>with $R_m \geq 215 \text{ N/mm}^2$ – EN 573       |
|                                                                                   | Component II: Aluminum alloy<br>with $R_m \geq 165 \text{ N/mm}^2$ – EN 573<br>with $R_m \geq 215 \text{ N/mm}^2$ – EN 573      |
| <u>Drilling-capacity</u> $\Sigma(t_i) \leq 5.00 \text{ mm}$                       |                                                                                                                                 |
| <u>Timber substructures</u><br>no performance determined                          |                                                                                                                                 |

|                                                                               |                | Component II, Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$ |      |      |      |         |         |         |         |         |         |
|-------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------|------|------|------|---------|---------|---------|---------|---------|---------|
|                                                                               |                | t II [mm]                                                       |      |      |      |         |         |         |         |         |         |
|                                                                               |                | 0,50                                                            | 0,70 | 0,80 | 1,00 | 1,20    | 1,50    | 2,00    | 3,00    | 4,00    |         |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,50                                                            | 0,26 | 0,34 | 0,38 | 0,45    | 0,49 ac | 0,49 ac | 0,49 ac | 0,49 ac | 0,49 ac |
|                                                                               |                | 0,60                                                            | 0,28 | 0,46 | 0,50 | 0,57    | 0,61 ac | 0,61 ac | 0,61 ac | 0,61 ac | 0,61 a  |
|                                                                               |                | 0,70                                                            | 0,29 | 0,58 | 0,61 | 0,69    | 0,73 ac | 0,73 ac | 0,73 ac | 0,73 ac | 0,73 a  |
|                                                                               |                | 0,80                                                            | 0,31 | 0,59 | 0,73 | 0,81    | 0,85 ac | 0,85 ac | 0,85 ac | 0,85 ac | 0,85 a  |
|                                                                               |                | 0,90                                                            | 0,32 | 0,61 | 0,75 | 0,93    | 0,97 ac | 1,06 ac | 1,06 ac | 1,06 ac | 1,06 a  |
|                                                                               |                | 1,00                                                            | 0,34 | 0,62 | 0,77 | 1,05 ac | 1,09 ac | 1,26 ac | 1,26 ac | 1,26 ac | 1,26 a  |
|                                                                               |                | 1,20                                                            | 0,34 | 0,63 | 0,78 | 1,07 ac | 1,21 ac | 1,26 ac | 1,41 ac | 1,70 a  | - -     |
|                                                                               |                | 1,50                                                            | 0,34 | 0,63 | 0,78 | 1,07 ac | 1,21 ac | 1,26 ac | 1,63 ac | 2,36 a  | - -     |
|                                                                               |                | 2,00                                                            | 0,34 | 0,63 | 0,78 | 1,07 ac | 1,21 a  | 1,26 a  | 1,63 a  | 2,36 a  | - -     |
|                                                                               | $N_{R,k,II}$   |                                                                 | 0,13 | 0,24 | 0,30 | 0,53    | 0,65    | 0,83    | 1,03    | 2,16    | 3,37    |

|                                                                               |                | Component II, Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$ |      |      |      |      |      |      |      |      |      |
|-------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------|------|------|------|------|------|------|------|------|------|
|                                                                               |                | t II [mm]                                                       |      |      |      |      |      |      |      |      |      |
|                                                                               |                | 0,50                                                            | 0,70 | 0,80 | 1,00 | 1,20 | 1,50 | 2,00 | 3,00 | 4,00 |      |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,50                                                            | 0,34 | 0,44 | 0,50 | 0,59 | 0,64 | 0,64 | 0,64 | 0,64 | 0,64 |
|                                                                               |                | 0,60                                                            | 0,36 | 0,60 | 0,65 | 0,74 | 0,79 | 0,79 | 0,79 | 0,79 | 0,79 |
|                                                                               |                | 0,70                                                            | 0,38 | 0,76 | 0,79 | 0,90 | 0,95 | 0,95 | 0,95 | 0,95 | 0,95 |
|                                                                               |                | 0,80                                                            | 0,40 | 0,77 | 0,95 | 1,06 | 1,11 | 1,11 | 1,11 | 1,11 | 1,11 |
|                                                                               |                | 0,90                                                            | 0,42 | 0,79 | 0,98 | 1,21 | 1,26 | 1,38 | 1,38 | 1,38 | 1,38 |
|                                                                               |                | 1,00                                                            | 0,44 | 0,81 | 1,00 | 1,37 | 1,42 | 1,64 | 1,64 | 1,64 | 1,64 |
|                                                                               |                | 1,20                                                            | 0,44 | 0,82 | 1,02 | 1,39 | 1,58 | 1,64 | 1,84 | 2,22 | - -  |
|                                                                               |                | 1,50                                                            | 0,44 | 0,82 | 1,02 | 1,39 | 1,58 | 1,64 | 2,12 | 3,07 | - -  |
|                                                                               |                | 2,00                                                            | 0,44 | 0,82 | 1,02 | 1,39 | 1,58 | 1,64 | 2,12 | 3,07 | - -  |
|                                                                               | $N_{R,k,II}$   |                                                                 | 0,16 | 0,28 | 0,34 | 0,69 | 0,79 | 0,95 | 1,30 | 2,56 | 4,00 |

|                                                                                                                                        |                 |
|----------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Self-drilling screw</b>                                                                                                             | <b>Annex 57</b> |
| ZEBRA Piasta H Ø 5,5 x L, ZEBRA Piasta plus H Ø 5,5 x L<br>with undercut, hexagon head and sealing washer $\geq \text{Ø}14 \text{ mm}$ |                 |



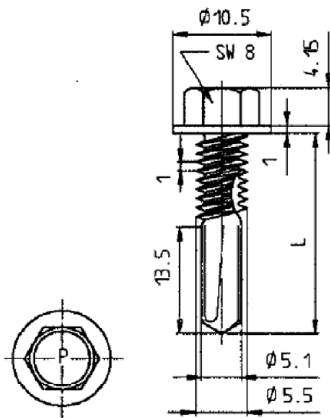
|                                                                                   |                                                                                                                                 |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
|  | <u>Materials</u>                                                                                                                |
|                                                                                   | Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM |
|                                                                                   | Component I: Aluminum alloy<br>with $R_m \geq 165 \text{ N/mm}^2$ – EN 573<br>with $R_m \geq 215 \text{ N/mm}^2$ – EN 573       |
|                                                                                   | Component II: S235 to S355 - EN 10025-1<br>S280GD to S550GD - EN 10346<br>HX300LAD to HX460LAD - EN 10346                       |
| <u>Drilling-capacity</u> $\Sigma(t_i) \leq 4.50 \text{ mm}$                       |                                                                                                                                 |
| <u>Timber substructures</u><br>no performance determined                          |                                                                                                                                 |

|                                                                               |                | Component II, steel sheet |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------|----------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|
| t II [mm]                                                                     |                | 2x0,63                    | 2x0,75 | 2x0,88 | 2x1,00 | 2x1,13 | 2x1,25 | 2x1,50 | 2x2,00 |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,40                      | 0,20 - | 0,20 - | 0,20 - | 0,20 - | 0,20 - | 0,20 - | 0,20 - |
|                                                                               |                | 0,50                      | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - |
|                                                                               |                | 0,60                      | 0,66 - | 0,69 - | 0,72 - | 0,75 - | 0,75 - | 0,75 - | 0,75 - |
|                                                                               |                | 0,80                      | 0,95 - | 1,03 - | 1,13 - | 1,21 - | 1,21 - | 1,21 - | 1,21 - |
|                                                                               |                | 1,00                      | 1,19 - | 1,35 - | 1,51 - | 1,67 - | 1,67 - | 1,67 - | - -    |
|                                                                               |                | 1,20                      | 1,19 - | 1,35 - | 1,51 - | 1,67 - | 1,67 - | 1,67 - | - -    |
|                                                                               |                | 1,50                      | 1,19 - | 1,35 - | 1,51 - | 1,67 - | 1,67 - | 1,67 - | - -    |
|                                                                               |                | 2,00                      | 1,19 - | 1,35 - | 1,51 - | 1,67 - | 1,67 - | - -    | - -    |
| $N_{R,k,II}$                                                                  |                | 1,03                      | 1,30   | 1,90   | 2,60   | 2,80   | 3,10   | 3,10   | 3,10   |

|                                                                               |                | Component II, steel sheet |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------|----------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|
| t II [mm]                                                                     |                | 2x0,63                    | 2x0,75 | 2x0,88 | 2x1,00 | 2x1,13 | 2x1,25 | 2x1,50 | 2x2,00 |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,40                      | 0,24 - | 0,24 - | 0,24 - | 0,24 - | 0,24 - | 0,24 - | 0,24 - |
|                                                                               |                | 0,50                      | 0,68 - | 0,68 - | 0,68 - | 0,68 - | 0,68 - | 0,68 - | 0,68 - |
|                                                                               |                | 0,60                      | 0,86 - | 0,90 - | 0,94 - | 0,98 - | 0,98 - | 0,98 - | 0,98 - |
|                                                                               |                | 0,80                      | 1,24 - | 1,34 - | 1,47 - | 1,58 - | 1,58 - | 1,58 - | 1,58 - |
|                                                                               |                | 1,00                      | 1,55 - | 1,76 - | 1,97 - | 2,18 - | 2,18 - | 2,18 - | - -    |
|                                                                               |                | 1,20                      | 1,55 - | 1,76 - | 1,97 - | 2,18 - | 2,18 - | 2,18 - | - -    |
|                                                                               |                | 1,50                      | 1,55 - | 1,76 - | 1,97 - | 2,18 - | 2,18 - | 2,18 - | - -    |
|                                                                               |                | 2,00                      | 1,55 - | 1,76 - | 1,97 - | 2,18 - | 2,18 - | - -    | - -    |
| $N_{R,k,II}$                                                                  |                | 1,03                      | 1,30   | 1,90   | 2,60   | 2,80   | 3,10   | 3,10   | 3,10   |

|                                                                                                                                        |                 |
|----------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Self-drilling screw</b>                                                                                                             | <b>Annex 58</b> |
| ZEBRA Piasta H Ø 5,5 x L, ZEBRA Piasta plus H Ø 5,5 x L<br>with undercut, hexagon head and sealing washer $\geq \text{Ø}14 \text{ mm}$ |                 |





#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 13.50$  mm

#### Timber substructures

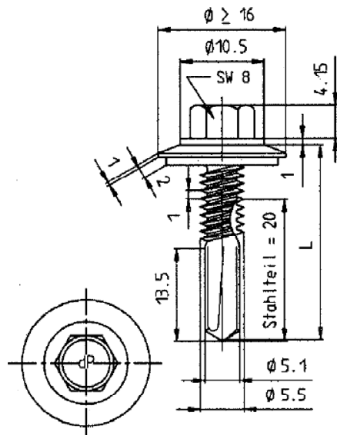
no performance determined

|                         |                       | Component II |         |           |           |           |         |
|-------------------------|-----------------------|--------------|---------|-----------|-----------|-----------|---------|
|                         |                       | t II [mm]    |         |           |           |           |         |
|                         |                       | 4,00         | 5,00    | 6,00      | 8,00      | 10,0      | 12,0    |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] |              |         |           |           |           |         |
|                         | 0,63                  | 3,26 ac      | 3,26 ac | 3,26 ac   | 3,26 ac   | 3,26 ac   | 3,26 ac |
|                         | 0,75                  | 4,42 ac      | 4,42 ac | 4,42 ac   | 4,42 ac   | 4,42 ac   | 4,42 ac |
|                         | 0,88                  | 5,13 ac      | 5,13 ac | 5,13 ac   | 5,13 ac   | 5,13 ac   | 5,13 ac |
|                         | 1,00                  | 5,79 ac      | 5,79 ac | 5,79 ac   | 5,79 ac   | 5,79 ac   | 5,79 ac |
|                         | 1,13                  | 6,67 ac      | 6,67 ac | 6,67 ac   | 6,67 ac   | 6,67 ac   | 6,67 ac |
|                         | 1,25                  | 7,48 ac      | 7,48 ac | 7,48 ac   | 7,48 ac   | 7,48 ac   | 7,48 ac |
|                         | 1,50                  | 9,16 ac      | 9,16 ac | 9,16 ac   | 9,16 ac   | 9,16 ac   | 9,16 ac |
|                         | 1,75                  | 9,16 ac      | 9,16 ac | 9,16 ac   | 9,16 ac   | 9,16 ac   | - -     |
|                         | 2,00                  | 9,16 ac      | 9,16 ac | 9,16 ac   | 9,16 ac   | 9,16 ac   | - -     |
|                         | N <sub>R,k</sub> [kN] |              |         |           |           |           |         |
|                         | 0,63                  | 1,60 ac      | 1,60 ac | 1,60 abcd | 1,60 abcd | 1,60 abcd | 1,60 ac |
|                         | 0,75                  | 2,10 ac      | 2,10 ac | 2,10 abcd | 2,10 abcd | 2,10 abcd | 2,10 ac |
|                         | 0,88                  | 2,60 ac      | 2,60 ac | 2,60 abcd | 2,60 abcd | 2,60 abcd | 2,60 a  |
|                         | 1,00                  | 3,10 ac      | 3,10 ac | 3,10 abcd | 3,10 abcd | 3,10 abcd | 3,10 a  |
|                         | 1,13                  | 3,60 ac      | 3,60 ac | 3,60 ac   | 3,60 ac   | 3,60 ac   | 3,60 ac |
|                         | 1,25                  | 4,10 ac      | 4,10 ac | 4,10 ac   | 4,10 ac   | 4,10 ac   | 4,10 ac |
|                         | 1,50                  | 5,20 ac      | 5,20 ac | 5,20 ac   | 5,20 ac   | 5,20 ac   | 5,20 ac |
|                         | 1,75                  | 5,20 ac      | 5,20 ac | 5,20 ac   | 5,20 ac   | 5,20 ac   | - -     |
|                         | 2,00                  | 5,20 ac      | 5,20 ac | 5,20 ac   | 5,20 ac   | 5,20 ac   | - -     |
|                         | N <sub>R,k,II</sub>   | 6,20 -       | 6,30 -  | 6,30 -    | 6,30 -    | 6,30 -    | 6,30 -  |

#### Self-drilling screw

ZEBRA Piasta Ø 5,5 -12 x L, ZEBRA Piasta plus Ø 5,5 -12 x L  
with hexagon head and extra-long drill bit

#### Annex 59



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506  
with vulcanized EPDM

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 13.50$  mm

#### Timber substructures

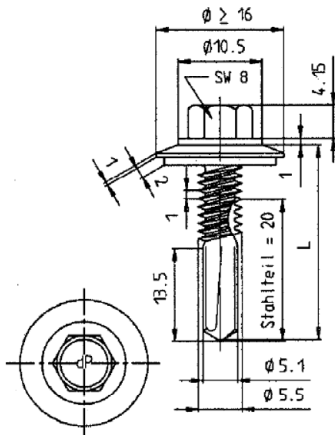
no performance determined

|                         |                | Component II |           |           |           |           |           |
|-------------------------|----------------|--------------|-----------|-----------|-----------|-----------|-----------|
|                         |                | t II [mm]    |           |           |           |           |           |
|                         |                | 4,00         | 5,00      | 6,00      | 8,00      | 10,0      | 12,0      |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] |              |           |           |           |           |           |
|                         | 0,63           | 2,60 abcd    | 2,60 abcd | 2,60 abcd | 2,60 abcd | 2,60 abcd | 2,60 abcd |
|                         | 0,75           | 3,10 abcd    | 3,10 abcd | 3,10 abcd | 3,10 abcd | 3,10 abcd | 3,10 abcd |
|                         | 0,88           | 3,60 ac      | 3,60 ac   | 3,60 ac   | 3,60 ac   | 3,60 ac   | 3,60 ac   |
|                         | 1,00           | 4,10 ac      | 4,10 ac   | 4,10 ac   | 4,10 ac   | 4,10 ac   | 4,10 ac   |
|                         | 1,13           | 4,60 ac      | 4,60 ac   | 4,60 ac   | 4,60 ac   | 4,60 ac   | 4,60 ac   |
|                         | 1,25           | 5,10 ac      | 5,10 ac   | 5,10 ac   | 5,10 ac   | 5,10 ac   | 5,10 ac   |
|                         | 1,50           | 6,00 ac      | 6,00 ac   | 6,00 ac   | 6,00 ac   | 6,00 ac   | 6,00 ac   |
|                         | 1,75           | 6,00 -       | 6,00 -    | 6,00 -    | 6,00 -    | 6,00 -    | - -       |
|                         | 2,00           | 6,00 -       | 6,00 -    | 6,00 -    | 6,00 -    | 6,00 -    | - -       |
|                         | $N_{R,k}$ [kN] |              |           |           |           |           |           |
|                         | 0,50           | 1,67 abcd    | 1,67 abcd | 1,67 abcd | 1,67 abcd | 1,67 abcd | 1,67 abcd |
|                         | 0,55           | 2,11 abcd    | 2,11 abcd | 2,11 abcd | 2,11 abcd | 2,11 abcd | 2,11 abcd |
|                         | 0,63           | 3,10 abcd    | 3,10 abcd | 3,10 abcd | 3,10 abcd | 3,10 abcd | 3,10 abcd |
|                         | 0,75           | 3,60 abcd    | 3,60 abcd | 3,60 abcd | 3,60 abcd | 3,60 abcd | 3,60 abcd |
|                         | 0,88           | 4,10 ac      | 4,10 ac   | 4,10 ac   | 4,10 ac   | 4,10 ac   | 4,10 ac   |
|                         | 1,00           | 4,50 ac      | 4,50 ac   | 4,50 ac   | 4,50 ac   | 4,50 ac   | 4,50 ac   |
|                         | 1,13           | 5,00 ac      | 5,00 ac   | 5,00 ac   | 5,00 ac   | 5,00 ac   | 5,00 ac   |
|                         | 1,25           | 5,40 ac      | 5,40 ac   | 5,40 ac   | 5,40 ac   | 5,40 ac   | 5,40 ac   |
|                         | 1,50           | 6,20 ac      | 6,30 ac   | 6,30 ac   | 6,30 ac   | 6,30 ac   | 6,30 ac   |
|                         | 1,75           | 6,20 -       | 6,30 -    | 6,30 -    | 6,30 -    | 6,30 -    | - -       |
|                         | 2,00           | 6,20 -       | 6,30 -    | 6,30 -    | 6,30 -    | 6,30 -    | - -       |
|                         | $N_{R,k,II}$   | 6,20 -       | 6,30 -    | 6,30 -    | 6,30 -    | 6,30 -    | 6,30 -    |

#### Self-drilling screw

ZEBRA Piasta Ø 5,5 -12 x L, ZEBRA Piasta plus Ø 5,5 -12 x L  
with hexagon head and sealing washer  $\geq \varnothing 16$  mm and extra long drill bit

#### Annex 60



## Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506  
with vulcanized EPDM

Component I: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity     $\Sigma(t_i) \leq 13.50$  mm

### Timber substructures

no performance determined

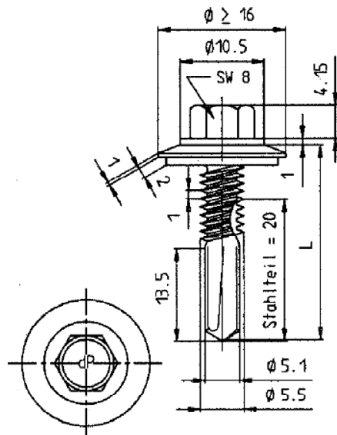
|                                                                                        |                       | Component II, steel sheet |        |        |        |        |        |        |        |
|----------------------------------------------------------------------------------------|-----------------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                        |                       | t II [mm]                 |        |        |        |        |        |        |        |
|                                                                                        |                       | 4,00                      | 6,00   | 7,00   | 8,00   | 9,00   | 10,00  | 11,00  | 12,00  |
| Component I, t I [mm]<br>Aluminum alloy with<br>R <sub>m</sub> ≥ 165 N/mm <sup>2</sup> | V <sub>R,k</sub> [kN] | 0,50                      | 0,85 - | 0,85 - | 0,85 - | 0,85 - | 0,85 - | 0,85 - | 0,85 - |
|                                                                                        |                       | 0,70                      | 1,39 - | 1,39 - | 1,39 - | 1,39 - | 1,39 - | 1,39 - | 1,39 - |
|                                                                                        |                       | 0,80                      | 1,66 - | 1,66 - | 1,66 - | 1,66 - | 1,66 - | 1,66 - | 1,66 - |
|                                                                                        |                       | 1,00                      | 2,23 - | 2,23 - | 2,23 - | 2,23 - | 2,23 - | 2,23 - | 2,23 - |
|                                                                                        |                       | 1,20                      | 2,66 - | 2,66 - | 2,66 - | 2,66 - | 2,66 - | 2,66 - | 2,66 - |
|                                                                                        |                       | 1,50                      | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - |
|                                                                                        |                       | 2,00                      | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - |
|                                                                                        |                       | N <sub>R,k,II</sub>       | 6,20   | 6,30   | 6,30   | 6,30   | 6,30   | 6,30   | 6,30   |

|                                                                                        |                       | Component II, steel sheet |        |        |        |        |        |        |        |        |
|----------------------------------------------------------------------------------------|-----------------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                        |                       | t II [mm]                 |        |        |        |        |        |        |        |        |
|                                                                                        |                       | 4,00                      | 6,00   | 7,00   | 8,00   | 9,00   | 10,00  | 11,00  | 12,00  |        |
| Component I, t I [mm]<br>Aluminum alloy with<br>R <sub>m</sub> ≥ 215 N/mm <sup>2</sup> | V <sub>R,k</sub> [kN] | 0,50                      | 1,19 - | 1,19 - | 1,19 - | 1,19 - | 1,19 - | 1,19 - | 1,19 - | 1,19 - |
|                                                                                        |                       | 0,70                      | 1,94 - | 1,94 - | 1,94 - | 1,94 - | 1,94 - | 1,94 - | 1,94 - | 1,94 - |
|                                                                                        |                       | 0,80                      | 2,32 - | 2,32 - | 2,32 - | 2,32 - | 2,32 - | 2,32 - | 2,32 - | 2,32 - |
|                                                                                        |                       | 1,00                      | 3,11 - | 3,11 - | 3,11 - | 3,11 - | 3,11 - | 3,11 - | 3,11 - | 3,11 - |
|                                                                                        |                       | 1,20                      | 3,71 - | 3,71 - | 3,71 - | 3,71 - | 3,71 - | 3,71 - | 3,71 - | 3,71 - |
|                                                                                        |                       | 1,50                      | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - |
|                                                                                        |                       | 2,00                      | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - |
|                                                                                        |                       | N <sub>R,k,II</sub>       | 6,20   | 6,30   | 6,30   | 6,30   | 6,30   | 6,30   | 6,30   | 6,30   |

### Self-drilling screw

ZEBRA Piasta Ø 5,5 -12 x L, ZEBRA Piasta plus Ø 5,5 -12 x L  
with hexagon head and sealing washer ≥ Ø16 mm and extra long drill bit

## Annex 61



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Component II: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Drilling-capacity  $\Sigma(t_i) \leq 13.50 \text{ mm}$

#### Timber substructures

no performance determined

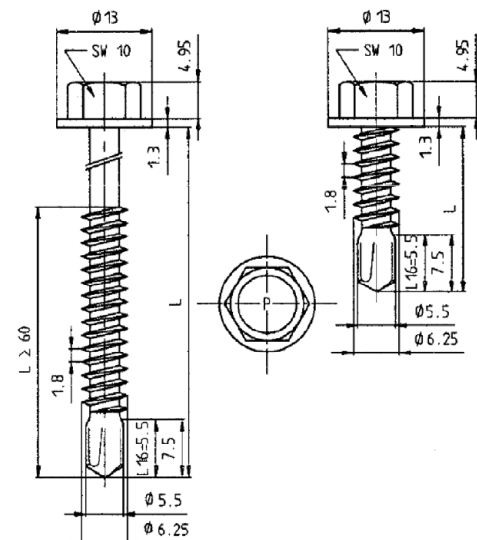
|                                                                                                 |              | Component II, Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$ |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                                                       |        |        |        |        |        |        |        |
|                                                                                                 |              | 4,00                                                            | 6,00   | 7,00   | 8,00   | 9,00   | 10,00  | 11,00  | 12,00  |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,50         | 0,85 -                                                          | 0,85 - | 0,85 - | 0,85 - | 0,85 - | 0,85 - | 0,85 - | 0,85 - |
|                                                                                                 | 0,70         | 1,39 -                                                          | 1,39 - | 1,39 - | 1,39 - | 1,39 - | 1,39 - | 1,39 - | 1,39 - |
|                                                                                                 | 0,80         | 1,66 -                                                          | 1,66 - | 1,66 - | 1,66 - | 1,66 - | 1,66 - | 1,66 - | 1,66 - |
|                                                                                                 | 1,00         | 2,23 -                                                          | 2,23 - | 2,23 - | 2,23 - | 2,23 - | 2,23 - | 2,23 - | 2,23 - |
|                                                                                                 | 1,20         | 2,66 -                                                          | 2,66 - | 2,66 - | 2,66 - | 2,66 - | 2,66 - | 2,66 - | 2,66 - |
|                                                                                                 | 1,50         | 3,30 -                                                          | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - |
|                                                                                                 | 2,00         | 3,30 -                                                          | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - |
|                                                                                                 | $N_{R,k,II}$ | 1,08                                                            | 2,22   | 2,22   | 2,22   | 2,22   | 2,22   | 2,22   | 2,22   |

|                                                                                                 |              | Component II, Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$ |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                                                       |        |        |        |        |        |        |        |
|                                                                                                 |              | 4,00                                                            | 6,00   | 7,00   | 8,00   | 9,00   | 10,00  | 11,00  | 12,00  |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,50         | 1,19 -                                                          | 1,19 - | 1,19 - | 1,19 - | 1,19 - | 1,19 - | 1,19 - | 1,19 - |
|                                                                                                 | 0,70         | 1,94 -                                                          | 1,94 - | 1,94 - | 1,94 - | 1,94 - | 1,94 - | 1,94 - | 1,94 - |
|                                                                                                 | 0,80         | 2,32 -                                                          | 2,32 - | 2,32 - | 2,32 - | 2,32 - | 2,32 - | 2,32 - | 2,32 - |
|                                                                                                 | 1,00         | 3,11 -                                                          | 3,11 - | 3,11 - | 3,11 - | 3,11 - | 3,11 - | 3,11 - | 3,11 - |
|                                                                                                 | 1,20         | 3,71 -                                                          | 3,71 - | 3,71 - | 3,71 - | 3,71 - | 3,71 - | 3,71 - | 3,71 - |
|                                                                                                 | 1,50         | 4,61 -                                                          | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - |
|                                                                                                 | 2,00         | 4,61 -                                                          | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - |
|                                                                                                 | $N_{R,k,II}$ | 1,41                                                            | 2,90   | 2,90   | 2,90   | 2,90   | 2,90   | 2,90   | 2,90   |

#### Self-drilling screw

ZEBRA Piasta Ø 5,5 - 12x L, ZEBRA Piasta Ø 5,5 – 12 x L  
with hexagon head and sealing washer  $\geq \phi 16 \text{ mm}$  and extra long drill bit

#### Annex 62

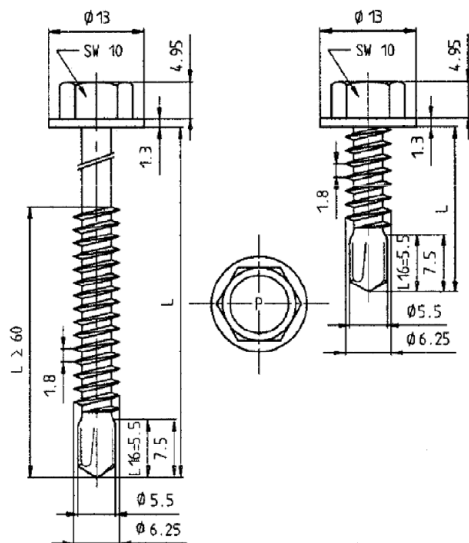
|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506 Washer: none</p> <p>Component I: S280GD to S550GD - EN 10346</p> <p>Component II: S235 to S355 - EN 10025-1<br/>S280GD to S550GD - EN 10346<br/>HX300LAD to HX460LAD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 6.00</math> mm</p> <p><b>Timber substructures</b><br/>no performance determined</p> |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                       | Component II |         |         |         |         |         |         |         |
|-------------------------|-----------------------|--------------|---------|---------|---------|---------|---------|---------|---------|
|                         |                       | t II [mm]    |         |         |         |         |         |         |         |
|                         |                       | 0,63         | 0,75    | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] |              |         |         |         |         |         |         |         |
|                         | 0,40                  | -            | -       | -       | -       | -       | -       | 1,64 ac | 1,64 ac |
|                         | 0,50                  | -            | -       | -       | -       | -       | -       | 1,76 ac | 1,76 ac |
|                         | 0,63                  | 0,80 ac      | 1,10 ac | 1,40 ac | 1,70 ac | 1,90 ac | 2,00 ac | 2,20 ac | 2,60 ac |
|                         | 0,75                  | 1,00 ac      | 1,30 ac | 1,50 ac | 1,80 ac | 2,20 ac | 2,40 ac | 2,60 ac | 3,20 ac |
|                         | 0,88                  | 1,20 ac      | 1,50 ac | 1,70 ac | 2,00 ac | 2,40 ac | 2,80 ac | 3,00 ac | 3,70 ac |
|                         | 1,00                  | 1,30 -       | 1,60 ac | 1,90 ac | 2,10 ac | 2,80 ac | 3,00 ac | 3,40 ac | 4,00 ac |
|                         | 1,13                  | 1,40 -       | 1,70 -  | 2,00 -  | 2,30 -  | 3,00 -  | 3,40 -  | 3,70 -  | 4,40 ac |
|                         | 1,25                  | 1,50 -       | 1,80 -  | 2,10 -  | 2,50 -  | 3,20 -  | 3,50 -  | 4,00 -  | 4,90 -  |
|                         | 1,50                  | 1,60 -       | 2,00 -  | 2,40 -  | 2,80 -  | 3,30 -  | 3,80 -  | 4,60 -  | 5,80 -  |
|                         | 1,75                  | 1,60 -       | 2,00 -  | 2,40 -  | 2,80 -  | 3,30 -  | 3,80 -  | 4,60 -  | 5,80 -  |
|                         | 2,00                  | 1,60 -       | 2,00 -  | 2,40 -  | 2,80 -  | 3,30 -  | 3,80 -  | 4,60 -  | 5,80 -  |
|                         | N <sub>R,k</sub> [kN] |              |         |         |         |         |         |         |         |
|                         | 0,40                  | 0,60 ac      | 0,70 ac | 0,80 ac | 1,00 ac | 1,08 ac | 1,08 ac | 1,08 ac | 1,08 ac |
|                         | 0,50                  | 0,60 ac      | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,38 ac | 1,38 ac | 1,38 ac |
|                         | 0,63                  | 0,60 ac      | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac | 2,10 ac |
|                         | 0,75                  | 0,60 ac      | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac | 2,10 ac |
|                         | 0,88                  | 0,60 ac      | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac | 2,10 ac |
|                         | 1,00                  | 0,60 -       | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac | 2,10 ac |
|                         | 1,13                  | 0,60 -       | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  | 2,10 ac |
|                         | 1,25                  | 0,60 -       | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  | 2,10 -  |
|                         | 1,50                  | 0,60 -       | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  | 2,10 -  |
|                         | 1,75                  | 0,60 -       | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  | 2,10 -  |
|                         | 2,00                  | 0,60 -       | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  | 2,10 -  |
|                         | N <sub>R,k,II</sub>   | 0,60 -       | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  | 2,10 -  |

**Self-drilling screw**

ZEBRA Piasta Ø 6,3 x L, ZEBRA Piasta plus Ø 6,3 x L  
with hexagon head

**Annex 63**



## Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: none

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 6.00$  mm

## Timber substructures

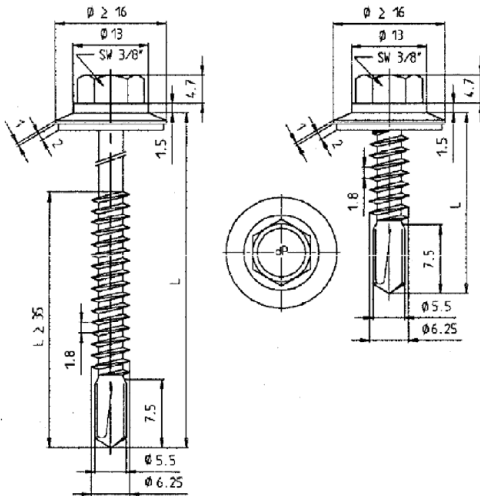
no performance determined

|                         |                       | Component II |         |         |         |         |
|-------------------------|-----------------------|--------------|---------|---------|---------|---------|
|                         |                       | t II [mm]    |         |         |         |         |
|                         |                       | 2,50         | 3,00    | 4,00    | 5,00    |         |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,40         | 1,64 ac | 1,64 ac | 1,64 ac | 1,64 ac |
|                         |                       | 0,50         | 1,76 ac | 1,76 ac | 1,76 ac | 1,76 ac |
|                         |                       | 0,63         | 2,60 ac | 2,60 ac | 2,60 ac | 2,60 -  |
|                         |                       | 0,75         | 3,20 ac | 3,20 ac | 3,20 ac | 3,20 -  |
|                         |                       | 0,88         | 3,70 ac | 3,70 ac | 3,70 ac | 3,70 -  |
|                         |                       | 1,00         | 4,40 ac | 4,40 ac | 4,80 ac | 4,80 -  |
|                         |                       | 1,13         | 5,05 ac | 5,05 ac | 5,80 ac | - -     |
|                         |                       | 1,25         | 5,55 -  | 6,20 -  | 6,60 a  | - -     |
|                         |                       | 1,50         | 6,75 -  | 7,70 -  | 8,50 a  | - -     |
|                         |                       | 1,75         | 6,75 -  | 7,70 -  | - -     | - -     |
|                         |                       | 2,00         | 6,75 -  | 7,70 -  | - -     | - -     |
|                         | N <sub>R,k</sub> [kN] | 0,40         | 1,08 ac | 1,08 ac | 1,08 ac | 1,08 ac |
|                         |                       | 0,50         | 1,38 ac | 1,38 ac | 1,38 ac | 1,38 ac |
|                         |                       | 0,63         | 2,40 ac | 2,40 ac | 2,40 ac | 2,40 ac |
|                         |                       | 0,75         | 3,00 ac | 3,00 ac | 3,00 ac | 3,00 ac |
|                         |                       | 0,88         | 3,35 ac | 3,90 ac | 3,90 ac | 3,90 ac |
|                         |                       | 1,00         | 3,35 ac | 4,30 ac | 4,30 ac | 4,30 ac |
|                         |                       | 1,13         | 3,35 ac | 4,60 ac | 5,00 ac | - -     |
|                         |                       | 1,25         | 3,35 -  | 4,60 -  | 5,70 -  | - -     |
|                         |                       | 1,50         | 3,35 -  | 4,60 -  | 6,60 -  | - -     |
|                         |                       | 1,75         | 3,35 -  | 4,60 -  | - -     | - -     |
|                         |                       | 2,00         | 3,35 -  | 4,60 -  | - -     | - -     |
| N <sub>R,k,II</sub>     | 3,35 -                | 4,60 -       | 6,60 -  | 6,60 -  |         |         |

### Self-drilling screw

ZEBRA Piasta Ø 6,3 x L, ZEBRA Piasta plus Ø 6,3 x L  
with hexagon head

## Annex 64



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 6.00$  mm

#### Timber substructures

no performance determined

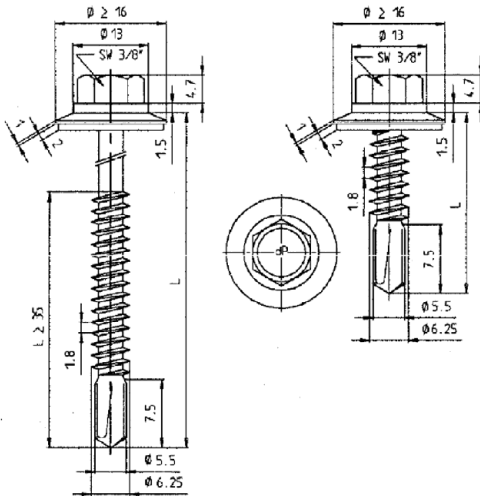
|             |                | Component II |        |         |         |         |         |         |         |           |
|-------------|----------------|--------------|--------|---------|---------|---------|---------|---------|---------|-----------|
|             |                | t II [mm]    |        |         |         |         |         |         |         |           |
|             |                | 0,63         | 0,75   | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |           |
| Component I | $V_{R,k}$ [kN] | 0,63         | 1,20 - | 1,30 ac | 1,50 ac | 1,60 ac | 1,80 ac | 1,90 ac | 2,20 ac | 2,80 abcd |
|             |                | 0,75         | 1,20 - | 1,40 ac | 1,70 ac | 1,90 ac | 2,00 ac | 2,10 ac | 2,40 ac | 3,20 ac   |
|             |                | 0,88         | 1,20 - | 1,50    | 1,80 ac | 2,10 ac | 2,20 ac | 2,40 ac | 2,60 ac | 3,50 ac   |
|             |                | 1,00         | 1,20 - | 1,60    | 2,00 -  | 2,30 -  | 2,60 ac | 2,70 ac | 3,10 ac | 3,80 ac   |
|             |                | 1,13         | 1,30 - | 1,60    | 2,00 -  | 2,40 -  | 3,00 -  | 3,10 -  | 3,40 ac | 4,10 ac   |
|             |                | 1,25         | 1,30 - | 1,70    | 2,10 -  | 2,60 -  | 3,10 -  | 3,30 -  | 3,60 ac | 4,40 ac   |
|             |                | 1,50         | 1,40 - | 1,80    | 2,10 -  | 2,60 -  | 3,20 -  | 3,70 -  | 4,00 -  | 5,00 -    |
|             |                | 1,75         | 1,40 - | 1,80    | 2,10 -  | 2,60 -  | 3,20 -  | 3,70 -  | 4,00 -  | 5,00 -    |
|             |                | 2,00         | 1,40 - | 1,80    | 2,10 -  | 2,60 -  | 3,20 -  | 3,70 -  | 4,00 -  | 5,00 -    |
|             | $N_{R,k}$ [kN] | 0,50         | 0,60 - | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac | 1,78 abcd |
|             |                | 0,55         | 0,60 - | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac | 2,10 abcd |
|             |                | 0,63         | 0,60 - | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac | 2,10 abcd |
|             |                | 0,75         | 0,60 - | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac | 2,10 ac   |
|             |                | 0,88         | 0,60 - | 0,70 -  | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac | 2,10 ac   |
|             |                | 1,00         | 0,60 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 ac | 1,30 ac | 1,70 ac | 2,10 ac   |
|             |                | 1,13         | 0,60 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 ac | 2,10 ac   |
|             |                | 1,25         | 0,60 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 ac | 2,10 ac   |
|             |                | 1,50         | 0,60 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  | 2,10 -    |
|             |                | 1,75         | 0,60 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  | 2,10 -    |
|             |                | 2,00         | 0,60 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  | 2,10 -    |
|             |                | $N_{R,k,II}$ | 0,60 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  | 2,10 -    |

#### Self-drilling screw

ZEBRA Piasta Ø 6,3 x L, ZEBRA Piasta plus Ø 6,3 x L  
with hexagon head and sealing washer  $\geq \varnothing 16$  mm

#### Annex 65





#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 6.00$  mm

#### Timber substructures

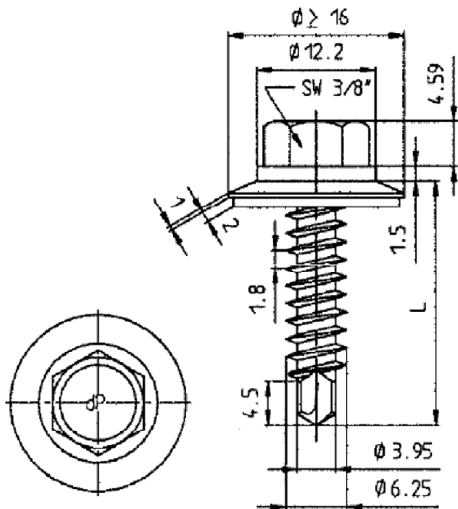
no performance determined

|                         |                       | Component II        |           |           |           |         |
|-------------------------|-----------------------|---------------------|-----------|-----------|-----------|---------|
|                         |                       | t II [mm]           |           |           |           |         |
|                         |                       | 2,50                | 3,00      | 4,00      | 5,00      |         |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,63                | 2,95 abcd | 3,10 abcd | 3,50 abcd | 3,50 ab |
|                         |                       | 0,75                | 3,40 ac   | 3,60 ac   | 3,90 ac   | 3,90 a  |
|                         |                       | 0,88                | 3,75 ac   | 4,00 ac   | 4,60 ac   | 4,60 a  |
|                         |                       | 1,00                | 4,15 ac   | 4,50 ac   | 5,20 ac   | 5,20 a  |
|                         |                       | 1,13                | 4,50 ac   | 4,90 ac   | 5,80 a    | - -     |
|                         |                       | 1,25                | 4,90 ac   | 5,40 -    | 6,40 -    | - -     |
|                         |                       | 1,50                | 5,65 -    | 6,30 -    | 7,00 -    | - -     |
|                         |                       | 1,75                | 5,65 -    | 6,30 -    | 7,00 -    | - -     |
|                         |                       | 2,00                | 5,65 -    | 6,30 -    | 7,00 -    | - -     |
|                         | N <sub>R,k</sub> [kN] | 0,50                | 1,78 abcd | 1,78 abcd | 1,78 abcd | 1,78 ab |
|                         |                       | 0,55                | 2,25 abcd | 2,25 abcd | 2,25 abcd | 2,25 ab |
|                         |                       | 0,63                | 3,30 abcd | 3,30 abcd | 3,30 abcd | 3,30 ab |
|                         |                       | 0,75                | 3,35 ac   | 3,80 ac   | 3,80 ac   | 3,80 a  |
|                         |                       | 0,88                | 3,35 ac   | 4,40 ac   | 4,40 ac   | 4,40 a  |
|                         |                       | 1,00                | 3,35 ac   | 4,60 ac   | 4,90 ac   | 4,90 a  |
|                         |                       | 1,13                | 3,35 a    | 4,60 a    | 5,40 a    | - -     |
|                         |                       | 1,25                | 3,35 -    | 4,60 -    | 5,90 -    | - -     |
|                         |                       | 1,50                | 3,35 -    | 4,60 -    | 6,60 -    | - -     |
|                         |                       | 1,75                | 3,35 -    | 4,60 -    | 6,60 -    | - -     |
|                         |                       | 2,00                | 3,35 -    | 4,60 -    | 6,60 -    | - -     |
|                         |                       | N <sub>R,k,II</sub> | 3,35 -    | 4,60 -    | 6,60 -    | 6,60 -  |

#### Self-drilling screw

ZEBRA Piasta Ø 6,3 x L, ZEBRA Piasta plus Ø 6,3 x L  
with hexagon head and sealing washer  $\geq \text{Ø}16$  mm

Annex 66



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: S280GD to S320GD - EN 10346

Component II: S235 – EN 10025-1  
S280GD to S320GD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 3.00$  mm

#### Timber substructures

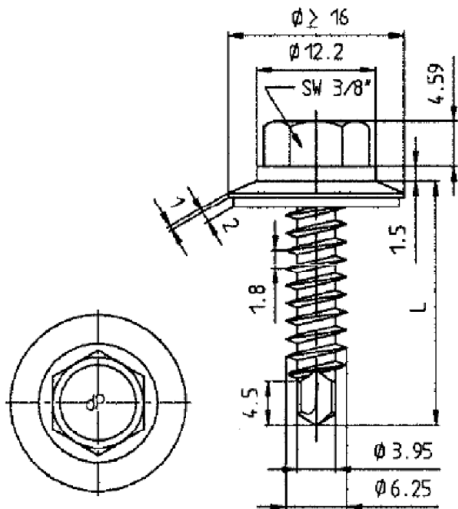
no performance determined

|                         |                | Component II |        |        |        |        |        |         |         |         |         |         |         |
|-------------------------|----------------|--------------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|
|                         |                | t II [mm]    |        |        |        |        |        |         |         |         |         |         |         |
|                         |                | 0,40         | 0,50   | 0,55   | 0,63   | 0,75   | 0,88   | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |         |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] | 0,40         | 0,77 - | 0,77 - | 0,77 - | 0,77 - | 0,77 - | 0,77 -  | 0,77 -  | 0,77 -  | 0,77 -  | 0,77 -  | 0,77 -  |
|                         |                | 0,50         | 0,77 - | 0,93 - | 0,93 - | 0,93 - | 0,93 - | 0,93 -  | 0,93 -  | 0,93 -  | 0,93 -  | 0,93 -  | 0,93 -  |
|                         |                | 0,55         | 0,77 - | 0,93 - | 1,19 - | 1,19 - | 1,19 - | 1,19 -  | 1,19 -  | 1,19 -  | 1,19 -  | 1,19 -  | 1,19 -  |
|                         |                | 0,63         | 0,77 - | 0,93 - | 1,19 - | 1,60 - | 1,70 - | 1,80 ac | 1,90 ac | 1,90 ac | 2,00 ac | 2,10 ac | 2,10 ac |
|                         |                | 0,75         | 0,77 - | 0,93 - | 1,19 - | 1,70 - | 1,90 - | 2,10 -  | 2,30 ac | 2,40 ac | 2,60 ac | 3,00 ac | 3,00 ac |
|                         |                | 0,88         | 0,77 - | 0,93 - | 1,19 - | 1,80 - | 2,10 - | 2,40 -  | 2,70 -  | 3,00 -  | 3,30 -  | 3,80 -  | 3,80 -  |
|                         |                | 1,00         | 0,77 - | 0,93 - | 1,19 - | 1,90 - | 2,30 - | 2,70 -  | 3,30 -  | 3,50 -  | 3,90 -  | 4,70 -  | 4,70 -  |
|                         |                | 1,13         | 0,77 - | 0,93 - | 1,19 - | 2,00 - | 2,40 - | 2,90 -  | 3,50 -  | 3,80 -  | 4,30 -  | 5,00 -  | -       |
|                         |                | 1,25         | 0,77 - | 0,93 - | 1,19 - | 2,10 - | 2,50 - | 3,10 -  | 3,80 -  | 4,10 -  | 4,70 -  | 5,00 -  | -       |
|                         |                | 1,50         | 0,77 - | 0,93 - | 1,19 - | 2,20 - | 2,70 - | 3,40 -  | 4,00 -  | 4,70 -  | 5,00 -  | 5,00 -  | -       |
|                         |                | 1,75         | 0,77 - | 0,93 - | 1,19 - | 2,20 - | 2,70 - | 3,40 -  | 4,00 -  | 4,70 -  | 5,00 -  | -       | -       |
|                         |                | 2,00         | 0,77 - | 0,93 - | 1,19 - | 2,20 - | 2,70 - | 3,40 -  | 4,00 -  | -       | -       | -       | -       |
|                         | $N_{R,k}$ [kN] | 0,40         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 1,74 -  | 1,74 -  | 1,74 -  | 1,74 -  |
|                         |                | 0,50         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 1,74 -  | 1,74 -  | 1,74 -  | 1,74 -  |
|                         |                | 0,55         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 1,77 -  | 1,77 -  | 1,77 -  |
|                         |                | 0,63         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 2,60 -  | 2,60 -  |
|                         |                | 0,75         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 3,20 -  | 3,20 -  |
|                         |                | 0,88         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 3,30 -  | 3,30 -  |
|                         |                | 1,00         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 3,30 -  | -       |
|                         |                | 1,13         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 3,30 -  | -       |
|                         |                | 1,25         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 3,30 -  | -       |
|                         |                | 1,50         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 3,30 -  | -       |
|                         |                | 1,75         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | -       | -       |
|                         |                | 2,00         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | -       | -       | -       | -       |
| $N_{R,k,II}$            |                | 0,50         | -      | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 3,30 -  | 3,30 -  |

#### Self-drilling screw

ZEBRA Piasta Ø 6,3 r x L, ZEBRA Piasta plus Ø 6,3 r x L  
with hexagon head and sealing washer  $\geq \phi 16$  mm

#### Annex 67



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Component II: S235 to S355 – EN 10025-1  
S280GD to S320GD – EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 3.00 \text{ mm}$

#### Timber substructures

no performance determined

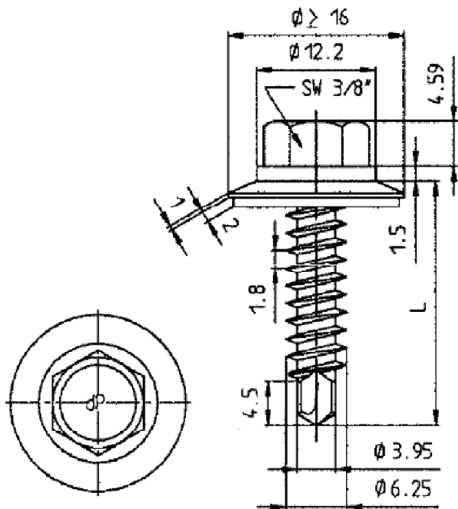
|                                                                                                 |              | Component II, steel sheet |        |        |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                 |        |        |        |        |        |        |        |        |        |
|                                                                                                 |              | 0,40                      | 0,50   | 0,55   | 0,63   | 0,75   | 0,88   | 1,00   | 1,25   | 1,50   | 2,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,40         | 0,28 -                    | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - |
|                                                                                                 | 0,50         | 0,28 -                    | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - |
|                                                                                                 | 0,70         | 0,28 -                    | 0,40 - | 0,45 - | 0,53 - | 0,60 - | 0,60 - | 0,60 - | 0,60 - | 0,60 - | 0,60 - |
|                                                                                                 | 0,80         | 0,28 -                    | 0,40 - | 0,45 - | 0,53 - | 0,76 - | 0,92 - | 0,92 - | 0,92 - | 0,92 - | 0,92 - |
|                                                                                                 | 1,00         | 0,28 -                    | 0,40 - | 0,45 - | 0,53 - | 0,76 - | 1,18 - | 1,57 - | 1,57 - | 1,57 - | 1,57 - |
|                                                                                                 | 1,20         | 0,28 -                    | 0,40 - | 0,45 - | 0,53 - | 0,76 - | 1,18 - | 1,57 - | 2,19 - | 2,19 - | - -    |
|                                                                                                 | 1,50         | 0,28 -                    | 0,40 - | 0,45 - | 0,53 - | 0,76 - | 1,18 - | 1,57 - | 2,35 - | 3,13 - | - -    |
|                                                                                                 | 2,00         | 0,28 -                    | 0,40 - | 0,45 - | 0,53 - | 0,76 - | 1,18 - | 1,57 - | 2,35 - | - -    | - -    |
|                                                                                                 | $N_{R,k,II}$ | 0,50 -                    | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 - | 1,70 - | 2,50 - | 3,30 - | 3,30 - |

|                                                                                                 |              | Component II, steel sheet |        |        |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                 |        |        |        |        |        |        |        |        |        |
|                                                                                                 |              | 0,40                      | 0,50   | 0,55   | 0,63   | 0,75   | 0,88   | 1,00   | 1,25   | 1,50   | 2,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,40         | 0,36 -                    | 0,36 - | 0,36 - | 0,36 - | 0,36 - | 0,36 - | 0,36 - | 0,36 - | 0,36 - | 0,36 - |
|                                                                                                 | 0,50         | 0,36 -                    | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - |
|                                                                                                 | 0,70         | 0,36 -                    | 0,52 - | 0,59 - | 0,69 - | 0,78 - | 0,78 - | 0,78 - | 0,78 - | 0,78 - | 0,78 - |
|                                                                                                 | 0,80         | 0,36 -                    | 0,52 - | 0,59 - | 0,69 - | 0,99 - | 1,20 - | 1,20 - | 1,20 - | 1,20 - | 1,20 - |
|                                                                                                 | 1,00         | 0,36 -                    | 0,52 - | 0,59 - | 0,69 - | 0,99 - | 1,54 - | 2,05 - | 2,05 - | 2,05 - | 2,05 - |
|                                                                                                 | 1,20         | 0,36 -                    | 0,52 - | 0,59 - | 0,69 - | 0,99 - | 1,54 - | 2,05 - | 2,85 - | 2,85 - | - -    |
|                                                                                                 | 1,50         | 0,36 -                    | 0,52 - | 0,59 - | 0,69 - | 0,99 - | 1,54 - | 2,05 - | 3,06 - | 4,08 - | - -    |
|                                                                                                 | 2,00         | 0,36 -                    | 0,52 - | 0,59 - | 0,69 - | 0,99 - | 1,54 - | 2,05 - | 3,06 - | - -    | - -    |
|                                                                                                 | $N_{R,k,II}$ | 0,50 -                    | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 - | 1,70 - | 2,50 - | 3,30 - | 3,30 - |

#### Self-drilling screw

ZEBRA Piasta Ø 6,3 r x L, ZEBRA Piasta plus Ø 6,3 r x L  
with hexagon head and sealing washer  $\geq \text{Ø}16 \text{ mm}$

#### Annex 68



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Component II: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Drilling-capacity  $\Sigma(t_i) \leq 3.00 \text{ mm}$

#### Timber substructures

no performance determined

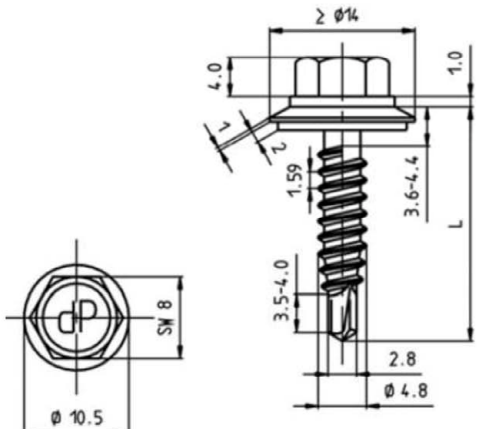
|                                                                                                 |              | Component II, Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$ |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                                                       |        |        |        |        |        |        |        |
|                                                                                                 |              | 0,40                                                            | 0,50   | 0,70   | 0,80   | 1,00   | 1,20   | 1,50   | 2,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,40         | 0,23 -                                                          | 0,23 - | 0,23 - | 0,23 - | 0,23 - | 0,23 - | 0,23 - | 0,23 - |
|                                                                                                 | 0,50         | 0,23 -                                                          | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - |
|                                                                                                 | 0,70         | 0,23 -                                                          | 0,40 - | 0,60 - | 0,60 - | 0,60 - | 0,60 - | 0,60 - | 0,60 - |
|                                                                                                 | 0,80         | 0,23 -                                                          | 0,40 - | 0,60 - | 0,92 - | 0,92 - | 0,92 - | 0,92 - | 0,92 - |
|                                                                                                 | 1,00         | 0,23 -                                                          | 0,40 - | 0,60 - | 0,92 - | 1,57 - | 1,57 - | 1,57 - | 1,57 - |
|                                                                                                 | 1,20         | 0,23 -                                                          | 0,40 - | 0,60 - | 0,92 - | 1,57 - | 2,19 - | 2,19 - | 2,19 - |
|                                                                                                 | 1,50         | 0,23 -                                                          | 0,40 - | 0,60 - | 0,92 - | 1,57 - | 2,19 - | 3,13 - | 3,13 - |
|                                                                                                 | 2,00         | 0,23 -                                                          | 0,40 - | 0,60 - | 0,92 - | 1,57 - | 2,19 - | 3,13 - | 3,13 - |
|                                                                                                 | $N_{R,k,II}$ | 0,16                                                            | 0,31   | 0,45   | 0,55   | 0,76   | 0,99   | 1,33   | 1,33   |

|                                                                                                 |              | Component II, Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$ |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                                                       |        |        |        |        |        |        |        |
|                                                                                                 |              | 0,40                                                            | 0,50   | 0,70   | 0,80   | 1,00   | 1,20   | 1,50   | 2,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,40         | 0,28 -                                                          | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - |
|                                                                                                 | 0,50         | 0,28 -                                                          | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - |
|                                                                                                 | 0,70         | 0,28 -                                                          | 0,52 - | 0,78 - | 0,78 - | 0,78 - | 0,78 - | 0,78 - | 0,78 - |
|                                                                                                 | 0,80         | 0,28 -                                                          | 0,52 - | 0,78 - | 1,20 - | 1,20 - | 1,20 - | 1,20 - | 1,20 - |
|                                                                                                 | 1,00         | 0,28 -                                                          | 0,52 - | 0,78 - | 1,20 - | 2,03 - | 2,03 - | 2,03 - | 2,03 - |
|                                                                                                 | 1,20         | 0,28 -                                                          | 0,52 - | 0,78 - | 1,20 - | 2,03 - | 2,84 - | 2,84 - | 2,84 - |
|                                                                                                 | 1,50         | 0,28 -                                                          | 0,52 - | 0,78 - | 1,20 - | 2,03 - | 2,84 - | 4,05 - | 4,05 - |
|                                                                                                 | 2,00         | 0,28 -                                                          | 0,52 - | 0,78 - | 1,20 - | 2,03 - | 2,84 - | 4,05 - | 4,05 - |
|                                                                                                 | $N_{R,k,II}$ | 0,19                                                            | 0,40   | 0,59   | 0,72   | 0,98   | 1,29   | 1,75   | 1,75   |

#### Self-drilling screw

ZEBRA Piasta Ø 6,3 r x L, ZEBRA Piasta plus Ø 6,3 r x L  
with hexagon head and sealing washer  $\geq \phi 16 \text{ mm}$

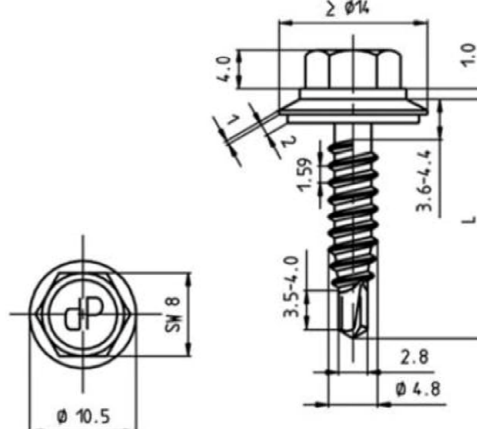
#### Annex 69

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><u>Materials</u></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM</p> <p>Component I: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p>Component II: S235 to S355 – EN 10025-1<br/>S280GD to S320GD - EN 10346</p> <p><u>Drilling-capacity</u> <math>\Sigma(t_i) \leq 3.00 \text{ mm}</math></p> <p><u>Timber substructures</u><br/>no performance determined</p> |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                               |                | Component II, steel sheet |               |               |               |               |                 |                 |                 |               |
|-------------------------------------------------------------------------------|----------------|---------------------------|---------------|---------------|---------------|---------------|-----------------|-----------------|-----------------|---------------|
|                                                                               |                | t II [mm]                 |               |               |               |               |                 |                 |                 |               |
|                                                                               |                | 0,40                      | 0,50          | 0,63          | 0,75          | 0,88          | 1,00            | 1,25            | 1,50            | 2,00          |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,50                      | 0,37 - 0,45 - | 0,46 - 0,59 - | 0,48 - 0,61 - | 0,50 - 0,62 - | 0,51 ac 0,63 ac | 0,51 ac 0,63 ac | 0,51 ac 0,63 ac | 0,51 a 0,63 a |
|                                                                               |                | 0,60                      | 0,37 - 0,52 - | 0,59 - 0,68 - | 0,61 - 0,73 - | 0,62 - 0,75 - | 0,63 ac 0,76 ac | 0,63 ac 0,80 ac | 0,63 ac 0,80 a  | 0,63 a 0,80 a |
|                                                                               |                | 0,70                      | 0,37 - 0,59 - | 0,68 - 0,75 - | 0,73 - 0,83 - | 0,75 - 0,87 - | 0,76 ac 0,88 a  | 0,80 ac 0,96 a  | 0,80 a 0,96 a   | 0,80 a 0,96 a |
|                                                                               |                | 0,80                      | 0,37 - 0,67 - | 0,75 - 0,83 - | 0,83 - 0,87 - | 0,87 - 0,88 a | 0,88 a 0,96 a   | 0,96 a 0,96 a   | 0,96 a 0,96 a   | 0,96 a 0,96 a |
|                                                                               |                | 1,00                      | 0,37 - 0,81 - | 0,89 - 0,97 - | 0,97 - 1,06 - | 1,06 - 1,13 - | 1,13 - 1,16 a   | 1,16 a 1,17 a   | 1,17 a -        | - -           |
|                                                                               |                | 1,20                      | 0,37 - 0,81 - | 0,89 - 0,97 - | 0,97 - 1,06 - | 1,06 - 1,13 - | 1,13 - 1,16 a   | 1,16 a 1,17 a   | 1,17 a -        | - -           |
|                                                                               |                | 1,50                      | 0,37 - 0,81 - | 0,89 - 0,97 - | 0,97 - 1,06 - | 1,06 - 1,13 - | 1,13 - 1,16 a   | 1,16 a -        | - -             | - -           |
|                                                                               |                | 2,00                      | 0,37 - 0,81 - | 0,89 - 0,97 - | 0,97 - 1,06 - | 1,06 - 1,13 - | 1,13 - -        | - -             | - -             | - -           |
|                                                                               | $N_{R,k,II}$   | 0,38                      | 0,50          | 0,70          | 1,00          | 1,10          | 1,40            | 1,70            | 2,70            | 2,70          |

|                                                                               |                | Component II, steel sheet |               |               |                |                 |                 |                 |                 |               |
|-------------------------------------------------------------------------------|----------------|---------------------------|---------------|---------------|----------------|-----------------|-----------------|-----------------|-----------------|---------------|
|                                                                               |                | t II [mm]                 |               |               |                |                 |                 |                 |                 |               |
|                                                                               |                | 0,40                      | 0,50          | 0,63          | 0,75           | 0,88            | 1,00            | 1,25            | 1,50            | 2,00          |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,50                      | 0,48 - 0,58 - | 0,60 - 0,63 - | 0,63 - 0,65 -  | 0,65 - 0,66 ac  | 0,66 ac 0,66 ac | 0,66 ac 0,66 ac | 0,66 ac 0,66 ac | 0,66 a 0,66 a |
|                                                                               |                | 0,60                      | 0,48 - 0,63 - | 0,77 - 0,79 - | 0,81 - 0,82 ac | 0,82 ac 0,82 ac | 0,82 ac 0,82 ac | 0,82 ac 0,82 ac | 0,82 ac 0,82 ac | 0,82 a 0,82 a |
|                                                                               |                | 0,70                      | 0,48 - 0,67 - | 0,88 - 0,95 - | 0,98 - 0,99 ac | 0,99 ac 1,04 ac | 1,04 ac 1,04 a  | 1,04 a 1,04 a   | 1,04 a 1,04 a   | 1,04 a 1,04 a |
|                                                                               |                | 0,80                      | 0,48 - 0,72 - | 0,91 - 1,00 - | 1,13 - 1,15 a  | 1,15 a 1,25 a   | 1,25 a 1,25 a   | 1,25 a 1,25 a   | 1,25 a 1,25 a   | 1,25 a 1,25 a |
|                                                                               |                | 1,00                      | 0,48 - 0,76 - | 0,95 - 1,10 - | 1,31 - 1,47 -  | 1,47 - 1,51 a   | 1,51 a 1,53 a   | 1,53 a -        | - -             | - -           |
|                                                                               |                | 1,20                      | 0,48 - 0,81 - | 0,98 - 1,14 - | 1,31 - 1,47 -  | 1,47 - 1,51 a   | 1,51 a 1,53 a   | 1,53 a -        | - -             | - -           |
|                                                                               |                | 1,50                      | 0,48 - 0,81 - | 0,98 - 1,14 - | 1,31 - 1,47 -  | 1,47 - 1,51 a   | 1,51 a -        | - -             | - -             | - -           |
|                                                                               |                | 2,00                      | 0,48 - 0,81 - | 0,98 - 1,14 - | 1,31 - 1,47 -  | 1,47 - -        | - -             | - -             | - -             | - -           |
|                                                                               | $N_{R,k,II}$   | 0,38                      | 0,50          | 0,70          | 1,00           | 1,10            | 1,40            | 1,70            | 2,70            | 2,70          |

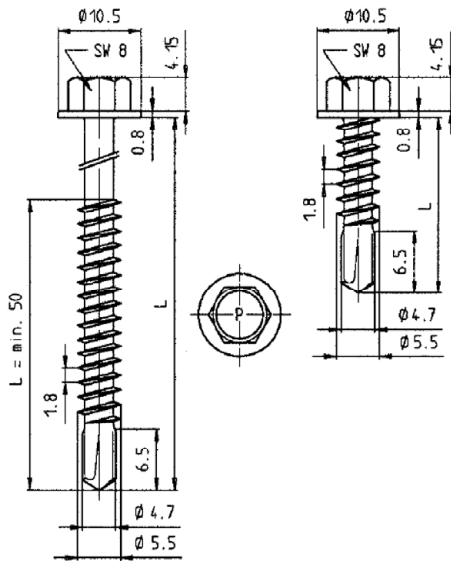
|                                                                                                                    |                 |
|--------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Self-drilling screw</b>                                                                                         | <b>Annex 47</b> |
| ZEBRA Piasta H Ø 4,8 x L, ZEBRA Piasta plus H Ø 4,8 x L<br>with undercut, hexagon head and sealing washer ≥ Ø14 mm |                 |

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><u>Materials</u></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM</p> <p>Component I: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p>Component II: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p><u>Drilling-capacity</u> <math>\Sigma(t_i) \leq 3.20 \text{ mm}</math></p> <p><u>Timber substructures</u><br/>no performance determined</p> |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                               |                | Component II, Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$ |        |        |        |        |         |         |         |         |        |
|-------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------|--------|--------|--------|--------|---------|---------|---------|---------|--------|
|                                                                               |                | t II [mm]                                                       |        |        |        |        |         |         |         |         |        |
|                                                                               |                | 0,50                                                            | 0,60   | 0,70   | 0,80   | 0,90   | 1,00    | 1,20    | 1,50    | 2,00    |        |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,50                                                            | 0,60   | 0,70   | 0,80   | 0,90   | 1,00    | 1,20    | 1,50    | 2,00    |        |
|                                                                               |                | 0,34 -                                                          | 0,37 - | 0,41 - | 0,44 - | 0,48 - | 0,52 ac | 0,51 ac | 0,51 ac | 0,51 ac |        |
|                                                                               |                | 0,60                                                            | 0,35 - | 0,50 - | 0,54 - | 0,56 - | 0,60 -  | 0,63 ac | 0,63 ac | 0,63 ac |        |
|                                                                               |                | 0,70                                                            | 0,37 - | 0,52 - | 0,66 - | 0,69 - | 0,73 -  | 0,76 ac | 0,80 ac | 0,60 ac | 0,80 a |
|                                                                               |                | 0,80                                                            | 0,38 - | 0,52 - | 0,67 - | 0,81 - | 0,85 -  | 0,88 ac | 0,96 ac | 0,96 ac | 0,96 a |
|                                                                               |                | 0,90                                                            | 0,40 - | 0,54 - | 0,67 - | 0,83 - | 0,97 -  | 1,01 ac | 1,06 ac | 1,06 a  | 1,06 a |
|                                                                               |                | 1,00                                                            | 0,41 - | 0,55 - | 0,70 - | 0,84 - | 0,99 -  | 1,13 ac | 1,15 ac | 1,17 a  | 1,33 a |
|                                                                               |                | 1,20                                                            | 0,41 - | 0,55 - | 0,70 - | 0,84 - | 0,99 -  | 1,13 a  | 1,15 a  | 1,17 a  | 1,60 a |
|                                                                               |                | 1,50                                                            | 0,41 - | 0,55 - | 0,70 - | 0,84 - | 0,99 -  | 1,13 a  | 1,15 a  | 1,17 a  | - -    |
|                                                                               |                | 2,00                                                            | 0,41 - | 0,55 - | 0,70 - | 0,84 - | 0,99 -  | 1,13 a  | 1,15 a  | - -     | - -    |
| $N_{R,k,II}$                                                                  |                | 0,17                                                            | 0,25   | 0,33   | 0,41   | 0,46   | 0,50    | 0,83    | 0,99    | 1,30    |        |

|                                                                               |                | Component II, Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$ |        |        |        |        |         |         |         |         |        |
|-------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------|--------|--------|--------|--------|---------|---------|---------|---------|--------|
|                                                                               |                | t II [mm]                                                       |        |        |        |        |         |         |         |         |        |
|                                                                               |                | 0,50                                                            | 0,60   | 0,70   | 0,80   | 0,90   | 1,00    | 1,20    | 1,50    | 2,00    |        |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,50                                                            | 0,60   | 0,70   | 0,80   | 0,90   | 1,00    | 1,20    | 1,50    | 2,00    |        |
|                                                                               |                | 0,44 -                                                          | 0,48 - | 0,53 - | 0,57 - | 0,63 - | 0,67 ac | 0,67 ac | 0,67 ac | 0,67 ac |        |
|                                                                               |                | 0,60                                                            | 0,46 - | 0,65 - | 0,70 - | 0,73 - | 0,78 -  | 0,82 ac | 0,82 ac | 0,82 ac |        |
|                                                                               |                | 0,70                                                            | 0,48 - | 0,68 - | 0,86 - | 0,90 - | 0,95 -  | 0,99 ac | 1,04 ac | 1,04 ac | 1,04 a |
|                                                                               |                | 0,80                                                            | 0,50 - | 0,68 - | 0,87 - | 1,06 - | 1,11 -  | 1,15 ac | 1,25 ac | 1,25 ac | 1,25 a |
|                                                                               |                | 0,90                                                            | 0,52 - | 0,70 - | 0,87 - | 1,08 - | 1,26 -  | 1,32 ac | 1,38 ac | 1,38 a  | 1,38 a |
|                                                                               |                | 1,00                                                            | 0,54 - | 0,72 - | 0,91 - | 1,09 - | 1,29 -  | 1,47 ac | 1,50 ac | 1,53 a  | 1,73 a |
|                                                                               |                | 1,20                                                            | 0,54 - | 0,72 - | 0,91 - | 1,09 - | 1,29 -  | 1,47 a  | 1,50 a  | 1,53 a  | 2,08 a |
|                                                                               |                | 1,50                                                            | 0,54 - | 0,72 - | 0,91 - | 1,09 - | 1,29 -  | 1,47 a  | 1,50 a  | 1,53 a  | - -    |
|                                                                               |                | 2,00                                                            | 0,54 - | 0,72 - | 0,91 - | 1,09 - | 1,29 -  | 1,47 a  | 1,50 a  | - -     | - -    |
| $N_{R,k,II}$                                                                  |                | 0,21                                                            | 0,29   | 0,38   | 0,46   | 0,55   | 0,64    | 1,03    | 1,12    | 1,63    |        |

|                                                                                                                 |          |
|-----------------------------------------------------------------------------------------------------------------|----------|
| Self-drilling screw                                                                                             | Annex 48 |
| ZEBRA Piasta H Ø 4,8 x L, ZEBRA Piasta plus H Ø 4,8 x L with undercut, hexagon head and sealing washer ≥ Ø14 mm |          |



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 5.25$  mm

#### Timber substructures

no performance determined

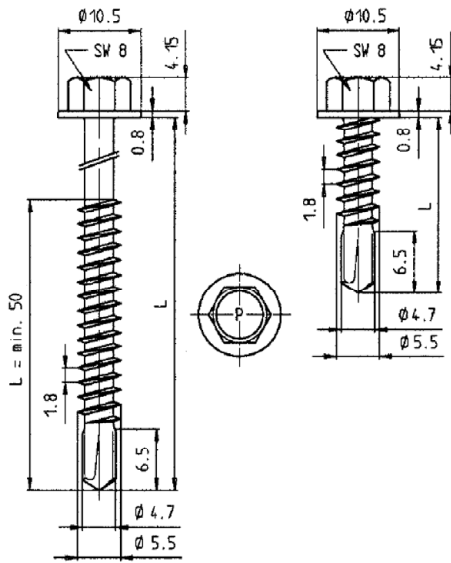
|             |                       | Component II        |             |         |         |         |         |         |         |
|-------------|-----------------------|---------------------|-------------|---------|---------|---------|---------|---------|---------|
|             |                       | t II [mm]           |             |         |         |         |         |         |         |
|             |                       | 0,63                | 0,75        | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |
| Component I | V <sub>R,k</sub> [kN] | 0,63                | 1,40 - 1,50 | ac 1,50 | ac 1,50 | ac 1,50 | ac 1,70 | ac 1,90 | ac 2,40 |
|             |                       | 0,75                | 1,40 - 1,60 | ac 1,70 | ac 1,80 | ac 1,90 | ac 2,10 | ac 2,50 | ac 2,80 |
|             |                       | 0,88                | 1,40 - 1,70 | ac 1,90 | ac 2,10 | ac 2,30 | ac 2,50 | ac 2,70 | ac 3,30 |
|             |                       | 1,00                | 1,40 - 1,80 | ac 2,00 | ac 2,20 | ac 2,50 | ac 2,70 | ac 3,00 | ac 3,60 |
|             |                       | 1,13                | 1,50 - 1,80 | ac 2,10 | ac 2,30 | ac 2,60 | ac 2,90 | ac 3,40 | ac 4,00 |
|             |                       | 1,25                | 1,50 - 1,90 | ac 2,20 | ac 2,50 | ac 2,80 | ac 3,10 | ac 3,60 | ac 4,40 |
|             |                       | 1,50                | 1,60 - 2,00 | ac 2,40 | ac 2,70 | ac 3,10 | ac 3,50 | ac 4,30 | ac 5,10 |
|             |                       | 1,75                | 1,60 - 2,00 | ac 2,40 | ac 2,70 | ac 3,10 | ac 3,50 | ac 4,30 | ac 5,10 |
|             |                       | 2,00                | 1,60 - 2,00 | ac 2,40 | ac 2,70 | ac 3,10 | ac 3,50 | ac 4,30 | ac 5,10 |
|             | N <sub>R,k</sub> [kN] | 0,63                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 1,90 |
|             |                       | 0,75                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,30 |
|             |                       | 0,88                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |
|             |                       | 1,00                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |
|             |                       | 1,13                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |
|             |                       | 1,25                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |
|             |                       | 1,50                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |
|             |                       | 1,75                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |
|             |                       | 2,00                | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |
|             |                       | N <sub>R,k,II</sub> | 0,40 - 0,60 | ac 0,70 | ac 0,90 | ac 1,00 | ac 1,20 | ac 1,60 | ac 2,40 |

#### Self-drilling screw

ZEBRA Piasta Ø 5,5 x L, ZEBRA Piasta plus Ø 5,5 x L  
with hexagon head

#### Annex 49





#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 5.25$  mm

#### Timber substructures

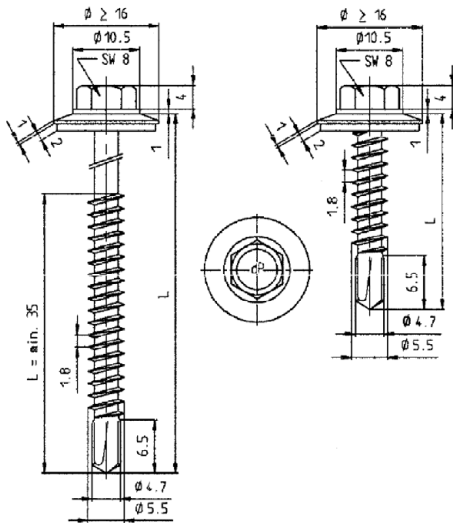
no performance determined

|                         |                | Component II |          |                 |
|-------------------------|----------------|--------------|----------|-----------------|
|                         |                | t II [mm]    |          |                 |
|                         |                | 2,50         | 3,00     | 4,00            |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] | 0,63         | 2,40 ac  | 2,40 - 2,40 -   |
|                         |                | 0,75         | 2,85 ac  | 2,90 - 2,90 -   |
|                         |                | 0,88         | 3,35 ac  | 3,40 - 3,50 -   |
|                         |                | 1,00         | 3,75 ac  | 3,90 - 4,20 -   |
|                         |                | 1,13         | 4,30 -   | 4,80 - 5,20 -   |
|                         |                | 1,25         | 4,90 -   | 5,40 - 6,00 -   |
|                         |                | 1,50         | 5,70 -   | 6,30 - - -      |
|                         |                | 1,75         | 5,70 -   | 6,30 - - -      |
|                         |                | 2,00         | 5,70 -   | 6,30 - - -      |
|                         | $N_{R,k}$ [kN] | 0,63         | 1,90 ac  | 1,90 ac 1,90 ac |
|                         |                | 0,75         | 2,30 ac  | 2,30 ac 2,30 ac |
|                         |                | 0,88         | 2,90 ac  | 2,90 ac 2,90 a  |
|                         |                | 1,00         | 3,25 ac  | 3,30 ac 3,30 a  |
|                         |                | 1,13         | 3,25 -   | 4,00 a 4,00 a   |
|                         |                | 1,25         | 3,25 -   | 4,30 - 4,30 a   |
|                         |                | 1,50         | 3,25 -   | 4,30 - - -      |
|                         |                | 1,75         | 3,25 -   | 4,30 - - -      |
|                         |                | 2,00         | 3,25 -   | 4,30 - - -      |
|                         | $N_{R,k,II}$   | 3,25         | - 4,30 - | 4,30 -          |

#### Self-drilling screw

ZEBRA Piasta Ø 5,5 x L, ZEBRA Piasta plus Ø 5,5 x L  
with hexagon head

**Annex 50**



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 5.25$  mm

#### Timber substructures

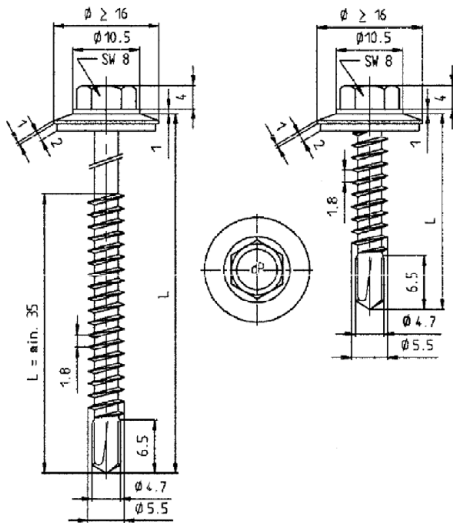
no performance determined

|                         |                | Component II |         |         |         |         |         |         |         |
|-------------------------|----------------|--------------|---------|---------|---------|---------|---------|---------|---------|
|                         |                | t II [mm]    |         |         |         |         |         |         |         |
|                         |                | 0,63         | 0,75    | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] |              |         |         |         |         |         |         |         |
|                         | 0,40           | 0,66 ac      | 0,66 ac | 0,66 ac | 0,66 ac | 0,66 ac | 0,66 ac | 1,53 ac | 1,53 ac |
|                         | 0,50           | 0,97 ac      | 0,97 ac | 0,97 ac | 0,97 ac | 0,97 ac | 0,97 ac | 1,53 ac | 1,53 ac |
|                         | 0,55           | 1,06 ac      | 1,06 ac | 1,06 ac | 1,06 ac | 1,06 ac | 1,06 ac | 1,53 ac | 1,53 ac |
|                         | 0,63           | 1,20 -       | 1,40 ac | 1,60 ac | 1,80 ac | 2,00 ac | 2,10 ac | 2,10 ac | 2,30 ac |
|                         | 0,75           | 1,20 -       | 1,40 ac | 1,70 ac | 1,90 ac | 2,30 ac | 2,30 ac | 2,40 ac | 2,60 ac |
|                         | 0,88           | 1,20 -       | 1,50 ac | 1,80 ac | 2,10 ac | 2,50 ac | 2,60 ac | 2,70 ac | 2,90 ac |
|                         | 1,00           | 1,20 -       | 1,60 -  | 2,00 -  | 2,30 ac | 2,70 ac | 2,80 ac | 2,90 ac | 3,10 ac |
|                         | 1,25           | 1,30 -       | 1,70 -  | 2,20 -  | 2,70 -  | 3,10 -  | 3,20 -  | 3,30 -  | 3,60 -  |
|                         | 1,50           | 1,40 -       | 1,90 -  | 2,40 -  | 2,90 -  | 3,40 -  | 3,50 -  | 3,70 -  | 4,10 -  |
|                         | 1,75           | 1,40 -       | 1,90 -  | 2,40 -  | 2,90 -  | 3,40 -  | 3,50 -  | 3,70 -  | 4,10 -  |
|                         | 2,00           | 1,40 -       | 1,90 -  | 2,40 -  | 2,90 -  | 3,40 -  | 3,50 -  | 3,70 -  | 4,10 -  |
|                         | $N_{R,k}$ [kN] |              |         |         |         |         |         |         |         |
|                         | 0,40           | 0,40 -       | 0,60 ac | 0,70 ac | 0,90 ac | 1,00 ac | 1,20 ac | 1,51 ac | 1,51 ac |
|                         | 0,50           | 0,40 -       | 0,60 ac | 0,70 ac | 0,90 ac | 1,00 ac | 1,20 ac | 1,60 ac | 1,78 ac |
|                         | 0,55           | 0,40 -       | 0,60 ac | 0,70 ac | 0,90 ac | 1,00 ac | 1,20 ac | 1,60 ac | 2,25 ac |
|                         | 0,63           | 0,40 -       | 0,60 ac | 0,70 ac | 0,90 ac | 1,00 ac | 1,20 ac | 1,60 ac | 2,40 ac |
|                         | 0,75           | 0,40 -       | 0,60 ac | 0,70 ac | 0,90 ac | 1,00 ac | 1,20 ac | 1,60 ac | 2,40 ac |
|                         | 0,88           | 0,40 -       | 0,60 ac | 0,70 ac | 0,90 ac | 1,00 ac | 1,20 ac | 1,60 ac | 2,40 ac |
|                         | 1,00           | 0,40 -       | 0,60 -  | 0,70 -  | 0,90 ac | 1,00 ac | 1,20 ac | 1,60 ac | 2,40 ac |
|                         | 1,25           | 0,40 -       | 0,60 -  | 0,70 -  | 0,90 -  | 1,00 -  | 1,20 -  | 1,60 -  | 2,40 -  |
|                         | 1,50           | 0,40 -       | 0,60 -  | 0,70 -  | 0,90 -  | 1,00 -  | 1,20 -  | 1,60 -  | 2,40 -  |
|                         | 1,75           | 0,40 -       | 0,60 -  | 0,70 -  | 0,90 -  | 1,00 -  | 1,20 -  | 1,60 -  | 2,40 -  |
|                         | 2,00           | 0,40 -       | 0,60 -  | 0,70 -  | 0,90 -  | 1,00 -  | 1,20 -  | 1,60 -  | 2,40 -  |
|                         | $N_{R,k,II}$   | 0,40 -       | 0,60 -  | 0,70 -  | 0,90 -  | 1,00 -  | 1,20 -  | 1,60 -  | 2,40 -  |

#### Self-drilling screw

ZEBRA Piasta Ø 5,5 x L, ZEBRA Piasta plus Ø 5,5 x L  
with hexagon head and sealing washer  $\geq \phi 16$  mm

#### Annex 51



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 5.25$  mm

#### Timber substructures

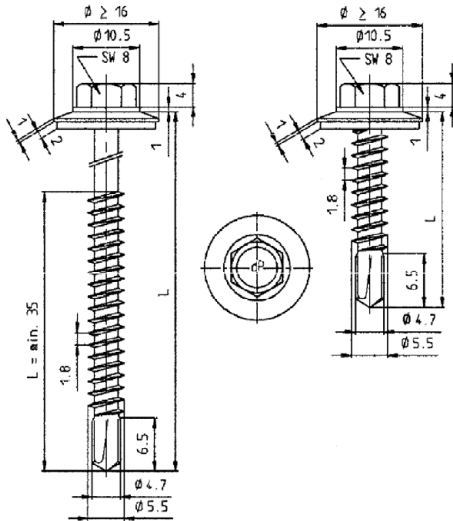
no performance determined

|                         |                | Component II |         |         |
|-------------------------|----------------|--------------|---------|---------|
|                         |                | t II [mm]    |         |         |
|                         |                | 2,50         | 3,00    | 4,00    |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] |              |         |         |
|                         | 0,40           | 1,53 ac      | 1,53 ac | 1,53 ac |
|                         | 0,50           | 1,53 ac      | 1,53 ac | 1,53 ac |
|                         | 0,55           | 1,53 ac      | 1,53 ac | 1,53 ac |
|                         | 0,63           | 2,45 ac      | 2,60 ac | 3,00 ac |
|                         | 0,75           | 2,80 ac      | 3,00 ac | 3,40 ac |
|                         | 0,88           | 3,15 ac      | 3,40 ac | 3,80 a  |
|                         | 1,00           | 3,40 ac      | 3,70 ac | 4,30 a  |
|                         | 1,25           | 4,00 -       | 4,40 -  | 5,10 -  |
|                         | 1,50           | 4,55 -       | 5,00 -  | - -     |
|                         | 1,75           | 4,55 -       | 5,00 -  | - -     |
|                         | 2,00           | 4,55 -       | 5,00 -  | - -     |
|                         | $N_{R,k}$ [kN] |              |         |         |
|                         | 0,40           | 1,51 ac      | 1,51 ac | 1,51 ac |
|                         | 0,50           | 1,78 ac      | 1,78 ac | 1,78 ac |
|                         | 0,55           | 2,25 ac      | 2,25 ac | 2,25 ac |
|                         | 0,63           | 3,30 ac      | 3,30 ac | 3,30 ac |
|                         | 0,75           | 3,25 ac      | 3,50 ac | 3,50 ac |
|                         | 0,88           | 3,25 ac      | 3,70 ac | 3,70 a  |
|                         | 1,00           | 3,25 ac      | 3,90 ac | 3,90 a  |
|                         | 1,25           | 3,25 -       | 4,10 -  | 4,10 -  |
|                         | 1,50           | 3,25 -       | 4,30 -  | - -     |
|                         | 1,75           | 3,25 -       | 4,30 -  | - -     |
|                         | 2,00           | 3,25 -       | 4,30 -  | - -     |
|                         | $N_{R,k,II}$   | 3,25 -       | 4,30 -  | 4,30 -  |

#### Self-drilling screw

ZEBRA Piasta Ø 5,5 x L, ZEBRA Piasta Ø 5,5 x L  
with hexagon head and sealing washer  $\geq \phi 16$  mm

#### Annex 52



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 5.25$  mm

#### Timber substructures

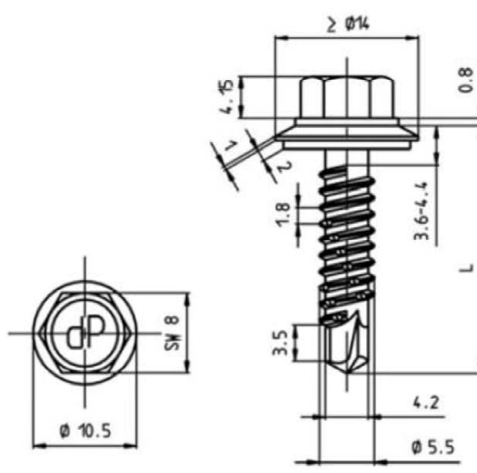
no performance determined

|                         |                       | Component II        |        |        |        |        |        |        |        |        |
|-------------------------|-----------------------|---------------------|--------|--------|--------|--------|--------|--------|--------|--------|
|                         |                       | t II [mm]           |        |        |        |        |        |        |        |        |
|                         |                       | 2x0,63              | 2x0,75 | 2x0,88 | 2x1,00 | 2x1,13 | 2x1,25 | 2x1,50 | 2x1,75 |        |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,50                | 1,20 - | 1,20 - | 1,20 - | 1,20 - | 1,20 - | 1,20 - | 1,20 - | 1,20 - |
|                         |                       | 0,55                | 1,29 - | 1,29 - | 1,29 - | 1,29 - | 1,29 - | 1,29 - | 1,29 - | 1,29   |
|                         |                       | 0,63                | 1,44 - | 1,80 - | 1,80 - | 1,80 - | 1,80 - | 1,80 - | 1,80 - | 1,80 - |
|                         |                       | 0,75                | 1,67 - | 2,30 - | 2,30 - | 2,30 - | 2,30 - | 2,30 - | 2,30 - | 2,30 - |
|                         |                       | 0,88                | 1,67 - | 2,30 - | 2,70 - | 2,90 - | 2,90 - | 2,90 - | 2,90 - | 2,90 - |
|                         |                       | 1,00                | 1,67 - | 2,30 - | 2,70 - | 3,10 - | 3,40 - | 3,40 - | 3,40 - | 3,40 - |
|                         |                       | 1,13                | 1,67 - | 2,30 - | 2,70 - | 3,10 - | 3,50 - | 3,80 - | 4,00 - | 4,00 - |
|                         |                       | 1,25                | 1,67 - | 2,30 - | 2,70 - | 3,10 - | 3,50 - | 3,80 - | 4,60 - | 4,60 - |
|                         |                       | 1,50                | 1,67 - | 2,30 - | 2,70 - | 3,10 - | 3,50 - | 3,80 - | 4,60 - | 4,60 - |
|                         |                       | 1,75                | 1,67 - | 2,30 - | 2,70 - | 3,10 - | 3,50 - | 3,80 - | 4,60 - | -      |
|                         |                       | 2,00                | 1,67 - | 2,30 - | 2,70 - | 3,10 - | 3,50 - | 3,80 - | 4,60 - | - -    |
|                         | N <sub>R,k</sub> [kN] | 0,50                | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,57 - | 1,57 - | 1,57 - | 1,57 - |
|                         |                       | 0,55                | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 1,98 - | 1,98 - | 1,98 - |
|                         |                       | 0,63                | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - | 2,90 - |
|                         |                       | 0,75                | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - | 2,90 - |
|                         |                       | 0,88                | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - | 2,90 - |
|                         |                       | 1,00                | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - | 2,90 - |
|                         |                       | 1,13                | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - | 2,90 - |
|                         |                       | 1,25                | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - | 2,90 - |
|                         |                       | 1,50                | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - | 2,90 - |
|                         |                       | 1,75                | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - | - -    |
|                         |                       | 2,00                | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - | - -    |
|                         |                       | N <sub>R,k,II</sub> | 0,87 - | 0,90 - | 1,10 - | 1,40 - | 1,80 - | 2,10 - | 2,90 - | 2,90   |

#### Self-drilling screw

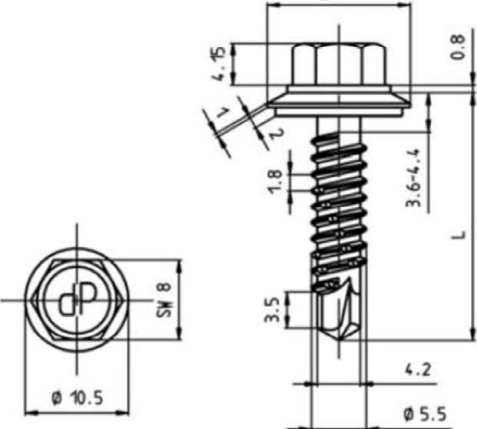
ZEBRA Piasta Ø 5,5 x L, ZEBRA Piasta plus Ø 5,5 x L  
with hexagon head and sealing washer  $\geq \phi 16$  mm

#### Annex 53

|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM</p> <p>Component I: S280GD to S550GD - EN 10346<br/>Component II: S235 to S355 - EN 10025-1<br/>S280GD to S550GD - EN 10346<br/>HX300LAD to HX460LAD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 4.50</math> mm</p> <p><b>Timber substructures</b><br/>no performance determined</p> |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                       | Component II |        |        |        |        |        |        |         |         |         |         |         |
|-------------------------|-----------------------|--------------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|
|                         |                       | t II [mm]    |        |        |        |        |        |        |         |         |         |         |         |
|                         |                       | 0,40         | 0,50   | 0,55   | 0,63   | 0,75   | 0,88   | 1,00   | 1,13    | 1,25    | 1,50    | 2,00    |         |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,40         | 0,61 - | 0,61 - | 0,61 - | 0,61 - | 0,61 - | 0,61 - | 0,61 -  | 0,61 -  | 0,61 -  | 0,61 -  | 0,61 -  |
|                         |                       | 0,50         | 0,61 - | 0,90 - | 0,90 - | 0,90 - | 0,90 - | 0,90 - | 0,90 -  | 0,90 -  | 0,90 -  | 0,90 -  | 0,90 -  |
|                         |                       | 0,55         | 0,61 - | 0,90 - | 0,94 - | 0,94 - | 0,94 - | 0,94 - | 0,94 -  | 0,94 -  | 0,94 -  | 0,94 -  | 0,94 -  |
|                         |                       | 0,63         | 0,61 - | 0,90 - | 0,94 - | 1,00 - | 1,20 - | 1,30 - | 1,40 ac | 1,70 ac | 1,90 ac | 1,90 ac | 1,90 ac |
|                         |                       | 0,75         | 0,61 - | 0,90 - | 0,94 - | 1,00 - | 1,80 - | 1,80 - | 1,80 -  | 1,80 -  | 2,00 -  | 2,10 -  | 2,40 ac |
|                         |                       | 0,88         | 0,61 - | 0,90 - | 0,94 - | 1,20 - | 1,80 - | 2,00 - | 2,20 -  | 2,20 -  | 2,20 -  | 2,50 -  | 3,10 -  |
|                         |                       | 1,00         | 0,61 - | 0,90 - | 0,94 - | 1,40 - | 1,80 - | 2,20 - | 2,60 -  | 2,60 -  | 2,60 -  | 3,00 -  | 3,70 -  |
|                         |                       | 1,13         | 0,61 - | 0,90 - | 0,94 - | 1,40 - | 2,10 - | 2,20 - | 2,60 -  | 2,90 -  | 3,10 -  | 3,60 -  | 4,40 -  |
|                         |                       | 1,25         | 0,61 - | 0,90 - | 0,94 - | 1,40 - | 2,30 - | 2,30 - | 2,60 -  | 3,10 -  | 3,60 -  | 4,10 -  | 5,10 -  |
|                         |                       | 1,50         | 0,61 - | 0,90 - | 0,94 - | 1,40 - | 2,30 - | 2,30 - | 2,60 -  | 3,10 -  | 3,60 -  | 4,10 -  | 5,10 -  |
|                         | 1,75                  | 0,61 -       | 0,90 - | 0,94 - | 1,40 - | 2,30 - | 2,30 - | 2,60 - | 3,10 -  | 3,60 -  | 4,10 -  | 5,10 -  |         |
|                         | 2,00                  | 0,61 -       | 0,90 - | 0,94 - | 1,40 - | 2,30 - | 2,30 - | 2,60 - | 3,10 -  | 3,60 -  | 4,10 -  | 5,10 -  |         |
|                         | N <sub>R,k</sub> [kN] | 0,40         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 1,70 -  | 1,70 -  |
|                         |                       | 0,50         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 1,87 -  | 1,87 -  |
|                         |                       | 0,55         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,07 -  | 2,07 -  |
|                         |                       | 0,63         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 2,40 -  |
|                         |                       | 0,75         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,10 -  |
|                         |                       | 0,88         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,20 -  |
|                         |                       | 1,00         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,30 -  |
|                         |                       | 1,13         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,30 -  |
|                         |                       | 1,25         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,30 -  |
|                         |                       | 1,50         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,30 -  |
|                         |                       | 1,75         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,30 -  |
|                         |                       | 2,00         | 0,28 - | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 -  | 1,10 -  | 1,30 -  | 2,30 -  | 3,30 -  |
| N <sub>R,k,II</sub>     |                       | 0,28 -       | 0,39 - | 0,47 - | 0,60 - | 0,70 - | 0,80 - | 0,90 - | 1,10 -  | 1,30 -  | 2,30 -  | 3,30 -  |         |

|                                                                                                                 |  |  |  |  |  |  |  |  |  |          |  |
|-----------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|----------|--|
|                                                                                                                 |  |  |  |  |  |  |  |  |  |          |  |
| Self-drilling screw                                                                                             |  |  |  |  |  |  |  |  |  | Annex 54 |  |
| ZEBRA Piasta H Ø 5,5 x L, ZEBRA Piasta plus H Ø 5,5 x L with undercut, hexagon head and sealing washer ≥ Ø14 mm |  |  |  |  |  |  |  |  |  |          |  |

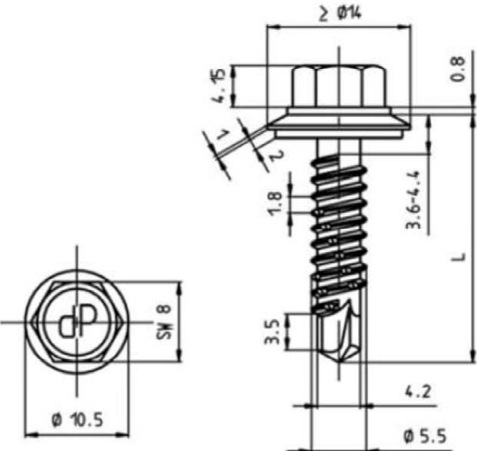
|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM</p> <p>Component I: S280GD to S550GD - EN 10346<br/>Component II: S235 to S355 - EN 10025-1<br/>S280GD to S550GD - EN 10346<br/>HX300LAD to HX460LAD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 4.50</math> mm</p> <p><b>Timber substructures</b><br/>no performance determined</p> |
|-----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                | Component II |        |        |        |         |         |         |         |
|-------------------------|----------------|--------------|--------|--------|--------|---------|---------|---------|---------|
|                         |                | t II [mm]    |        |        |        |         |         |         |         |
|                         |                | 2x0,63       | 2x0,75 | 2x0,88 | 2x1,00 | 2x1,13  | 2x1,25  | 2x1,50  | 2x2,00  |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] | 0,50         | 1,29 - | 1,29 - | 1,29 - | 1,29 -  | 1,29 -  | 1,29 -  | 1,29 -  |
|                         |                | 0,55         | 1,38 - | 1,38 - | 1,38 - | 1,38 -  | 1,38 -  | 1,38 -  | 1,38 -  |
|                         |                | 0,63         | 1,53 - | 1,40 - | 1,40 - | 1,40 -  | 1,60 -  | 1,80 ac | 1,80 ac |
|                         |                | 0,75         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 ac | 2,50 ac |
|                         |                | 0,88         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 -  | 2,50 -  |
|                         |                | 1,00         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 -  | 2,50 -  |
|                         |                | 1,13         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 -  | 2,50 -  |
|                         |                | 1,25         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 -  | 2,50 -  |
|                         |                | 1,50         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 -  | 2,50 -  |
|                         |                | 1,75         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 -  | -       |
|                         |                | 2,00         | 1,75 - | 2,10 - | 2,30 - | 2,50 -  | 2,50 -  | 2,50 -  | -       |
|                         | $N_{R,k}$ [kN] | 0,50         | 1,03 - | 1,30 - | 1,87 - | 1,87 -  | 1,87 -  | 1,87 -  | 1,87 -  |
|                         |                | 0,55         | 1,03 - | 1,30 - | 1,90 - | 2,07 -  | 2,07 -  | 2,07 -  | 2,07 -  |
|                         |                | 0,63         | 1,03 - | 1,30 - | 1,90 - | 2,40 ac | 2,40 ac | 2,40 ac | 2,40 ac |
|                         |                | 0,75         | 1,03 - | 1,30 - | 1,90 - | 2,60 ac | 2,80 ac | 3,10 ac | 3,10 ac |
|                         |                | 0,88         | 1,03 - | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | 3,10 -  |
|                         |                | 1,00         | 1,03 - | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | 3,10 -  |
|                         |                | 1,13         | 1,03 - | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | 3,10 -  |
|                         |                | 1,25         | 1,03 - | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | 3,10 -  |
|                         |                | 1,50         | 1,03 - | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | 3,10 -  |
|                         |                | 1,75         | 1,03 - | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | -       |
|                         |                | 2,00         | 1,03 - | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | -       |
|                         | $N_{R,k,II}$   | 1,03         | -      | 1,30 - | 1,90 - | 2,60 -  | 2,80 -  | 3,10 -  | 3,10 -  |

**Self-drilling screw**

ZEBRA Piasta H Ø 5,5 x L, ZEBRA Piasta plus H Ø 5,5 x L  
with undercut, hexagon head and sealing washer  $\geq \text{Ø}14$  mm

**Annex 55**

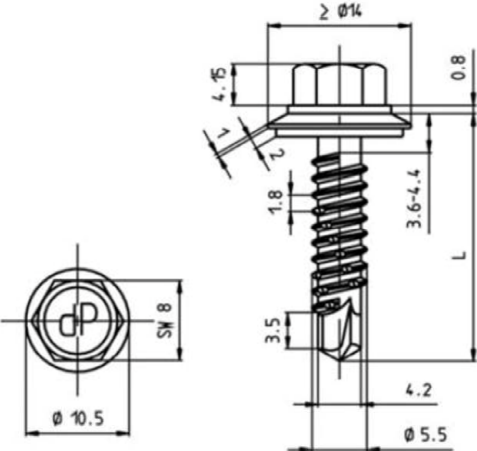
|                                                                                   |                                                                                                                                 |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
|  | <u>Materials</u>                                                                                                                |
|                                                                                   | Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM |
|                                                                                   | Component I: Aluminum alloy<br>with $R_m \geq 165 \text{ N/mm}^2$ – EN 573<br>with $R_m \geq 215 \text{ N/mm}^2$ – EN 573       |
|                                                                                   | Component II: S235 to S355 - EN 10025-1<br>S280GD to S550GD - EN 10346<br>HX300LAD to HX460LAD - EN 10346                       |
| <u>Drilling-capacity</u> $\Sigma(t_i) \leq 4.80 \text{ mm}$                       |                                                                                                                                 |
| <u>Timber substructures</u><br>no performance determined                          |                                                                                                                                 |

|                                                                               |                | Component II, steel sheet |               |               |               |               |                 |                 |                 |                 |
|-------------------------------------------------------------------------------|----------------|---------------------------|---------------|---------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|
|                                                                               |                | t II [mm]                 |               |               |               |               |                 |                 |                 |                 |
|                                                                               |                | 0,40                      | 0,50          | 0,63          | 0,75          | 0,88          | 1,00            | 1,25            | 1,50            | 2,00            |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,40                      | 0,20 - 0,20 - | 0,20 - 0,20 - | 0,20 - 0,20 - | 0,20 - 0,20 - | 0,20 - 0,20 -   | 0,20 - 0,20 -   | 0,20 - 0,20 -   | 0,20 - 0,20 -   |
|                                                                               |                | 0,50                      | 0,20 - 0,42 - | 0,43 - 0,43 - | 0,45 - 0,45 - | 0,46 - 0,46 - | 0,47 - 0,47 -   | 0,49 ac 0,49 ac | 0,49 ac 0,49 ac | 0,49 ac 0,49 ac |
|                                                                               |                | 0,70                      | 0,20 - 0,53 - | 0,62 - 0,62 - | 0,68 - 0,68 - | 0,69 - 0,69 - | 0,70 - 0,70 -   | 0,73 ac 0,73 ac | 0,73 ac 0,73 ac | 0,73 ac 0,73 ac |
|                                                                               |                | 0,80                      | 0,20 - 0,59 - | 0,68 - 0,68 - | 0,77 - 0,77 - | 0,81 - 0,81 - | 0,82 - 0,82 -   | 0,85 ac 0,85 ac | 0,85 ac 0,85 ac | 0,85 ac 0,85 ac |
|                                                                               |                | 1,00                      | 0,20 - 0,70 - | 0,79 - 0,79 - | 0,88 - 0,88 - | 0,97 - 0,97 - | 1,05 ac 1,05 ac | 1,13 ac 1,13 ac | 1,26 ac 1,26 ac | 1,26 ac 1,26 ac |
|                                                                               |                | 1,20                      | 0,20 - 0,70 - | 0,81 - 0,81 - | 0,92 - 0,92 - | 1,02 - 1,02 - | 1,13 ac 1,13 ac | 1,22 ac 1,22 ac | 1,26 ac 1,26 ac | 1,41 ac 1,41 ac |
|                                                                               |                | 1,50                      | 0,20 - 0,70 - | 0,81 - 0,81 - | 0,92 - 0,92 - | 1,02 - 1,02 - | 1,13 ac 1,13 ac | 1,22 ac 1,22 ac | 1,26 ac 1,26 ac | 1,63 ac 1,63 ac |
|                                                                               |                | 2,00                      | 0,20 - 0,70 - | 0,81 - 0,81 - | 0,92 - 0,92 - | 1,02 - 1,02 - | 1,13 ac 1,13 ac | 1,22 ac 1,22 ac | 1,26 ac 1,26 ac | 1,63 ac 1,63 ac |
|                                                                               | $N_{R,k,II}$   | 0,28                      | 0,39          | 0,60          | 0,70          | 0,80          | 0,90            | 1,30            | 2,30            | 3,30            |

|                                                                               |                | Component II, steel sheet |               |               |               |               |                 |                 |                 |                 |
|-------------------------------------------------------------------------------|----------------|---------------------------|---------------|---------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|
|                                                                               |                | t II [mm]                 |               |               |               |               |                 |                 |                 |                 |
|                                                                               |                | 0,40                      | 0,50          | 0,63          | 0,75          | 0,88          | 1,00            | 1,25            | 1,50            | 2,00            |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,40                      | 0,24 - 0,24 - | 0,24 - 0,24 - | 0,24 - 0,24 - | 0,24 - 0,24 - | 0,24 - 0,24 -   | 0,24 - 0,24 -   | 0,24 - 0,24 -   | 0,24 - 0,24 -   |
|                                                                               |                | 0,50                      | 0,24 - 0,55 - | 0,56 - 0,56 - | 0,59 - 0,59 - | 0,60 - 0,60 - | 0,61 - 0,61 -   | 0,64 ac 0,64 ac | 0,64 ac 0,64 ac | 0,64 ac 0,64 ac |
|                                                                               |                | 0,70                      | 0,24 - 0,61 - | 0,75 - 0,75 - | 0,86 - 0,86 - | 0,91 - 0,91 - | 0,91 - 0,91 -   | 0,95 ac 0,95 ac | 0,95 ac 0,95 ac | 0,95 ac 0,95 ac |
|                                                                               |                | 0,80                      | 0,24 - 0,64 - | 0,81 - 0,81 - | 0,98 - 0,98 - | 1,06 - 1,06 - | 1,07 - 1,07 -   | 1,11 ac 1,11 ac | 1,11 ac 1,11 ac | 1,11 ac 1,11 ac |
|                                                                               |                | 1,00                      | 0,24 - 0,70 - | 0,81 - 0,81 - | 1,04 - 1,04 - | 1,21 - 1,21 - | 1,37 ac 1,37 ac | 1,47 ac 1,47 ac | 1,64 ac 1,64 ac | 1,64 ac 1,64 ac |
|                                                                               |                | 1,20                      | 0,24 - 0,70 - | 0,89 - 0,89 - | 1,07 - 1,07 - | 1,26 - 1,26 - | 1,47 ac 1,47 ac | 1,59 ac 1,59 ac | 1,64 ac 1,64 ac | 1,84 ac 1,84 ac |
|                                                                               |                | 1,50                      | 0,24 - 0,70 - | 0,89 - 0,89 - | 1,07 - 1,07 - | 1,26 - 1,26 - | 1,47 ac 1,47 ac | 1,59 ac 1,59 ac | 1,64 ac 1,64 ac | 2,12 ac 2,12 ac |
|                                                                               |                | 2,00                      | 0,24 - 0,70 - | 0,89 - 0,89 - | 1,07 - 1,07 - | 1,26 - 1,26 - | 1,47 ac 1,47 ac | 1,59 ac 1,59 ac | 1,64 ac 1,64 ac | 2,12 ac 2,12 ac |
|                                                                               | $N_{R,k,II}$   | 0,28                      | 0,39          | 0,60          | 0,70          | 0,80          | 0,90            | 1,30            | 2,30            | 3,30            |

|                                                                                                                                        |                 |
|----------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Self-drilling screw</b>                                                                                                             | <b>Annex 56</b> |
| ZEBRA Piasta H Ø 5,5 x L, ZEBRA Piasta plus H Ø 5,5 x L<br>with undercut, hexagon head and sealing washer $\geq \text{Ø}14 \text{ mm}$ |                 |

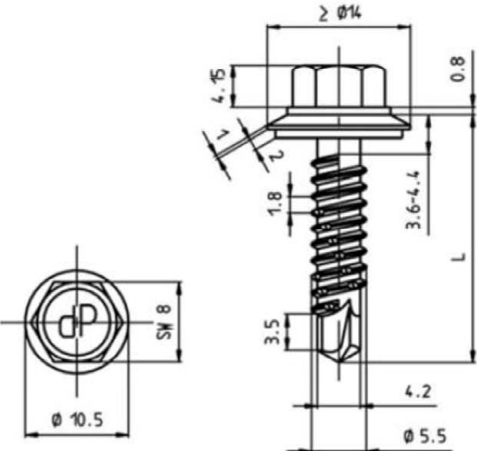


|                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><u>Materials</u></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM</p> <p>Component I: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p>Component II: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p><u>Drilling-capacity</u> <math>\Sigma(t_i) \leq 5.00 \text{ mm}</math></p> <p><u>Timber substructures</u><br/>no performance determined</p> |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                               |                | Component II, Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$ |      |      |      |         |         |         |         |         |         |
|-------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------|------|------|------|---------|---------|---------|---------|---------|---------|
|                                                                               |                | t II [mm]                                                       |      |      |      |         |         |         |         |         |         |
|                                                                               |                | 0,50                                                            | 0,70 | 0,80 | 1,00 | 1,20    | 1,50    | 2,00    | 3,00    | 4,00    |         |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,50                                                            | 0,26 | 0,34 | 0,38 | 0,45    | 0,49 ac | 0,49 ac | 0,49 ac | 0,49 ac | 0,49 ac |
|                                                                               |                | 0,60                                                            | 0,28 | 0,46 | 0,50 | 0,57    | 0,61 ac | 0,61 ac | 0,61 ac | 0,61 ac | 0,61 a  |
|                                                                               |                | 0,70                                                            | 0,29 | 0,58 | 0,61 | 0,69    | 0,73 ac | 0,73 ac | 0,73 ac | 0,73 ac | 0,73 a  |
|                                                                               |                | 0,80                                                            | 0,31 | 0,59 | 0,73 | 0,81    | 0,85 ac | 0,85 ac | 0,85 ac | 0,85 ac | 0,85 a  |
|                                                                               |                | 0,90                                                            | 0,32 | 0,61 | 0,75 | 0,93    | 0,97 ac | 1,06 ac | 1,06 ac | 1,06 ac | 1,06 a  |
|                                                                               |                | 1,00                                                            | 0,34 | 0,62 | 0,77 | 1,05 ac | 1,09 ac | 1,26 ac | 1,26 ac | 1,26 ac | 1,26 a  |
|                                                                               |                | 1,20                                                            | 0,34 | 0,63 | 0,78 | 1,07 ac | 1,21 ac | 1,26 ac | 1,41 ac | 1,70 a  | - -     |
|                                                                               |                | 1,50                                                            | 0,34 | 0,63 | 0,78 | 1,07 ac | 1,21 ac | 1,26 ac | 1,63 ac | 2,36 a  | - -     |
|                                                                               |                | 2,00                                                            | 0,34 | 0,63 | 0,78 | 1,07 ac | 1,21 a  | 1,26 a  | 1,63 a  | 2,36 a  | - -     |
|                                                                               | $N_{R,k,II}$   |                                                                 | 0,13 | 0,24 | 0,30 | 0,53    | 0,65    | 0,83    | 1,03    | 2,16    | 3,37    |

|                                                                               |                | Component II, Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$ |      |      |      |      |      |      |      |      |      |
|-------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------|------|------|------|------|------|------|------|------|------|
|                                                                               |                | t II [mm]                                                       |      |      |      |      |      |      |      |      |      |
|                                                                               |                | 0,50                                                            | 0,70 | 0,80 | 1,00 | 1,20 | 1,50 | 2,00 | 3,00 | 4,00 |      |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$ | $V_{R,k}$ [kN] | 0,50                                                            | 0,34 | 0,44 | 0,50 | 0,59 | 0,64 | 0,64 | 0,64 | 0,64 | 0,64 |
|                                                                               |                | 0,60                                                            | 0,36 | 0,60 | 0,65 | 0,74 | 0,79 | 0,79 | 0,79 | 0,79 | 0,79 |
|                                                                               |                | 0,70                                                            | 0,38 | 0,76 | 0,79 | 0,90 | 0,95 | 0,95 | 0,95 | 0,95 | 0,95 |
|                                                                               |                | 0,80                                                            | 0,40 | 0,77 | 0,95 | 1,06 | 1,11 | 1,11 | 1,11 | 1,11 | 1,11 |
|                                                                               |                | 0,90                                                            | 0,42 | 0,79 | 0,98 | 1,21 | 1,26 | 1,38 | 1,38 | 1,38 | 1,38 |
|                                                                               |                | 1,00                                                            | 0,44 | 0,81 | 1,00 | 1,37 | 1,42 | 1,64 | 1,64 | 1,64 | 1,64 |
|                                                                               |                | 1,20                                                            | 0,44 | 0,82 | 1,02 | 1,39 | 1,58 | 1,64 | 1,84 | 2,22 | - -  |
|                                                                               |                | 1,50                                                            | 0,44 | 0,82 | 1,02 | 1,39 | 1,58 | 1,64 | 2,12 | 3,07 | - -  |
|                                                                               |                | 2,00                                                            | 0,44 | 0,82 | 1,02 | 1,39 | 1,58 | 1,64 | 2,12 | 3,07 | - -  |
|                                                                               | $N_{R,k,II}$   |                                                                 | 0,16 | 0,28 | 0,34 | 0,69 | 0,79 | 0,95 | 1,30 | 2,56 | 4,00 |

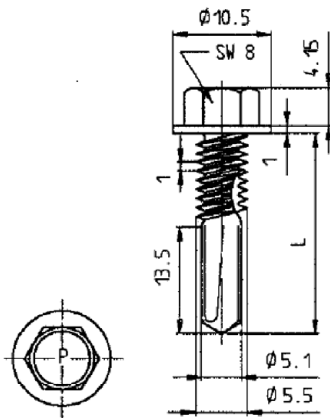
|                                                                                                                                                           |                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| <p><b>Self-drilling screw</b></p>                                                                                                                         | <p><b>Annex 57</b></p> |
| <p>ZEBRA Piasta H Ø 5,5 x L, ZEBRA Piasta plus H Ø 5,5 x L<br/>with undercut, hexagon head and sealing washer <math>\geq \text{Ø}14 \text{ mm}</math></p> |                        |

|                                                                                   |                                                                                                                                 |
|-----------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
|  | <u>Materials</u>                                                                                                                |
|                                                                                   | Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM |
|                                                                                   | Component I: Aluminum alloy<br>with $R_m \geq 165 \text{ N/mm}^2$ – EN 573<br>with $R_m \geq 215 \text{ N/mm}^2$ – EN 573       |
|                                                                                   | Component II: S235 to S355 - EN 10025-1<br>S280GD to S550GD - EN 10346<br>HX300LAD to HX460LAD - EN 10346                       |
| <u>Drilling-capacity</u> $\Sigma(t_i) \leq 4.50 \text{ mm}$                       |                                                                                                                                 |
| <u>Timber substructures</u><br>no performance determined                          |                                                                                                                                 |

|                                                                                                 |      | Component II, steel sheet |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|------|---------------------------|--------|--------|--------|--------|--------|--------|--------|
| t II [mm]                                                                                       |      | 2x0,63                    | 2x0,75 | 2x0,88 | 2x1,00 | 2x1,13 | 2x1,25 | 2x1,50 | 2x2,00 |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,40 | 0,20 -                    | 0,20 - | 0,20 - | 0,20 - | 0,20 - | 0,20 - | 0,20 - | 0,20 - |
|                                                                                                 | 0,50 | 0,52 -                    | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - |
|                                                                                                 | 0,60 | 0,66 -                    | 0,69 - | 0,72 - | 0,75 - | 0,75 - | 0,75 - | 0,75 - | 0,75 - |
|                                                                                                 | 0,80 | 0,95 -                    | 1,03 - | 1,13 - | 1,21 - | 1,21 - | 1,21 - | 1,21 - | 1,21 - |
|                                                                                                 | 1,00 | 1,19 -                    | 1,35 - | 1,51 - | 1,67 - | 1,67 - | 1,67 - | 1,67 - | - -    |
|                                                                                                 | 1,20 | 1,19 -                    | 1,35 - | 1,51 - | 1,67 - | 1,67 - | 1,67 - | 1,67 - | - -    |
|                                                                                                 | 1,50 | 1,19 -                    | 1,35 - | 1,51 - | 1,67 - | 1,67 - | 1,67 - | 1,67 - | - -    |
|                                                                                                 | 2,00 | 1,19 -                    | 1,35 - | 1,51 - | 1,67 - | 1,67 - | 1,67 - | - -    | - -    |
| $N_{R,k,II}$                                                                                    |      | 1,03                      | 1,30   | 1,90   | 2,60   | 2,80   | 3,10   | 3,10   | 3,10   |

|                                                                                                 |      | Component II, steel sheet |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|------|---------------------------|--------|--------|--------|--------|--------|--------|--------|
| t II [mm]                                                                                       |      | 2x0,63                    | 2x0,75 | 2x0,88 | 2x1,00 | 2x1,13 | 2x1,25 | 2x1,50 | 2x2,00 |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,40 | 0,24 -                    | 0,24 - | 0,24 - | 0,24 - | 0,24 - | 0,24 - | 0,24 - | 0,24 - |
|                                                                                                 | 0,50 | 0,68 -                    | 0,68 - | 0,68 - | 0,68 - | 0,68 - | 0,68 - | 0,68 - | 0,68 - |
|                                                                                                 | 0,60 | 0,86 -                    | 0,90 - | 0,94 - | 0,98 - | 0,98 - | 0,98 - | 0,98 - | 0,98 - |
|                                                                                                 | 0,80 | 1,24 -                    | 1,34 - | 1,47 - | 1,58 - | 1,58 - | 1,58 - | 1,58 - | 1,58 - |
|                                                                                                 | 1,00 | 1,55 -                    | 1,76 - | 1,97 - | 2,18 - | 2,18 - | 2,18 - | 2,18 - | - -    |
|                                                                                                 | 1,20 | 1,55 -                    | 1,76 - | 1,97 - | 2,18 - | 2,18 - | 2,18 - | 2,18 - | - -    |
|                                                                                                 | 1,50 | 1,55 -                    | 1,76 - | 1,97 - | 2,18 - | 2,18 - | 2,18 - | 2,18 - | - -    |
|                                                                                                 | 2,00 | 1,55 -                    | 1,76 - | 1,97 - | 2,18 - | 2,18 - | 2,18 - | - -    | - -    |
| $N_{R,k,II}$                                                                                    |      | 1,03                      | 1,30   | 1,90   | 2,60   | 2,80   | 3,10   | 3,10   | 3,10   |

|                                                                                                                                        |                 |
|----------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| <b>Self-drilling screw</b>                                                                                                             | <b>Annex 58</b> |
| ZEBRA Piasta H Ø 5,5 x L, ZEBRA Piasta plus H Ø 5,5 x L<br>with undercut, hexagon head and sealing washer $\geq \text{Ø}14 \text{ mm}$ |                 |



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: None

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 13.50$  mm

#### Timber substructures

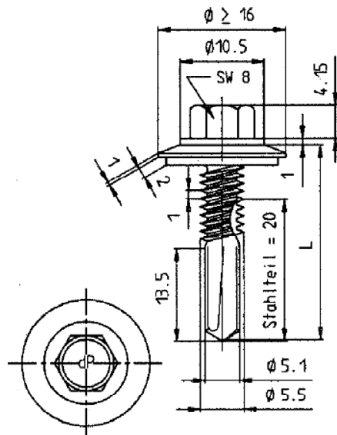
no performance determined

|                         |                | Component II |         |           |           |           |         |
|-------------------------|----------------|--------------|---------|-----------|-----------|-----------|---------|
|                         |                | t II [mm]    |         |           |           |           |         |
|                         |                | 4,00         | 5,00    | 6,00      | 8,00      | 10,0      | 12,0    |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] |              |         |           |           |           |         |
|                         | 0,63           | 3,26 ac      | 3,26 ac | 3,26 ac   | 3,26 ac   | 3,26 ac   | 3,26 ac |
|                         | 0,75           | 4,42 ac      | 4,42 ac | 4,42 ac   | 4,42 ac   | 4,42 ac   | 4,42 ac |
|                         | 0,88           | 5,13 ac      | 5,13 ac | 5,13 ac   | 5,13 ac   | 5,13 ac   | 5,13 ac |
|                         | 1,00           | 5,79 ac      | 5,79 ac | 5,79 ac   | 5,79 ac   | 5,79 ac   | 5,79 ac |
|                         | 1,13           | 6,67 ac      | 6,67 ac | 6,67 ac   | 6,67 ac   | 6,67 ac   | 6,67 ac |
|                         | 1,25           | 7,48 ac      | 7,48 ac | 7,48 ac   | 7,48 ac   | 7,48 ac   | 7,48 ac |
|                         | 1,50           | 9,16 ac      | 9,16 ac | 9,16 ac   | 9,16 ac   | 9,16 ac   | 9,16 ac |
|                         | 1,75           | 9,16 ac      | 9,16 ac | 9,16 ac   | 9,16 ac   | 9,16 ac   | - -     |
|                         | 2,00           | 9,16 ac      | 9,16 ac | 9,16 ac   | 9,16 ac   | 9,16 ac   | - -     |
|                         | $N_{R,k}$ [kN] |              |         |           |           |           |         |
|                         | 0,63           | 1,60 ac      | 1,60 ac | 1,60 abcd | 1,60 abcd | 1,60 abcd | 1,60 ac |
|                         | 0,75           | 2,10 ac      | 2,10 ac | 2,10 abcd | 2,10 abcd | 2,10 abcd | 2,10 ac |
|                         | 0,88           | 2,60 ac      | 2,60 ac | 2,60 abcd | 2,60 abcd | 2,60 abcd | 2,60 a  |
|                         | 1,00           | 3,10 ac      | 3,10 ac | 3,10 abcd | 3,10 abcd | 3,10 abcd | 3,10 a  |
|                         | 1,13           | 3,60 ac      | 3,60 ac | 3,60 ac   | 3,60 ac   | 3,60 ac   | 3,60 ac |
|                         | 1,25           | 4,10 ac      | 4,10 ac | 4,10 ac   | 4,10 ac   | 4,10 ac   | 4,10 ac |
|                         | 1,50           | 5,20 ac      | 5,20 ac | 5,20 ac   | 5,20 ac   | 5,20 ac   | 5,20 ac |
|                         | 1,75           | 5,20 ac      | 5,20 ac | 5,20 ac   | 5,20 ac   | 5,20 ac   | - -     |
|                         | 2,00           | 5,20 ac      | 5,20 ac | 5,20 ac   | 5,20 ac   | 5,20 ac   | - -     |
|                         | $N_{R,k,II}$   | 6,20 -       | 6,30 -  | 6,30 -    | 6,30 -    | 6,30 -    | 6,30 -  |

#### Self-drilling screw

ZEBRA Piasta Ø 5,5 -12 x L, ZEBRA Piasta plus Ø 5,5 -12 x L  
with hexagon head and extra-long drill bit

#### Annex 59



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506  
with vulcanized EPDM

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 13.50$  mm

#### Timber substructures

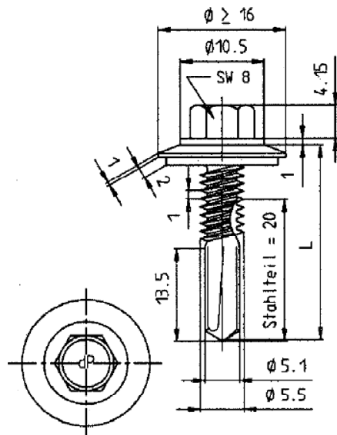
no performance determined

|                         |                | Component II |           |           |           |           |           |
|-------------------------|----------------|--------------|-----------|-----------|-----------|-----------|-----------|
|                         |                | t II [mm]    |           |           |           |           |           |
|                         |                | 4,00         | 5,00      | 6,00      | 8,00      | 10,0      | 12,0      |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] |              |           |           |           |           |           |
|                         | 0,63           | 2,60 abcd    | 2,60 abcd | 2,60 abcd | 2,60 abcd | 2,60 abcd | 2,60 abcd |
|                         | 0,75           | 3,10 abcd    | 3,10 abcd | 3,10 abcd | 3,10 abcd | 3,10 abcd | 3,10 abcd |
|                         | 0,88           | 3,60 ac      | 3,60 ac   | 3,60 ac   | 3,60 ac   | 3,60 ac   | 3,60 ac   |
|                         | 1,00           | 4,10 ac      | 4,10 ac   | 4,10 ac   | 4,10 ac   | 4,10 ac   | 4,10 ac   |
|                         | 1,13           | 4,60 ac      | 4,60 ac   | 4,60 ac   | 4,60 ac   | 4,60 ac   | 4,60 ac   |
|                         | 1,25           | 5,10 ac      | 5,10 ac   | 5,10 ac   | 5,10 ac   | 5,10 ac   | 5,10 ac   |
|                         | 1,50           | 6,00 ac      | 6,00 ac   | 6,00 ac   | 6,00 ac   | 6,00 ac   | 6,00 ac   |
|                         | 1,75           | 6,00 -       | 6,00 -    | 6,00 -    | 6,00 -    | 6,00 -    | - -       |
|                         | 2,00           | 6,00 -       | 6,00 -    | 6,00 -    | 6,00 -    | 6,00 -    | - -       |
|                         | $N_{R,k}$ [kN] |              |           |           |           |           |           |
|                         | 0,50           | 1,67 abcd    | 1,67 abcd | 1,67 abcd | 1,67 abcd | 1,67 abcd | 1,67 abcd |
|                         | 0,55           | 2,11 abcd    | 2,11 abcd | 2,11 abcd | 2,11 abcd | 2,11 abcd | 2,11 abcd |
|                         | 0,63           | 3,10 abcd    | 3,10 abcd | 3,10 abcd | 3,10 abcd | 3,10 abcd | 3,10 abcd |
|                         | 0,75           | 3,60 abcd    | 3,60 abcd | 3,60 abcd | 3,60 abcd | 3,60 abcd | 3,60 abcd |
|                         | 0,88           | 4,10 ac      | 4,10 ac   | 4,10 ac   | 4,10 ac   | 4,10 ac   | 4,10 ac   |
|                         | 1,00           | 4,50 ac      | 4,50 ac   | 4,50 ac   | 4,50 ac   | 4,50 ac   | 4,50 ac   |
|                         | 1,13           | 5,00 ac      | 5,00 ac   | 5,00 ac   | 5,00 ac   | 5,00 ac   | 5,00 ac   |
|                         | 1,25           | 5,40 ac      | 5,40 ac   | 5,40 ac   | 5,40 ac   | 5,40 ac   | 5,40 ac   |
|                         | 1,50           | 6,20 ac      | 6,30 ac   | 6,30 ac   | 6,30 ac   | 6,30 ac   | 6,30 ac   |
|                         | 1,75           | 6,20 -       | 6,30 -    | 6,30 -    | 6,30 -    | 6,30 -    | - -       |
|                         | 2,00           | 6,20 -       | 6,30 -    | 6,30 -    | 6,30 -    | 6,30 -    | - -       |
|                         | $N_{R,k,II}$   | 6,20 -       | 6,30 -    | 6,30 -    | 6,30 -    | 6,30 -    | 6,30 -    |

#### Self-drilling screw

ZEBRA Piasta Ø 5,5 -12 x L, ZEBRA Piasta plus Ø 5,5 -12 x L  
with hexagon head and sealing washer  $\geq \text{Ø}16$  mm and extra long drill bit

#### Annex 60



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 13.50 \text{ mm}$

#### Timber substructures

no performance determined

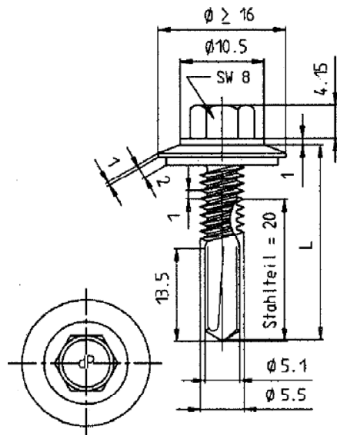
|                                                                                                 |              | Component II, steel sheet |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                 |        |        |        |        |        |        |        |
|                                                                                                 |              | 4,00                      | 6,00   | 7,00   | 8,00   | 9,00   | 10,00  | 11,00  | 12,00  |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,50         | 0,85 -                    | 0,85 - | 0,85 - | 0,85 - | 0,85 - | 0,85 - | 0,85 - | 0,85 - |
|                                                                                                 | 0,70         | 1,39 -                    | 1,39 - | 1,39 - | 1,39 - | 1,39 - | 1,39 - | 1,39 - | 1,39 - |
|                                                                                                 | 0,80         | 1,66 -                    | 1,66 - | 1,66 - | 1,66 - | 1,66 - | 1,66 - | 1,66 - | 1,66 - |
|                                                                                                 | 1,00         | 2,23 -                    | 2,23 - | 2,23 - | 2,23 - | 2,23 - | 2,23 - | 2,23 - | 2,23 - |
|                                                                                                 | 1,20         | 2,66 -                    | 2,66 - | 2,66 - | 2,66 - | 2,66 - | 2,66 - | 2,66 - | 2,66 - |
|                                                                                                 | 1,50         | 3,30 -                    | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - |
|                                                                                                 | 2,00         | 3,30 -                    | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - |
|                                                                                                 | $N_{R,k,II}$ | 6,20                      | 6,30   | 6,30   | 6,30   | 6,30   | 6,30   | 6,30   | 6,30   |

|                                                                                                 |              | Component II, steel sheet |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                 |        |        |        |        |        |        |        |
|                                                                                                 |              | 4,00                      | 6,00   | 7,00   | 8,00   | 9,00   | 10,00  | 11,00  | 12,00  |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,50         | 1,19 -                    | 1,19 - | 1,19 - | 1,19 - | 1,19 - | 1,19 - | 1,19 - | 1,19 - |
|                                                                                                 | 0,70         | 1,94 -                    | 1,94 - | 1,94 - | 1,94 - | 1,94 - | 1,94 - | 1,94 - | 1,94 - |
|                                                                                                 | 0,80         | 2,32 -                    | 2,32 - | 2,32 - | 2,32 - | 2,32 - | 2,32 - | 2,32 - | 2,32 - |
|                                                                                                 | 1,00         | 3,11 -                    | 3,11 - | 3,11 - | 3,11 - | 3,11 - | 3,11 - | 3,11 - | 3,11 - |
|                                                                                                 | 1,20         | 3,71 -                    | 3,71 - | 3,71 - | 3,71 - | 3,71 - | 3,71 - | 3,71 - | 3,71 - |
|                                                                                                 | 1,50         | 4,61 -                    | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - |
|                                                                                                 | 2,00         | 4,61 -                    | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - |
|                                                                                                 | $N_{R,k,II}$ | 6,20                      | 6,30   | 6,30   | 6,30   | 6,30   | 6,30   | 6,30   | 6,30   |

#### Self-drilling screw

ZEBRA Piasta Ø 5,5 -12 x L, ZEBRA Piasta plus Ø 5,5 -12 x L  
with hexagon head and sealing washer  $\geq \text{Ø}16 \text{ mm}$  and extra long drill bit

#### Annex 61



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Component II: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Drilling-capacity  $\Sigma(t_i) \leq 13.50 \text{ mm}$

#### Timber substructures

no performance determined

|                                                                                                 |              | Component II, Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$ |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                                                       |        |        |        |        |        |        |        |
|                                                                                                 |              | 4,00                                                            | 6,00   | 7,00   | 8,00   | 9,00   | 10,00  | 11,00  | 12,00  |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,50         | 0,85 -                                                          | 0,85 - | 0,85 - | 0,85 - | 0,85 - | 0,85 - | 0,85 - | 0,85 - |
|                                                                                                 | 0,70         | 1,39 -                                                          | 1,39 - | 1,39 - | 1,39 - | 1,39 - | 1,39 - | 1,39 - | 1,39 - |
|                                                                                                 | 0,80         | 1,66 -                                                          | 1,66 - | 1,66 - | 1,66 - | 1,66 - | 1,66 - | 1,66 - | 1,66 - |
|                                                                                                 | 1,00         | 2,23 -                                                          | 2,23 - | 2,23 - | 2,23 - | 2,23 - | 2,23 - | 2,23 - | 2,23 - |
|                                                                                                 | 1,20         | 2,66 -                                                          | 2,66 - | 2,66 - | 2,66 - | 2,66 - | 2,66 - | 2,66 - | 2,66 - |
|                                                                                                 | 1,50         | 3,30 -                                                          | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - |
|                                                                                                 | 2,00         | 3,30 -                                                          | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - | 3,30 - |
|                                                                                                 | $N_{R,k,II}$ | 1,08                                                            | 2,22   | 2,22   | 2,22   | 2,22   | 2,22   | 2,22   | 2,22   |

|                                                                                                 |              | Component II, Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$ |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                                                       |        |        |        |        |        |        |        |
|                                                                                                 |              | 4,00                                                            | 6,00   | 7,00   | 8,00   | 9,00   | 10,00  | 11,00  | 12,00  |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,50         | 1,19 -                                                          | 1,19 - | 1,19 - | 1,19 - | 1,19 - | 1,19 - | 1,19 - | 1,19 - |
|                                                                                                 | 0,70         | 1,94 -                                                          | 1,94 - | 1,94 - | 1,94 - | 1,94 - | 1,94 - | 1,94 - | 1,94 - |
|                                                                                                 | 0,80         | 2,32 -                                                          | 2,32 - | 2,32 - | 2,32 - | 2,32 - | 2,32 - | 2,32 - | 2,32 - |
|                                                                                                 | 1,00         | 3,11 -                                                          | 3,11 - | 3,11 - | 3,11 - | 3,11 - | 3,11 - | 3,11 - | 3,11 - |
|                                                                                                 | 1,20         | 3,71 -                                                          | 3,71 - | 3,71 - | 3,71 - | 3,71 - | 3,71 - | 3,71 - | 3,71 - |
|                                                                                                 | 1,50         | 4,61 -                                                          | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - |
|                                                                                                 | 2,00         | 4,61 -                                                          | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - | 4,61 - |
|                                                                                                 | $N_{R,k,II}$ | 1,41                                                            | 2,90   | 2,90   | 2,90   | 2,90   | 2,90   | 2,90   | 2,90   |

#### Self-drilling screw

ZEBRA Piasta Ø 5,5 - 12x L, ZEBRA Piasta Ø 5,5 – 12 x L  
with hexagon head and sealing washer  $\geq \phi 16 \text{ mm}$  and extra long drill bit

#### Annex 62

|  |                                                                                                                                                                                                                                                                                                                                                                                                               |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506 Washer: none</p> <p>Component I: S280GD to S550GD - EN 10346</p> <p>Component II: S235 to S355 - EN 10025-1<br/>S280GD to S550GD - EN 10346<br/>HX300LAD to HX460LAD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 6.00</math> mm</p> <p><b>Timber substructures</b></p> <p>no performance determined</p> |
|--|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                | Component II |         |         |         |         |         |         |         |
|-------------------------|----------------|--------------|---------|---------|---------|---------|---------|---------|---------|
|                         |                | t II [mm]    |         |         |         |         |         |         |         |
|                         |                | 0,63         | 0,75    | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] | 0,40         | - -     | - -     | - -     | - -     | - -     | 1,64 ac | 1,64 ac |
|                         |                | 0,50         | - -     | - -     | - -     | - -     | - -     | 1,76 ac | 1,76 ac |
|                         |                | 0,63         | 0,80 ac | 1,10 ac | 1,40 ac | 1,70 ac | 1,90 ac | 2,00 ac | 2,20 ac |
|                         |                | 0,75         | 1,00 ac | 1,30 ac | 1,50 ac | 1,80 ac | 2,20 ac | 2,40 ac | 2,60 ac |
|                         |                | 0,88         | 1,20 ac | 1,50 ac | 1,70 ac | 2,00 ac | 2,40 ac | 2,80 ac | 3,00 ac |
|                         |                | 1,00         | 1,30 -  | 1,60 ac | 1,90 ac | 2,10 ac | 2,80 ac | 3,00 ac | 3,40 ac |
|                         |                | 1,13         | 1,40 -  | 1,70 -  | 2,00 -  | 2,30 -  | 3,00 -  | 3,40 -  | 4,00 ac |
|                         |                | 1,25         | 1,50 -  | 1,80 -  | 2,10 -  | 2,50 -  | 3,20 -  | 3,50 -  | 4,00 -  |
|                         |                | 1,50         | 1,60 -  | 2,00 -  | 2,40 -  | 2,80 -  | 3,30 -  | 3,80 -  | 4,60 -  |
|                         |                | 1,75         | 1,60 -  | 2,00 -  | 2,40 -  | 2,80 -  | 3,30 -  | 3,80 -  | 4,60 -  |
|                         |                | 2,00         | 1,60 -  | 2,00 -  | 2,40 -  | 2,80 -  | 3,30 -  | 3,80 -  | 4,60 -  |
|                         | $N_{R,k}$ [kN] | 0,40         | 0,60 ac | 0,70 ac | 0,80 ac | 1,00 ac | 1,08 ac | 1,08 ac | 1,08 ac |
|                         |                | 0,50         | 0,60 ac | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,38 ac | 1,38 ac |
|                         |                | 0,63         | 0,60 ac | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac |
|                         |                | 0,75         | 0,60 ac | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac |
|                         |                | 0,88         | 0,60 ac | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac |
|                         |                | 1,00         | 0,60 -  | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac |
|                         |                | 1,13         | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  |
|                         |                | 1,25         | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  |
|                         |                | 1,50         | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  |
|                         |                | 1,75         | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  |
|                         |                | 2,00         | 0,60 -  | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  |
|                         | $N_{R,k,II}$   | 0,60         | -       | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  |

**Self-drilling screw**

ZEBRA Piasta Ø 6,3 x L, ZEBRA Piasta plus Ø 6,3 x L  
with hexagon head

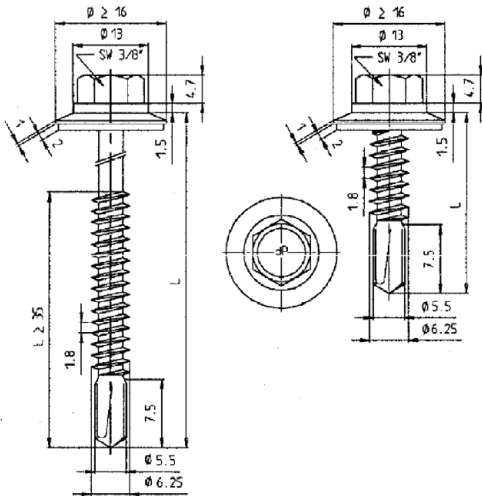
**Annex 63**



|  |                                                                                                                                                                                                                                                                                                                                                                                                             |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><b>Materials</b></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: none</p> <p>Component I: S280GD to S550GD - EN 10346<br/>Component II: S235 to S355 - EN 10025-1<br/>S280GD to S550GD - EN 10346<br/>HX300LAD to HX460LAD - EN 10346</p> <p><b>Drilling-capacity</b> <math>\Sigma(t_i) \leq 6.00</math> mm</p> <p><b>Timber substructures</b><br/>no performance determined</p> |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                         |                       | Component II        |         |         |         |         |
|-------------------------|-----------------------|---------------------|---------|---------|---------|---------|
|                         |                       | t II [mm]           |         |         |         |         |
|                         |                       | 2,50                | 3,00    | 4,00    | 5,00    |         |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,40                | 1,64 ac | 1,64 ac | 1,64 ac | 1,64 ac |
|                         |                       | 0,50                | 1,76 ac | 1,76 ac | 1,76 ac | 1,76 ac |
|                         |                       | 0,63                | 2,60 ac | 2,60 ac | 2,60 ac | 2,60 -  |
|                         |                       | 0,75                | 3,20 ac | 3,20 ac | 3,20 ac | 3,20 -  |
|                         |                       | 0,88                | 3,70 ac | 3,70 ac | 3,70 ac | 3,70 -  |
|                         |                       | 1,00                | 4,40 ac | 4,40 ac | 4,80 ac | 4,80 -  |
|                         |                       | 1,13                | 5,05 ac | 5,05 ac | 5,80 ac | - -     |
|                         |                       | 1,25                | 5,55 -  | 6,20 -  | 6,60 a  | - -     |
|                         |                       | 1,50                | 6,75 -  | 7,70 -  | 8,50 a  | - -     |
|                         |                       | 1,75                | 6,75 -  | 7,70 -  | - -     | - -     |
|                         |                       | 2,00                | 6,75 -  | 7,70 -  | - -     | - -     |
|                         | N <sub>R,k</sub> [kN] | 0,40                | 1,08 ac | 1,08 ac | 1,08 ac | 1,08 ac |
|                         |                       | 0,50                | 1,38 ac | 1,38 ac | 1,38 ac | 1,38 ac |
|                         |                       | 0,63                | 2,40 ac | 2,40 ac | 2,40 ac | 2,40 ac |
|                         |                       | 0,75                | 3,00 ac | 3,00 ac | 3,00 ac | 3,00 ac |
|                         |                       | 0,88                | 3,35 ac | 3,90 ac | 3,90 ac | 3,90 ac |
|                         |                       | 1,00                | 3,35 ac | 4,30 ac | 4,30 ac | 4,30 ac |
|                         |                       | 1,13                | 3,35 ac | 4,60 ac | 5,00 ac | - -     |
|                         |                       | 1,25                | 3,35 -  | 4,60 -  | 5,70 -  | - -     |
|                         |                       | 1,50                | 3,35 -  | 4,60 -  | 6,60 -  | - -     |
|                         |                       | 1,75                | 3,35 -  | 4,60 -  | - -     | - -     |
|                         |                       | 2,00                | 3,35 -  | 4,60 -  | - -     | - -     |
|                         |                       | N <sub>R,k,II</sub> | 3,35 -  | 4,60 -  | 6,60 -  | 6,60 -  |

|                                                                          |          |
|--------------------------------------------------------------------------|----------|
|                                                                          |          |
| Self-drilling screw                                                      | Annex 64 |
| ZEBRA Piasta Ø 6,3 x L, ZEBRA Piasta plus Ø 6,3 x L<br>with hexagon head |          |



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 6.00$  mm

#### Timber substructures

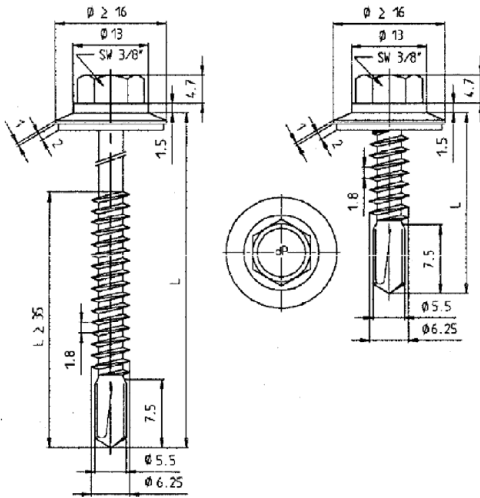
no performance determined

|             |                | Component II |        |         |         |         |         |         |         |           |
|-------------|----------------|--------------|--------|---------|---------|---------|---------|---------|---------|-----------|
|             |                | t II [mm]    |        |         |         |         |         |         |         |           |
|             |                | 0,63         | 0,75   | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |           |
| Component I | $V_{R,k}$ [kN] | 0,63         | 1,20 - | 1,30 ac | 1,50 ac | 1,60 ac | 1,80 ac | 1,90 ac | 2,20 ac | 2,80 abcd |
|             |                | 0,75         | 1,20 - | 1,40 ac | 1,70 ac | 1,90 ac | 2,00 ac | 2,10 ac | 2,40 ac | 3,20 ac   |
|             |                | 0,88         | 1,20 - | 1,50    | 1,80 ac | 2,10 ac | 2,20 ac | 2,40 ac | 2,60 ac | 3,50 ac   |
|             |                | 1,00         | 1,20 - | 1,60    | 2,00 -  | 2,30 -  | 2,60 ac | 2,70 ac | 3,10 ac | 3,80 ac   |
|             |                | 1,13         | 1,30 - | 1,60    | 2,00 -  | 2,40 -  | 3,00 -  | 3,10 -  | 3,40 ac | 4,10 ac   |
|             |                | 1,25         | 1,30 - | 1,70    | 2,10 -  | 2,60 -  | 3,10 -  | 3,30 -  | 3,60 ac | 4,40 ac   |
|             |                | 1,50         | 1,40 - | 1,80    | 2,10 -  | 2,60 -  | 3,20 -  | 3,70 -  | 4,00 -  | 5,00 -    |
|             |                | 1,75         | 1,40 - | 1,80    | 2,10 -  | 2,60 -  | 3,20 -  | 3,70 -  | 4,00 -  | 5,00 -    |
|             |                | 2,00         | 1,40 - | 1,80    | 2,10 -  | 2,60 -  | 3,20 -  | 3,70 -  | 4,00 -  | 5,00 -    |
|             | $N_{R,k}$ [kN] | 0,50         | 0,60 - | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac | 1,78 abcd |
|             |                | 0,55         | 0,60 - | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac | 2,10 abcd |
|             |                | 0,63         | 0,60 - | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac | 2,10 abcd |
|             |                | 0,75         | 0,60 - | 0,70 ac | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac | 2,10 ac   |
|             |                | 0,88         | 0,60 - | 0,70 -  | 0,80 ac | 1,00 ac | 1,20 ac | 1,30 ac | 1,70 ac | 2,10 ac   |
|             |                | 1,00         | 0,60 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 ac | 1,30 ac | 1,70 ac | 2,10 ac   |
|             |                | 1,13         | 0,60 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 ac | 2,10 ac   |
|             |                | 1,25         | 0,60 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 ac | 2,10 ac   |
|             |                | 1,50         | 0,60 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  | 2,10 -    |
|             |                | 1,75         | 0,60 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  | 2,10 -    |
|             |                | 2,00         | 0,60 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  | 2,10 -    |
|             |                | $N_{R,k,II}$ | 0,60 - | 0,70 -  | 0,80 -  | 1,00 -  | 1,20 -  | 1,30 -  | 1,70 -  | 2,10 -    |

#### Self-drilling screw

ZEBRA Piasta Ø 6,3 x L, ZEBRA Piasta plus Ø 6,3 x L  
with hexagon head and sealing washer  $\geq \varnothing 16$  mm

Annex 65



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506  
with vulcanized EPDM

Component I: S280GD to S550GD - EN 10346

Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 6.00$  mm

#### Timber substructures

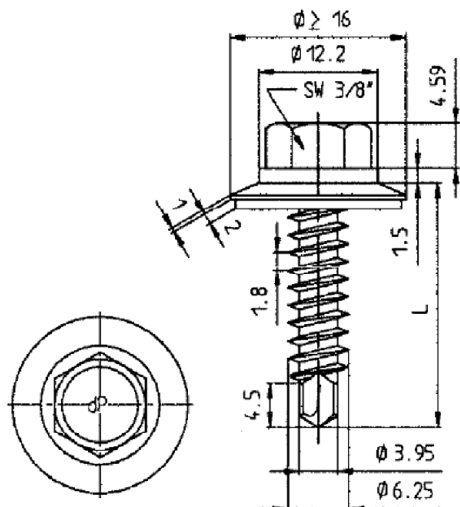
no performance determined

|                         |                       | Component II        |           |           |           |         |
|-------------------------|-----------------------|---------------------|-----------|-----------|-----------|---------|
|                         |                       | t II [mm]           |           |           |           |         |
|                         |                       | 2,50                | 3,00      | 4,00      | 5,00      |         |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,63                | 2,95 abcd | 3,10 abcd | 3,50 abcd | 3,50 ab |
|                         |                       | 0,75                | 3,40 ac   | 3,60 ac   | 3,90 ac   | 3,90 a  |
|                         |                       | 0,88                | 3,75 ac   | 4,00 ac   | 4,60 ac   | 4,60 a  |
|                         |                       | 1,00                | 4,15 ac   | 4,50 ac   | 5,20 ac   | 5,20 a  |
|                         |                       | 1,13                | 4,50 ac   | 4,90 ac   | 5,80 a    | - -     |
|                         |                       | 1,25                | 4,90 ac   | 5,40 -    | 6,40 -    | - -     |
|                         |                       | 1,50                | 5,65 -    | 6,30 -    | 7,00 -    | - -     |
|                         |                       | 1,75                | 5,65 -    | 6,30 -    | 7,00 -    | - -     |
|                         |                       | 2,00                | 5,65 -    | 6,30 -    | 7,00 -    | - -     |
|                         | N <sub>R,k</sub> [kN] | 0,50                | 1,78 abcd | 1,78 abcd | 1,78 abcd | 1,78 ab |
|                         |                       | 0,55                | 2,25 abcd | 2,25 abcd | 2,25 abcd | 2,25 ab |
|                         |                       | 0,63                | 3,30 abcd | 3,30 abcd | 3,30 abcd | 3,30 ab |
|                         |                       | 0,75                | 3,35 ac   | 3,80 ac   | 3,80 ac   | 3,80 a  |
|                         |                       | 0,88                | 3,35 ac   | 4,40 ac   | 4,40 ac   | 4,40 a  |
|                         |                       | 1,00                | 3,35 ac   | 4,60 ac   | 4,90 ac   | 4,90 a  |
|                         |                       | 1,13                | 3,35 a    | 4,60 a    | 5,40 a    | - -     |
|                         |                       | 1,25                | 3,35 -    | 4,60 -    | 5,90 -    | - -     |
|                         |                       | 1,50                | 3,35 -    | 4,60 -    | 6,60 -    | - -     |
|                         |                       | 1,75                | 3,35 -    | 4,60 -    | 6,60 -    | - -     |
|                         |                       | 2,00                | 3,35 -    | 4,60 -    | 6,60 -    | - -     |
|                         |                       | N <sub>R,k,II</sub> | 3,35 -    | 4,60 -    | 6,60 -    | 6,60 -  |

#### Self-drilling screw

ZEBRA Piasta Ø 6,3 x L, ZEBRA Piasta plus Ø 6,3 x L  
with hexagon head and sealing washer  $\geq \text{Ø}16$  mm

Annex 66



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: S280GD to S320GD - EN 10346

Component II: S235 – EN 10025-1  
S280GD to S320GD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 3.00$  mm

#### Timber substructures

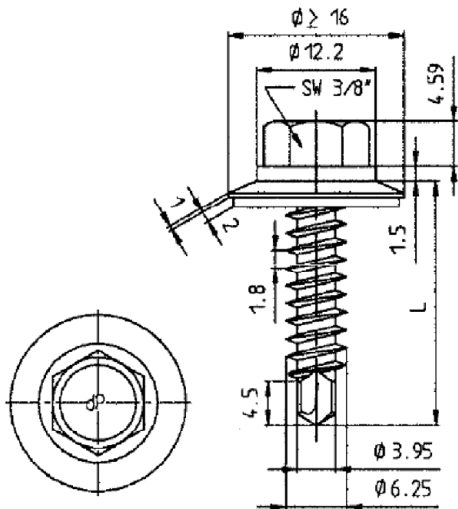
no performance determined

|                         |                | Component II |        |        |        |        |        |         |         |         |         |         |         |
|-------------------------|----------------|--------------|--------|--------|--------|--------|--------|---------|---------|---------|---------|---------|---------|
|                         |                | t II [mm]    |        |        |        |        |        |         |         |         |         |         |         |
|                         |                | 0,40         | 0,50   | 0,55   | 0,63   | 0,75   | 0,88   | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    |         |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] | 0,40         | 0,77 - | 0,77 - | 0,77 - | 0,77 - | 0,77 - | 0,77 -  | 0,77 -  | 0,77 -  | 0,77 -  | 0,77 -  | 0,77 -  |
|                         |                | 0,50         | 0,77 - | 0,93 - | 0,93 - | 0,93 - | 0,93 - | 0,93 -  | 0,93 -  | 0,93 -  | 0,93 -  | 0,93 -  | 0,93 -  |
|                         |                | 0,55         | 0,77 - | 0,93 - | 1,19 - | 1,19 - | 1,19 - | 1,19 -  | 1,19 -  | 1,19 -  | 1,19 -  | 1,19 -  | 1,19 -  |
|                         |                | 0,63         | 0,77 - | 0,93 - | 1,19 - | 1,60 - | 1,70 - | 1,80 ac | 1,90 ac | 1,90 ac | 2,00 ac | 2,10 ac | 2,10 ac |
|                         |                | 0,75         | 0,77 - | 0,93 - | 1,19 - | 1,70 - | 1,90 - | 2,10 -  | 2,30 ac | 2,40 ac | 2,60 ac | 3,00 ac | 3,00 ac |
|                         |                | 0,88         | 0,77 - | 0,93 - | 1,19 - | 1,80 - | 2,10 - | 2,40 -  | 2,70 -  | 3,00 -  | 3,30 -  | 3,80 -  | 3,80 -  |
|                         |                | 1,00         | 0,77 - | 0,93 - | 1,19 - | 1,90 - | 2,30 - | 2,70 -  | 3,30 -  | 3,50 -  | 3,90 -  | 4,70 -  | 4,70 -  |
|                         |                | 1,13         | 0,77 - | 0,93 - | 1,19 - | 2,00 - | 2,40 - | 2,90 -  | 3,50 -  | 3,80 -  | 4,30 -  | 5,00 -  | -       |
|                         |                | 1,25         | 0,77 - | 0,93 - | 1,19 - | 2,10 - | 2,50 - | 3,10 -  | 3,80 -  | 4,10 -  | 4,70 -  | 5,00 -  | -       |
|                         |                | 1,50         | 0,77 - | 0,93 - | 1,19 - | 2,20 - | 2,70 - | 3,40 -  | 4,00 -  | 4,70 -  | 5,00 -  | 5,00 -  | -       |
|                         |                | 1,75         | 0,77 - | 0,93 - | 1,19 - | 2,20 - | 2,70 - | 3,40 -  | 4,00 -  | 4,70 -  | 5,00 -  | -       | -       |
|                         |                | 2,00         | 0,77 - | 0,93 - | 1,19 - | 2,20 - | 2,70 - | 3,40 -  | 4,00 -  | -       | -       | -       | -       |
|                         | $N_{R,k}$ [kN] | 0,40         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 1,74 -  | 1,74 -  | 1,74 -  | 1,74 -  |
|                         |                | 0,50         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 1,74 -  | 1,74 -  | 1,74 -  | 1,74 -  |
|                         |                | 0,55         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 1,77 -  | 1,77 -  | 1,77 -  |
|                         |                | 0,63         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 2,60 -  | 2,60 -  |
|                         |                | 0,75         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 3,20 -  | 3,20 -  |
|                         |                | 0,88         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 3,30 -  | 3,30 -  |
|                         |                | 1,00         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 3,30 -  | -       |
|                         |                | 1,13         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 3,30 -  | -       |
|                         |                | 1,25         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 3,30 -  | -       |
|                         |                | 1,50         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 3,30 -  | -       |
|                         |                | 1,75         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | -       | -       |
|                         |                | 2,00         | 0,50 - | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | -       | -       | -       | -       |
| $N_{R,k,II}$            |                | 0,50         | -      | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 -  | 1,70 -  | 2,10 -  | 2,50 -  | 3,30 -  | 3,30 -  |

#### Self-drilling screw

ZEBRA Piasta Ø 6,3 r x L, ZEBRA Piasta plus Ø 6,3 r x L  
with hexagon head and sealing washer  $\geq \phi 16$  mm

#### Annex 67



#### Materials

Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506  
Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM

Component I: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Component II: S235 to S355 – EN 10025-1  
S280GD to S320GD – EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 3.00 \text{ mm}$

#### Timber substructures

no performance determined

|                                                                                                 |              | Component II, steel sheet |        |        |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                 |        |        |        |        |        |        |        |        |        |
|                                                                                                 |              | 0,40                      | 0,50   | 0,55   | 0,63   | 0,75   | 0,88   | 1,00   | 1,25   | 1,50   | 2,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,40         | 0,28 -                    | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - |
|                                                                                                 | 0,50         | 0,28 -                    | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - |
|                                                                                                 | 0,70         | 0,28 -                    | 0,40 - | 0,45 - | 0,53 - | 0,60 - | 0,60 - | 0,60 - | 0,60 - | 0,60 - | 0,60 - |
|                                                                                                 | 0,80         | 0,28 -                    | 0,40 - | 0,45 - | 0,53 - | 0,76 - | 0,92 - | 0,92 - | 0,92 - | 0,92 - | 0,92 - |
|                                                                                                 | 1,00         | 0,28 -                    | 0,40 - | 0,45 - | 0,53 - | 0,76 - | 1,18 - | 1,57 - | 1,57 - | 1,57 - | 1,57 - |
|                                                                                                 | 1,20         | 0,28 -                    | 0,40 - | 0,45 - | 0,53 - | 0,76 - | 1,18 - | 1,57 - | 2,19 - | 2,19 - | - -    |
|                                                                                                 | 1,50         | 0,28 -                    | 0,40 - | 0,45 - | 0,53 - | 0,76 - | 1,18 - | 1,57 - | 2,35 - | 3,13 - | - -    |
|                                                                                                 | 2,00         | 0,28 -                    | 0,40 - | 0,45 - | 0,53 - | 0,76 - | 1,18 - | 1,57 - | 2,35 - | - -    | - -    |
|                                                                                                 | $N_{R,k,II}$ | 0,50 -                    | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 - | 1,70 - | 2,50 - | 3,30 - | 3,30 - |

|                                                                                                 |              | Component II, steel sheet |        |        |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                 |        |        |        |        |        |        |        |        |        |
|                                                                                                 |              | 0,40                      | 0,50   | 0,55   | 0,63   | 0,75   | 0,88   | 1,00   | 1,25   | 1,50   | 2,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,40         | 0,36 -                    | 0,36 - | 0,36 - | 0,36 - | 0,36 - | 0,36 - | 0,36 - | 0,36 - | 0,36 - | 0,36 - |
|                                                                                                 | 0,50         | 0,36 -                    | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - |
|                                                                                                 | 0,70         | 0,36 -                    | 0,52 - | 0,59 - | 0,69 - | 0,78 - | 0,78 - | 0,78 - | 0,78 - | 0,78 - | 0,78 - |
|                                                                                                 | 0,80         | 0,36 -                    | 0,52 - | 0,59 - | 0,69 - | 0,99 - | 1,20 - | 1,20 - | 1,20 - | 1,20 - | 1,20 - |
|                                                                                                 | 1,00         | 0,36 -                    | 0,52 - | 0,59 - | 0,69 - | 0,99 - | 1,54 - | 2,05 - | 2,05 - | 2,05 - | 2,05 - |
|                                                                                                 | 1,20         | 0,36 -                    | 0,52 - | 0,59 - | 0,69 - | 0,99 - | 1,54 - | 2,05 - | 2,85 - | 2,85 - | - -    |
|                                                                                                 | 1,50         | 0,36 -                    | 0,52 - | 0,59 - | 0,69 - | 0,99 - | 1,54 - | 2,05 - | 3,06 - | 4,08 - | - -    |
|                                                                                                 | 2,00         | 0,36 -                    | 0,52 - | 0,59 - | 0,69 - | 0,99 - | 1,54 - | 2,05 - | 3,06 - | - -    | - -    |
|                                                                                                 | $N_{R,k,II}$ | 0,50 -                    | 0,59 - | 0,71 - | 0,90 - | 1,10 - | 1,50 - | 1,70 - | 2,50 - | 3,30 - | 3,30 - |

#### Self-drilling screw

ZEBRA Piasta Ø 6,3 r x L, ZEBRA Piasta plus Ø 6,3 r x L  
with hexagon head and sealing washer  $\geq \text{Ø}16 \text{ mm}$

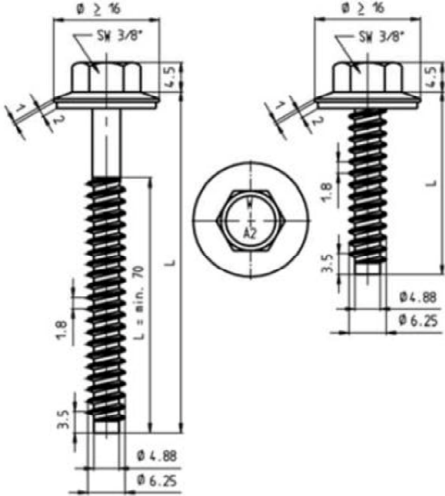
#### Annex 68

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p><u>Materials</u></p> <p>Fastener: Stainless steel A2, A4 or A5 – EN ISO 3506<br/>Washer: Stainless steel A2, A4 or A5 – EN ISO 3506 with vulcanized EPDM</p> <p>Component I: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p>Component II: Aluminum alloy<br/>with <math>R_m \geq 165 \text{ N/mm}^2</math> – EN 573<br/>with <math>R_m \geq 215 \text{ N/mm}^2</math> – EN 573</p> <p><u>Drilling-capacity</u> <math>\Sigma(t_i) \leq 3.00 \text{ mm}</math></p> <p><u>Timber substructures</u><br/>no performance determined</p> |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                                                                                                 |              | Component II, Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$ |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                                                       |        |        |        |        |        |        |        |
|                                                                                                 |              | 0,40                                                            | 0,50   | 0,70   | 0,80   | 1,00   | 1,20   | 1,50   | 2,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,40         | 0,23 -                                                          | 0,23 - | 0,23 - | 0,23 - | 0,23 - | 0,23 - | 0,23 - | 0,23 - |
|                                                                                                 | 0,50         | 0,23 -                                                          | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - | 0,40 - |
|                                                                                                 | 0,70         | 0,23 -                                                          | 0,40 - | 0,60 - | 0,60 - | 0,60 - | 0,60 - | 0,60 - | 0,60 - |
|                                                                                                 | 0,80         | 0,23 -                                                          | 0,40 - | 0,60 - | 0,92 - | 0,92 - | 0,92 - | 0,92 - | 0,92 - |
|                                                                                                 | 1,00         | 0,23 -                                                          | 0,40 - | 0,60 - | 0,92 - | 1,57 - | 1,57 - | 1,57 - | 1,57 - |
|                                                                                                 | 1,20         | 0,23 -                                                          | 0,40 - | 0,60 - | 0,92 - | 1,57 - | 2,19 - | 2,19 - | 2,19 - |
|                                                                                                 | 1,50         | 0,23 -                                                          | 0,40 - | 0,60 - | 0,92 - | 1,57 - | 2,19 - | 3,13 - | 3,13 - |
|                                                                                                 | 2,00         | 0,23 -                                                          | 0,40 - | 0,60 - | 0,92 - | 1,57 - | 2,19 - | 3,13 - | 3,13 - |
|                                                                                                 | $N_{R,k,II}$ | 0,16                                                            | 0,31   | 0,45   | 0,55   | 0,76   | 0,99   | 1,33   | 1,33   |

|                                                                                                 |              | Component II, Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$ |        |        |        |        |        |        |        |
|-------------------------------------------------------------------------------------------------|--------------|-----------------------------------------------------------------|--------|--------|--------|--------|--------|--------|--------|
|                                                                                                 |              | t II [mm]                                                       |        |        |        |        |        |        |        |
|                                                                                                 |              | 0,40                                                            | 0,50   | 0,70   | 0,80   | 1,00   | 1,20   | 1,50   | 2,00   |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,40         | 0,28 -                                                          | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - | 0,28 - |
|                                                                                                 | 0,50         | 0,28 -                                                          | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - | 0,52 - |
|                                                                                                 | 0,70         | 0,28 -                                                          | 0,52 - | 0,78 - | 0,78 - | 0,78 - | 0,78 - | 0,78 - | 0,78 - |
|                                                                                                 | 0,80         | 0,28 -                                                          | 0,52 - | 0,78 - | 1,20 - | 1,20 - | 1,20 - | 1,20 - | 1,20 - |
|                                                                                                 | 1,00         | 0,28 -                                                          | 0,52 - | 0,78 - | 1,20 - | 2,03 - | 2,03 - | 2,03 - | 2,03 - |
|                                                                                                 | 1,20         | 0,28 -                                                          | 0,52 - | 0,78 - | 1,20 - | 2,03 - | 2,84 - | 2,84 - | 2,84 - |
|                                                                                                 | 1,50         | 0,28 -                                                          | 0,52 - | 0,78 - | 1,20 - | 2,03 - | 2,84 - | 4,05 - | 4,05 - |
|                                                                                                 | 2,00         | 0,28 -                                                          | 0,52 - | 0,78 - | 1,20 - | 2,03 - | 2,84 - | 4,05 - | 4,05 - |
|                                                                                                 | $N_{R,k,II}$ | 0,19                                                            | 0,40   | 0,59   | 0,72   | 0,98   | 1,29   | 1,75   | 1,75   |

|                                                                                                          |                 |
|----------------------------------------------------------------------------------------------------------|-----------------|
| <b>Self-drilling screw</b>                                                                               | <b>Annex 69</b> |
| ZEBRA Piasta Ø 6,3 r x L, ZEBRA Piasta plus Ø 6,3 r x L<br>with hexagon head and sealing washer ≥ Ø16 mm |                 |



#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: steel, zinc coated and with vulcanized EPDM

Component I: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Component II: Aluminum alloy  
with  $R_m \geq 165 \text{ N/mm}^2$  – EN 573  
with  $R_m \geq 215 \text{ N/mm}^2$  – EN 573

Predrill diameter : see table below

#### Timber substructures

No performance determined

| Component I, Aluminum alloy with $R_m \geq 165 \text{ N/mm}^2$                                  |       |         |         |         |         |         |         |         |             |
|-------------------------------------------------------------------------------------------------|-------|---------|---------|---------|---------|---------|---------|---------|-------------|
| t II [mm]                                                                                       | 1,00  | 1,20    | 1,50    | 2,00    | 3,00    | 4,00    | 5,00    | 6,00    | $\geq 7,00$ |
| d <sub>pd</sub> [mm]                                                                            | Ø 5,0 |         |         | Ø 5,3   |         | Ø 5,5   |         | Ø 5,7   | Ø 5,0       |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 165 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,50  | 0,85 ac | 0,89 ac | 0,89 ac | 0,89 ac | 0,89 ac | 0,89 ac | 0,89 ac | 0,89 ac     |
|                                                                                                 | 0,60  | 0,94 ac | 0,98 ac | 0,98 ac | 1,98 ac | 0,95 ac | 0,98 ac | 0,98 ac | 0,98 ac     |
|                                                                                                 | 0,70  | 1,03 ac | 1,07 ac | 1,07 ac | 1,07 ac | 1,07 ac | 1,07 ac | 1,07 ac | 1,07 ac     |
|                                                                                                 | 0,80  | 1,12 ac | 1,16 ac | 1,25 ac | 1,25 ac | 1,25 ac | 1,25 ac | 1,25 ac | 1,25 ac     |
|                                                                                                 | 1,00  | 1,30 ac | 1,34 ac | 1,62 ac | 1,94 ac | 1,94 ac | 1,94 ac | 1,94 ac | 1,94 ac     |
|                                                                                                 | 1,20  | 1,30 ac | 1,43 ac | 1,62 ac | 1,94 ac | 2,40 ac | 2,40 ac | 2,40 ac | 2,40 ac     |
|                                                                                                 | 1,50  | 1,30 ac | 1,43 ac | 1,62 ac | 1,94 ac | 2,40 ac | 2,92 ac | 2,92 ac | 2,92 ac     |
|                                                                                                 | 2,00  | 1,30 ac | 1,43 ac | 1,62 ac | 1,94 ac | 2,40 ac | 2,92 ac | 2,92 ac | 2,92 ac     |
| $N_{R,k,II}$                                                                                    | 0,49  | 0,64    | 1,02    | 1,08    | 2,09    | 2,99    | 2,99    | 2,99    | 2,99        |

| Component I, Aluminum alloy with $R_m \geq 215 \text{ N/mm}^2$                                  |       |         |         |         |         |         |         |         |             |
|-------------------------------------------------------------------------------------------------|-------|---------|---------|---------|---------|---------|---------|---------|-------------|
| t II [mm]                                                                                       | 1,00  | 1,20    | 1,50    | 2,00    | 3,00    | 4,00    | 5,00    | 6,00    | $\geq 7,00$ |
| d <sub>pd</sub> [mm]                                                                            | Ø 5,0 |         |         | Ø 5,3   |         | Ø 5,5   |         | Ø 5,7   | Ø 5,0       |
| Component I, t I [mm]<br>Aluminum alloy with<br>$R_m \geq 215 \text{ N/mm}^2$<br>$V_{R,k}$ [kN] | 0,50  | 1,10 ac | 1,16 ac | 1,16 ac | 1,16 ac | 1,15 ac | 1,16 ac | 1,16 ac | 1,16 ac     |
|                                                                                                 | 0,60  | 1,22 ac | 1,28 ac | 1,28 ac | 1,28 ac | 1,28 ac | 1,28 ac | 1,28 ac | 1,28 ac     |
|                                                                                                 | 0,70  | 1,34 ac | 1,39 ac | 1,39 ac | 1,39 ac | 1,39 ac | 1,39 ac | 1,39 ac | 1,39 ac     |
|                                                                                                 | 0,80  | 1,46 ac | 1,51 ac | 1,63 ac | 1,63 ac | 1,63 ac | 1,63 ac | 1,63 ac | 1,63 ac     |
|                                                                                                 | 1,00  | 1,70 ac | 1,75 ac | 2,08 ac | 2,53 ac | 2,53 ac | 2,53 ac | 2,53 ac | 2,53 ac     |
|                                                                                                 | 1,20  | 1,70 ac | 1,86 ac | 2,08 ac | 2,53 ac | 3,13 ac | 3,13 ac | 3,13 ac | 3,13 ac     |
|                                                                                                 | 1,50  | 1,70 ac | 1,86 ac | 2,08 ac | 2,53 ac | 3,13 ac | 3,81 ac | 3,81 ac | 3,81 ac     |
|                                                                                                 | 2,00  | 1,70 ac | 1,86 ac | 2,08 ac | 2,53 ac | 3,13 ac | 3,81 ac | 3,81 ac | 3,81 ac     |
| $N_{R,k,II}$                                                                                    | 0,63  | 0,80    | 1,17    | 1,36    | 2,48    | 3,54    | 3,54    | 3,54    | 3,54        |

If component I and component II are made of aluminium with  $R_m \geq 245 \text{ N/mm}^2$ , the values for  $V_{R,k}$  with  $R_m \geq 215 \text{ N/mm}^2$  may be increased by 14%.

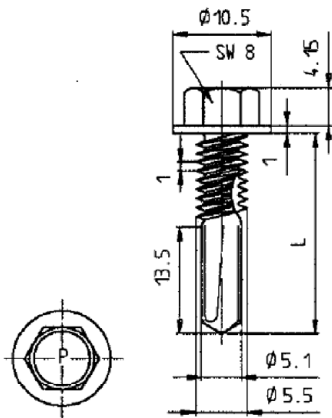
If component II is made of aluminium with  $R_m \geq 245 \text{ N/mm}^2$ , the values for  $N_{R,k}$  with  $R_m \geq 215 \text{ N/mm}^2$  may be increased by 14%.

#### Self-drilling screw

FABA Typ BZ 6,3 x L  
with hexagon head and sealing washer  $\geq \phi 16 \text{ mm}$

#### Annex 93





#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: None

Component I: S280GD to S550GD - EN 10346

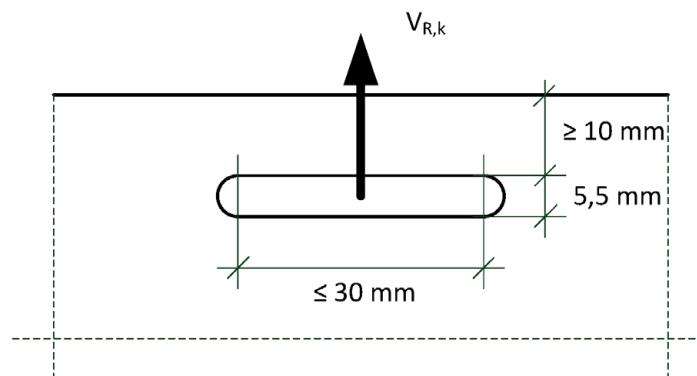
Component II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 13.50$  mm

#### Timber substructures

no performance determined

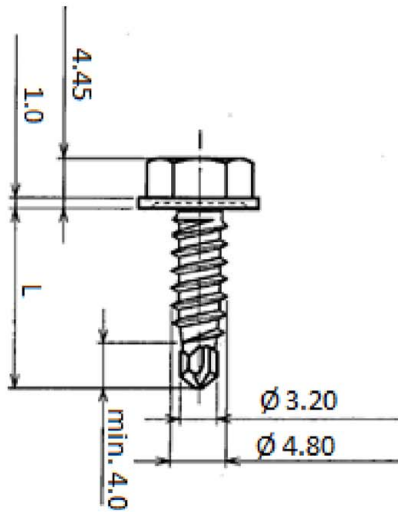
|                         |                | Component II |        |        |        |        |        |        |        |
|-------------------------|----------------|--------------|--------|--------|--------|--------|--------|--------|--------|
|                         |                | t II [mm]    |        |        |        |        |        |        |        |
|                         |                | 2,00         | 3,00   | 4,00   | 5,00   | 6,00   | 8,00   | 10,0   | 12,0   |
| Component I<br>t I [mm] | $V_{R,k}$ [kN] | 1,50         | 3,17 - | 3,17 - | 3,17 - | 3,17 - | 3,17 - | 3,17 - | 3,17 - |
|                         |                | 1,75         | 3,36 - | 3,36 - | 3,36 - | 3,36 - | 3,36 - | 3,36 - | 3,36 - |
|                         |                | 2,00         | 3,55 - | 3,55 - | 3,55 - | 3,55 - | 3,55 - | 3,55 - | 3,55 - |
|                         |                | 3,00         | 3,55 - | 5,20 - | 5,20 - | 5,20 - | 5,20 - | 5,20 - | 5,20 - |
|                         | $N_{R,k}$ [kN] | 1,50         | - -    | - -    | - -    | - -    | - -    | - -    | - -    |
|                         |                | 1,75         | - -    | - -    | - -    | - -    | - -    | - -    | - -    |
|                         |                | 2,00         | - -    | - -    | - -    | - -    | - -    | - -    | - -    |
|                         |                | 3,00         | - -    | - -    | - -    | - -    | - -    | - -    | - -    |
|                         | $N_{R,k,II}$   |              | - -    | - -    | - -    | - -    | - -    | - -    | - -    |



#### Self-drilling screw

ZEBRA Pias Ø 5,5 - 12 x L, ZEBRA Pias plus Ø 5,5 - 12 x L  
with hexagon head and extra-long drill bit

#### Annex 94



#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: None

Component I: S280GD to S320GD - EN 10346

Component II: S235 – EN 10025-1  
S280GD to S320GD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 3.00$  mm

#### Timber substructures

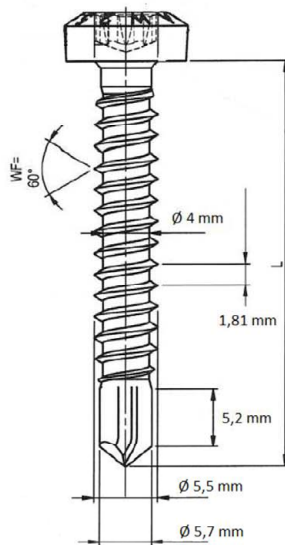
no performance determined

|                         |                       | Component II |             |             |             |                |                |                |                |                |                |
|-------------------------|-----------------------|--------------|-------------|-------------|-------------|----------------|----------------|----------------|----------------|----------------|----------------|
|                         |                       | t II [mm]    |             |             |             |                |                |                |                |                |                |
|                         |                       | 0,40         | 0,50        | 0,55        | 0,63        | 0,75           | 0,88           | 1,00           | 1,13           | 1,25           | 1,50           |
| Component I<br>t I [mm] | V <sub>R,k</sub> [kN] | 0,40         | 0,75 - 0,75 | 0,75 - 0,75 | 0,75 - 0,75 | 0,75 - 0,75    | 0,75 - 0,75    | 0,75 - 0,75    | 0,75 - 0,75    | 0,75 - 0,75    | 0,75 - 0,75    |
|                         |                       | 0,50         | 0,75 - 0,95 | 0,95 - 0,95 | 0,95 - 0,95 | 0,95 - 0,95    | 0,95 - 0,95    | 0,95 - 0,95    | 0,95 - 0,95    | 0,95 - 0,95    | 0,95 - 0,95    |
|                         |                       | 0,55         | 0,75 - 0,95 | 1,04 - 1,04 | 1,04 - 1,04 | 1,04 - 1,04    | 1,04 - 1,04    | 1,04 - 1,04    | 1,04 - 1,04    | 1,04 - 1,04    | 1,04 - 1,04    |
|                         |                       | 0,63         | 0,75 - 0,95 | 1,04 - 1,20 | 1,20 - 1,40 | 1,40 ac - 1,50 | 1,50 ac - 1,70 | 1,70 ac - 1,90 | 1,85 - 2,05    | 2,00 ac - 2,20 | 2,30 ac - 2,50 |
|                         |                       | 0,75         | 0,75 - 0,95 | 1,04 - 1,30 | 1,30 - 1,40 | 1,40 - 1,50    | 1,50 ac - 1,70 | 1,70 ac - 1,90 | 2,05 - 2,20    | 2,20 ac - 2,50 | 2,50 ac - 2,80 |
|                         |                       | 0,88         | 0,75 - 0,95 | 1,04 - 1,40 | 1,40 - 1,70 | 1,70 - 1,90    | 1,90 ac - 2,10 | 2,10 ac - 2,30 | 2,30 - 2,50    | 2,50 ac - 2,80 | 2,80 ac - 3,10 |
|                         |                       | 1,00         | 0,75 - 0,95 | 1,04 - 1,40 | 1,40 - 1,80 | 1,80 - 2,00    | 2,00 - 2,30    | 2,30 ac - 2,50 | 2,50 - 2,70    | 2,70 ac - 3,10 | 3,10 ac - 3,40 |
|                         |                       | 1,13         | 0,75 - 0,95 | 1,04 - 1,40 | 1,40 - 1,80 | 1,80 - 2,15    | 2,15 - 2,50    | 2,50 - 2,80    | 2,80 - 3,00    | 3,00 - 3,40    | 3,40 - 3,70    |
|                         |                       | 1,25         | 0,75 - 0,95 | 1,04 - 1,50 | 1,50 - 1,90 | 1,90 - 2,30    | 2,30 - 2,70    | 2,70 - 2,95    | 2,95 - 3,30    | 3,30 - 3,70    | 3,70 ac - 4,50 |
|                         |                       | 1,50         | 0,75 - 0,95 | 1,04 - 1,50 | 1,50 - 2,00 | 2,00 - 2,40    | 2,40 - 3,00    | 3,00 - 3,45    | 3,45 - 3,90    | 3,90 - 4,50    | 4,50 - 5,00    |
|                         |                       | 1,75         | 0,75 - 0,95 | 1,04 - 1,50 | 1,50 - 2,00 | 2,00 - 2,40    | 2,40 - 3,00    | 3,00 - 3,45    | 3,45 - 3,90    | 3,90 - 4,50    | 4,50 - 5,00    |
|                         |                       | 2,00         | 0,75 - 0,95 | 1,04 - 1,50 | 1,50 - 2,00 | 2,00 - 2,40    | 2,40 - 3,00    | 3,00 - 3,45    | 3,45 - 3,90    | 3,90 - 4,50    | 4,50 - 5,00    |
|                         | N <sub>R,k</sub> [kN] | 0,40         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00    | 1,00 - 1,08    | 1,08 - 1,08    | 1,08 - 1,08    | 1,08 - 1,08    | 1,08 - 1,08    |
|                         |                       | 0,50         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00    | 1,00 - 1,20    | 1,20 - 1,33    | 1,33 - 1,33    | 1,33 - 1,33    | 1,33 - 1,33    |
|                         |                       | 0,55         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00    | 1,00 - 1,20    | 1,20 - 1,50    | 1,50 - 1,63    | 1,63 - 1,63    | 1,63 - 1,63    |
|                         |                       | 0,63         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00    | 1,00 ac - 1,20 | 1,20 ac - 1,50 | 1,50 ac - 1,80 | 1,80 ac - 2,10 | 2,10 ac - 2,30 |
|                         |                       | 0,75         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00    | 1,00 - 1,20    | 1,20 ac - 1,50 | 1,50 ac - 1,80 | 1,80 ac - 2,30 | 2,30 ac - 2,50 |
|                         |                       | 0,88         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00    | 1,00 - 1,20    | 1,20 - 1,50    | 1,50 - 1,80    | 1,80 - 2,50    | 2,50 ac - 2,80 |
|                         |                       | 1,00         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00    | 1,00 - 1,20    | 1,20 - 1,50    | 1,50 - 1,80    | 1,80 - 2,50    | 2,50 ac - 2,80 |
|                         |                       | 1,13         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00    | 1,00 - 1,20    | 1,20 - 1,50    | 1,50 - 1,80    | 1,80 - 2,50    | 2,50 a - 2,80  |
|                         |                       | 1,25         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00    | 1,00 - 1,20    | 1,20 - 1,50    | 1,50 - 1,80    | 1,80 - 2,50    | 2,50 - 2,80    |
|                         |                       | 1,50         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00    | 1,00 - 1,20    | 1,20 - 1,50    | 1,50 - 1,80    | 1,80 - 2,50    | 2,50 - 2,80    |
|                         |                       | 1,75         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00    | 1,00 - 1,20    | 1,20 - 1,50    | 1,50 - 1,80    | 1,80 - 2,50    | 2,50 - 2,80    |
|                         |                       | 2,00         | 0,28 - 0,32 | 0,34 - 0,60 | 0,60 - 0,80 | 0,80 - 1,00    | 1,00 - 1,20    | 1,20 - 1,50    | 1,50 - 1,80    | 1,80 - 2,50    | 2,50 - 2,80    |
|                         | N <sub>R,k,II</sub>   | 0,28         | 0,32 - 0,34 | 0,60 - 0,80 | 0,80 - 1,00 | 1,00 - 1,20    | 1,20 - 1,50    | 1,50 - 1,80    | 1,80 - 2,50    | 2,50 - 2,80    | 2,80 - 3,10    |

#### Self-drilling screw

ZEBRA Pias Ø 4,8 r x L, ZEBRA Pias plus Ø 4,8 r x L  
with hexagon head

Annex 95



#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: None

Bauteil I: S280GD to S550GD - EN 10346

Bauteil II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 5.25$  mm

#### Timber substructures

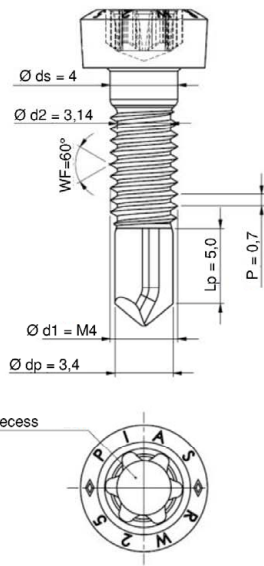
no performance determined

|                                |                | Component II, S280GD |                |         |         |         |         |         |         |         |                 |      |
|--------------------------------|----------------|----------------------|----------------|---------|---------|---------|---------|---------|---------|---------|-----------------|------|
|                                |                | t II [mm]            |                |         |         |         |         |         |         |         |                 |      |
|                                |                | 0,63                 | 0,75           | 0,88    | 1,00    | 1,13    | 1,25    | 1,50    | 2,00    | 2,50    | 3,00            | 4,00 |
| Component I, S280 GD, t I [mm] | $V_{R,k}$ [kN] | 0,63                 | 1,40 - 1,50 ac | 1,50 ac | 1,50 ac | 1,50 ac | 1,70 ac | 1,90 ac | 2,40 ac | 2,40 ac | 2,40 - 2,40 -   |      |
|                                |                | 0,75                 | 1,40 - 1,60 ac | 1,70 ac | 1,80 ac | 1,90 ac | 2,10 ac | 2,50 ac | 2,80 ac | 2,85 ac | 2,90 - 2,90 -   |      |
|                                |                | 0,88                 | 1,40 - 1,70 -  | 1,90 ac | 2,10 ac | 2,30 ac | 2,50 ac | 2,70 ac | 3,30 ac | 3,35 ac | 3,40 - 3,50 -   |      |
|                                |                | 1,00                 | 1,40 - 1,80 -  | 2,00 -  | 2,20 -  | 2,50 -  | 2,70 ac | 3,00 ac | 3,60 ac | 3,75 ac | 3,90 - 4,20 -   |      |
|                                |                | 1,13                 | 1,50 - 1,80 -  | 2,10 -  | 2,30 -  | 2,60 -  | 2,90 -  | 3,40 -  | 4,00 -  | 4,30 -  | 4,80 - 5,20 -   |      |
|                                |                | 1,25                 | 1,50 - 1,90 -  | 2,20 -  | 2,50 -  | 2,80 -  | 3,10 -  | 3,60 -  | 4,40 -  | 4,90 -  | 5,40 - 6,00 -   |      |
|                                |                | 1,50                 | 1,60 - 2,00 -  | 2,40 -  | 2,70 -  | 3,10 -  | 3,50 -  | 4,30 -  | 5,10 -  | 5,70 -  | 6,30 - -        |      |
|                                |                | 1,75                 | 1,60 - 2,00 -  | 2,40 -  | 2,70 -  | 3,10 -  | 3,50 -  | 4,30 -  | 5,10 -  | 5,70 -  | 6,30 - -        |      |
|                                |                | 2,00                 | 1,60 - 2,00 -  | 2,40 -  | 2,70 -  | 3,10 -  | 3,50 -  | 4,30 -  | 5,10 -  | 5,70 -  | 6,30 - -        |      |
|                                | $N_{R,k}$ [kN] | 0,63                 | 0,40 - 0,50 ac | 0,60 ac | 0,80 ac | 0,90 ac | 1,10 ac | 1,74 ac | 1,90 ac | 1,90 ac | 1,90 ac 1,90 ac |      |
|                                |                | 0,75                 | 0,40 - 0,50 ac | 0,60 ac | 0,80 ac | 0,90 ac | 1,10 ac | 1,74 ac | 2,30 ac | 2,30 ac | 2,30 ac 2,30 ac |      |
|                                |                | 0,88                 | 0,40 - 0,50 -  | 0,60 ac | 0,80 ac | 0,90 ac | 1,10 ac | 1,74 ac | 2,63 ac | 2,65 ac | 2,90 ac 2,90 a  |      |
|                                |                | 1,00                 | 0,40 - 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 ac | 1,74 ac | 2,63 ac | 2,85 ac | 3,30 ac 3,30 a  |      |
|                                |                | 1,13                 | 0,40 - 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,74 -  | 2,63 -  | 3,20 -  | 4,00 a 4,00 a   |      |
|                                |                | 1,25                 | 0,40 - 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,74 -  | 2,63 -  | 3,40 -  | 4,40 - 4,40 a   |      |
|                                |                | 1,50                 | 0,40 - 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,74 -  | 2,63 -  | 3,60 -  | 4,80 - -        |      |
|                                |                | 1,75                 | 0,40 - 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,74 -  | 2,63 -  | 3,60 -  | 4,80 - -        |      |
|                                |                | 2,00                 | 0,40 - 0,50 -  | 0,60 -  | 0,80 -  | 0,90 -  | 1,10 -  | 1,74 -  | 2,63 -  | 3,60 -  | 4,80 - -        |      |
|                                | $N_{R,k,II}$   | 0,40                 | 0,40 - 0,50 -  | 0,60    | 0,80 -  | 0,90 -  | 1,10 -  | 1,74 -  | 2,63 -  | 3,60 -  | 4,80 - 4,80 -   |      |
|                                |                |                      |                |         |         |         |         |         |         |         |                 |      |

#### Self-drilling screw

ZEBRA Pias Ø 5,5 x L, ZEBRA Pias plus Ø 5,5 x L  
with pan head and AW or RW drive

Annex 96



#### Materials

Fastener: Carbon steel; case hardened and galvanized  
Washer: None

Bauteil I: S280GD to S550GD - EN 10346

Bauteil II: S235 to S355 - EN 10025-1  
S280GD to S550GD - EN 10346  
HX300LAD to HX460LAD - EN 10346

Drilling-capacity  $\Sigma(t_i) \leq 4.00$  mm

#### Timber substructures

no performance determined

|                                                     |                | Component II |             |             |             |             |             |             |             |
|-----------------------------------------------------|----------------|--------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                                                     |                | t II [mm]    |             |             |             |             |             |             |             |
|                                                     |                | 1,00         | 1,13        | 1,25        | 1,50        | 2,00        | 2,50        | 3,00        | 4,00        |
| Component I, t I [mm]<br>Predrill-Diameter Ø 4,2 mm | $V_{R,k}$ [kN] | 2,00         | 3,49 - 3,70 | 3,89 - 4,29 | 5,08 - 5,08 | 5,08 - 5,08 | 5,08 - 5,08 | 5,08 - 5,08 | 5,08 - 5,08 |
|                                                     | $N_{R,k}$ [kN] | 2,00         | 1,14 - 1,32 | 1,49 - 1,84 | 2,53 - 3,61 | 3,66 - 4,69 | 4,69 - 5,08 | 5,08 - 5,08 | 5,08 - 5,08 |
|                                                     | $N_{R,k,II}$   | 1,14         | 1,32 - 1,49 | 1,84 - 2,53 | 3,61 - 4,69 | 4,69 - 5,08 | 5,08 - 5,08 | 5,08 - 5,08 | 5,08 - 5,08 |

**Self-drilling screw**

W-ABZ M4  
with pan head and RW drive

**Annex 97**