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Authorised and notified according to Article 10 of the Council Directive of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products (89/106/EEC)

Deutsches Institut für Bautechnik

DIBt

Mitglied der EOTA
*Member of EOTA*

# European Technical Approval ETA-11/0309

*English translation prepared by DIBt - Original version in German language*

| | | |
|---|---|---|
| Handelsbezeichnung<br>*Trade name* | | Würth Kunststoff-Rahmendübel W-UR SymCon<br>*Würth Plastic Anchor W-UR SymCon* |
| Zulassungsinhaber<br>*Holder of approval* | | Adolf Würth GmbH & Co. KG<br>Reinhold-Würth-Straße 12 -17<br>74653 Künzelsau<br>DEUTSCHLAND |
| Zulassungsgegenstand und Verwendungszweck<br>*Generic type and use of construction product* | | Kunststoffdübel als Mehrfachbefestigung von nichttragenden Systemen zur Verankerung in Beton, Mauerwerk, Porenbeton, Wetterschalen und Hohlkammerdecken<br>*Plastic anchor for multiple use in concrete, masonry, autoclaved aerated concrete, weather resistant skins and hollow core slabs for non-structural applications* |
| Geltungsdauer:<br>*Validity:* | vom<br>*from*<br>bis<br>*to* | 26 June 2013<br>12 April 2018 |
| Herstellwerk<br>*Manufacturing plant* | | Herstellwerk 2 |

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|---|---|
| Diese Zulassung umfasst<br>*This Approval contains* | 54 Seiten einschließlich 42 Anhänge<br>*54 pages including 42 annexes* |
| Diese Zulassung ersetzt<br>*This Approval replaces* | ETA-11/0309 mit Geltungsdauer vom 12.04.2013 bis 12.04.2018<br>*ETA-11/0309 with validity from 12.04.2013 to 12.04.2018* |

# I LEGAL BASES AND GENERAL CONDITIONS

1 This European technical approval is issued by Deutsches Institut für Bautechnik in accordance with:

- Council Directive 89/106/EEC of 21 December 1988 on the approximation of laws, regulations and administrative provisions of Member States relating to construction products[1], modified by Council Directive 93/68/EEC[2] and Regulation (EC) N° 1882/2003 of the European Parliament and of the Council[3];
- *Gesetz über das In-Verkehr-Bringen von und den freien Warenverkehr mit Bauprodukten zur Umsetzung der Richtlinie 89/106/EWG des Rates vom 21. Dezember 1988 zur Angleichung der Rechts- und Verwaltungsvorschriften der Mitgliedstaaten über Bauprodukte und anderer Rechtsakte der Europäischen Gemeinschaften (Bauproduktengesetz - BauPG) vom 28. April 1998[4], as amended by Article 2 of the law of 8 November 2011[5];*
- Common Procedural Rules for Requesting, Preparing and the Granting of European technical approvals set out in the Annex to Commission Decision 94/23/EC[6];

2 Deutsches Institut für Bautechnik is authorized to check whether the provisions of this European technical approval are met. Checking may take place in the manufacturing plant. Nevertheless, the responsibility for the conformity of the products to the European technical approval and for their fitness for the intended use remains with the holder of the European technical approval.

3 This European technical approval is not to be transferred to manufacturers or agents of manufacturers other than those indicated on page 1, or manufacturing plants other than those indicated on page 1 of this European technical approval.

4 This European technical approval may be withdrawn by Deutsches Institut für Bautechnik, in particular pursuant to information by the Commission according to Article 5(1) of Council Directive 89/106/EEC.

5 Reproduction of this European technical approval including transmission by electronic means shall be in full. However, partial reproduction can be made with the written consent of Deutsches Institut für Bautechnik. In this case partial reproduction has to be designated as such. Texts and drawings of advertising brochures shall not contradict or misuse the European technical approval.

6 The European technical approval is issued by the approval body in its official language. This version corresponds fully to the version circulated within EOTA. Translations into other languages have to be designated as such.



1 Official Journal of the European Communities L 40, 11 February 1989, p. 12
2 Official Journal of the European Communities L 220, 30 August 1993, p. 1
3 Official Journal of the European Union L 284, 31 October 2003, p. 25
4 *Bundesgesetzblatt Teil I 1998*, p. 812
5 *Bundesgesetzblatt Teil I 2011*, p. 2178
6 Official Journal of the European Communities L 17, 20 January 1994, p. 34

# II SPECIFIC CONDITIONS OF THE EUROPEAN TECHNICAL APPROVAL

## 1 Definition of product and intended use

### 1.1 Definition of the construction product

The Würth Plastic Anchor W-UR SymCon in the sizes W-UR 6, W-UR 10 and W-UR 14 is a plastic anchor consisting of a plastic sleeve made of polyamide and an accompanying specific screw of galvanised steel or of stainless steel.

The plastic sleeve is expanded by screwing in the specific screw which presses the sleeve against the wall of the drilled hole.

The installed anchor is shown in Annex 1, 2 and 3.

### 1.2 Intended use

The anchor is intended to be used for anchorages for which requirements for safety in use in the sense of the Essential Requirement 4 of Council Directive 89/106/EEC shall be fulfilled and failure of the fixture represents an immediate risk to human life.

The anchor is to be used only for multiple fixing for non-structural applications.

The base material may consist of use category "a, b, c and d" as given in the following Table:

| Use category | Anchor type | Remarks |
|---|---|---|
| a | W-UR 6 SymCon<br>W-UR 10 SymCon<br>W-UR 14 SymCon | • Normal weight concrete<br>• Strength class C12/15 at minimum according to EN 206-1:2000-12<br>• Cracked and non-cracked concrete<br>• reinforced or unreinforced concrete |
| | W-UR 10 SymCon | • Hollow core slabs according to Annex 40 |
| | W-UR 10 SymCon | • Thin skins (weather resistant skins of external wall panels) according to Annex 41, 42 |
| b | W-UR 10 SymCon<br>W-UR 14 SymCon | • Masonry walls (solid block) according to Annex 10<br>• Mortar strength class ≥ M 2,5 according to EN 998-2:2003 |
| c | W-UR 10 SymCon<br>W-UR 14 SymCon | • Masonry walls (hollow bricks) according to Annex 11, 12<br>• Mortar strength class ≥ M 2,5 according to EN 998-2:2003 |
| d | W-UR 10 SymCon | • Autoclaved aerated concrete walls according to Annex 39 |

The anchor Würth W-UR SymCon may also be used with requirements related to resistance to fire according 4.2.2.

Specific screw of galvanised steel:

The specific screw made of galvanised steel may only be used in structures subject to dry internal conditions.

The specific screw made of galvanised steel with exception of the stair bolt and the special screw with head-form loop according Annex 6 may also be used in structures subject to external atmospheric exposure, if the area of the head of the screw is protected against moisture and driving rain after mounting of the fixing unit in this way, that intrusion of moisture into the anchor shaft is prevented. Therefore there shall be an external cladding or a ventilated rainscreen mounted in front of the head of the screw and the head of the screw itself shall be coated with a soft plastic, permanently elastic bitumen-oil-combination coating (e. g. undercoating or body cavity protection for cars).

The anchor may be used in the following temperature range:

| | | |
|---|---|---|
| Temperature range b): | -40 °C to +80 °C | (max long term temperature +50 °C and max short term temperature +80 °C) |
| Temperature range c): | -40 °C to +50 °C | (max long term temperature +30 °C and max short term temperature +50 °C) |

The anchor W-UR 6 SymCon may only be used in temperature range c).

Specific screw of stainless steel:

The specific screw made of stainless steel may be used in structures subject to dry internal conditions and also in structures subject to external atmospheric exposure (including industrial and marine environment), or exposure in permanently damp internal conditions, if no particular aggressive conditions exist. Such particular aggressive conditions are e. g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e. g. in desulphurization plants or road tunnels where de-icing materials are used).

The provisions made in this European technical approval are based on an assumed working life of the anchor of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, 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.

## 2 Characteristics of the product and methods of verification

### 2.1 Characteristics of the product

The anchor corresponds to the drawings and information given in Annex 4, 5 and 7. The characteristic material values, dimensions and tolerances of the anchor not given in these Annexes shall correspond to the respective values laid down in the technical documentation[7] of this European technical approval.

The characteristic values for the design of the anchorages are given in Annex 9, Annexes 13 to 15 and Annexes 17 to 42.

Each anchor is to be marked with the identifying mark, the type, the diameter and the length of the anchor according to Annex 4 and 5. The special screws are marked according Annex 6.

The minimum embedment depth shall be marked.

The anchor shall only be packaged and supplied as a complete unit.

In addition to the specific clauses relating to dangerous substances contained in this European technical approval, there may be other requirements applicable to the products falling within its scope (e. g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Directive, these requirements need also to be complied with, when and where they apply.



[7] The technical documentation of this European technical approval is deposited at the Deutsches Institut für Bautechnik and, as far as relevant for the tasks of the approved bodies involved in the attestation of conformity procedure, is handed over to the approved bodies.

### 2.2 Methods of verification

The assessment of the fitness of the anchor for the intended use in relation to the requirements for safety in use in the sense of the Essential Requirement 4 has been made in compliance with the Guideline for European technical approval of "Plastic Anchors for Multiple Use in Concrete and Masonry for Non-structural Applications", ETAG 020,

- Part 1: "General",
- Part 2: "Plastic Anchors for Use in Normal Weight Concrete",
- Part 3: "Plastic Anchors for Use in Solid Masonry Materials" and
- Part 4: "Plastic Anchors for Use in Hollow or Perforated Masonry"
- Part 5: "Plastic Anchors for Use in Autoclaved Aerated Concrete (AAC)"

based on the use categories "a" (W-UR 6 SymCon) or "a, b, c and d" (W-UR 10 SymCon) or "a, b and c" (W-UR 14 SymCon).

## 3 Evaluation and attestation of conformity and CE marking

### 3.1 System of attestation of conformity

According to the decision 97/463/EG of the European Commission[8] the system 2(ii) (referred to as system 2+) of attestation of conformity applies.

This system of attestation of conformity is defined as follows.

System 2+: Declaration of conformity of the product by the manufacturer on the basis of:

(a) Tasks for the manufacturer:
  (1) initial type-testing of the product;
  (2) factory production control;
  (3) testing of samples taken at the factory in accordance with a prescribed test plan.

(b) Tasks for the approved body:
  (4) certification of factory production control on the basis of:
    – initial inspection of factory and of factory production control;
    – continuous surveillance, assessment and approval of factory production control.

### 3.2 Responsibilities

#### 3.2.1 Tasks of the manufacturer

3.2.1.1 Factory production control

The manufacturer shall exercise permanent internal control of production. All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures, including records of results performed. This production control system shall insure that the product is in conformity with this European technical approval.

The manufacturer may only use raw materials stated in the technical documentation of this European technical approval.

The factory production control shall be in accordance with the control plan which is part of the technical documentation of this European technical approval. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited at Deutsches Institut für Bautechnik.[9]

[8] Official Journal of the European Communities L 198 of 25.07.1997.

[9] The control plan is a confidential part of the documentation of the European technical approval, but not published together with the ETA and only handed over to the approved body involved in the procedure of attestation of conformity. See section 3.2.2.

The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

3.2.1.2 Other tasks of manufacturer

The manufacturer shall, on the basis of a contract, involve a body which is approved for the tasks referred to in section 3.1 in the field of anchors in order to undertake the actions laid down in section 3.2.2. For this purpose, the control plan referred to in sections 3.2.1.1 and 3.2.2 shall be handed over by the manufacturer to the approved body involved.

The manufacturer shall make a declaration of conformity, stating that the construction product is in conformity with the provisions of this European technical approval.

### 3.2.2 Tasks of approved bodies

The approved body shall perform the

- initial inspection of factory and of factory production control,
- continuous surveillance, assessment and approval of factory production control,

in accordance with the provisions laid down in the control plan.

The approved body shall retain the essential points of its actions referred to above and state the results obtained and conclusions drawn in a written report.

The approved certification body involved by the manufacturer shall issue an EC certificate of conformity of the factory production control stating the conformity with the factory production control of this European technical approval.

In cases where the provisions of the European technical approval and its control plan are no longer fulfilled the certification body shall withdraw the certificate of conformity and inform Deutsches Institut für Bautechnik without delay.

### 3.3 CE marking

The CE marking shall be affixed on each packaging of the anchor. The letters "CE" shall be followed by the identification number of the approved certification body, where relevant, and be accompanied by the following additional information:

- name and address of the producer (legal entity responsible for the manufacturer),
- last two digits of the year in which the CE marking was affixed,
- number of the EC certificate for the factory production control,
- number of the European technical approval,
- number of the guideline for European technical approval
- use categories "a" (W-UR 6 SymCon) or "a, b, c and d" (W-UR 10 SymCon) or "a, b and c" (W-UR 14 SymCon).

## 4 Assumptions under which the fitness of the product for the intended use was favourably assessed

### 4.1 Manufacturing

The European technical approval is issued for the product on the basis of agreed data/information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA shall be necessary.

## 4.2 Design of anchorages

### 4.2.1 General

Fitness for the intended use of the anchor is given under the following conditions:

- The design of anchorages is carried out in compliance with ETAG 020, Guideline for European technical approval of "Plastic Anchors for Multiple Use in Concrete and Masonry for Non-structural Applications", Annex C under the responsibility of an engineer experienced in anchorages.
- Verifiable calculation notes and drawings shall be prepared taking account of the loads to be anchored, the nature and strength of the base materials and the dimensions of the anchorage members as well as of the relevant tolerances.
- The anchor is to be used only for multiple fixing for non-structural applications.

  Therefore the design of the fixture may specify the number $n_1$ of fixing points to fasten the fixture and the number $n_2$ of anchors per fixing point. Furthermore the design value of actions $N_{Sd}$ on a fixing point to a value $\leq n_3$ (kN) is specified up to which the strength and stiffness of the fixture are fulfilled and the load transfer in the case of excessive slip or failure of one anchor need not be taken into account in the design of the fixture.

  The following default values for $n_1$, $n_2$ and $n_3$ may be taken:

  $n_1 \geq 4$; $n_2 \geq 1$ and $n_3 \leq 4{,}5$ kN or

  $n_1 \geq 3$; $n_2 \geq 1$ and $n_3 \leq 3{,}0$ kN.
- Shear loads acting on an anchor may be assumed to act without lever arm if both of the following conditions are fulfilled:
  - The fixture shall be made of metal and in the area of the anchorage be fixed directly to the base material either without an intermediate layer or with a levelling layer of mortar with a thickness $\leq 3$ mm.
  - The fixture shall be in contact with the anchor over its entire thickness. (Therefore the diameter of clearance hole in the fixture $d_f$ has to be equal or smaller than the value given in Annex 8, Table 3.1 and 3.2)

  If these two conditions are not fulfilled the lever arm is calculated according to ETAG 020, Annex C. The characteristic bending moment is given in Annex 9.

### 4.2.2 Resistance in concrete (use category "a")

The characteristic values of resistance of the anchor for use in concrete are given in Annex 9, 13 and 14. The design method is valid for cracked and non-cracked concrete.

The characteristic values of resistance of the anchor W-UR 10 SymCon for use in hollow core slabs are given in Annex 40. The characteristic values of resistance of the anchor W-UR 10 SymCon for use in weather resistant skins are given in Annex 42.

According to the EOTA Technical Report TR 020 "Evaluation of anchorages in concrete concerning resistance to fire" it can be assumed that for fastening of facade systems the load bearing behaviour of the Würth W-UR 10 SymCon, has a sufficient resistance to fire at least 90 minutes (R90) if the admissible load $[F_{Rk} / (\gamma_M \cdot \gamma_F)]$ is $\leq 0{,}8$ kN (no permanent centric tension load).

### 4.2.3 Resistance in solid masonry (use category "b")

The characteristic values of resistance of the anchor for use in solid masonry are given in Annex 17, 18, 29, 30 and 34 - 37. These values are independent of the load direction (tension, shear or combined tension and shear) and the mode of failure.

The characteristic resistances given for use in solid masonry are only valid for the base material and the bricks according this tables or larger brick sizes and larger compressive strength of the masonry unit.

If smaller brick sizes are present on the construction site or if the mortar strength is smaller than the required value, the characteristic resistance of the anchor may be determined by job site tests according to 4.4.

### 4.2.4 Resistance in hollow or perforated masonry (use category "c")

The characteristic resistances for use in hollow or perforated masonry given in Annex 19 - 28, 31 – 33 and 38 are only valid for the bricks and blocks according this tables regarding base material, size of the units, compressive strength and configuration of the voids.

These values are independent of the load direction (tension, shear or combined tension and shear) and the mode of failure and are valid for the given $h_{nom}$ according Annex 8.

The influence of larger embedment depths [compare Annex 8, footnote 2)] and/or different bricks and blocks (according Annex 19 - 28, 31 – 33 and 38 regarding base material, size of the units, compressive strength and configuration of the voids) has to be detected by job site tests according to 4.4.

### 4.2.5 Resistance in autoclaved aerated concrete (use category "d")

The characteristic values of resistance of the anchor for use in autoclaved aerated concrete are given in Annex 39. These values are independent of the load direction (tension, shear or combined tension and shear) and the mode of failure.

The anchor shall not be installed and used in water saturated aerated concrete

### 4.2.6 Specific conditions for the design method in solid masonry and hollow or perforated masonry, autoclaved aerated concrete

The mortar strength class of the masonry has to be M 2,5 according to EN 998-2:2003 at minimum.

The characteristic resistance $F_{Rk}$ for a single plastic anchor may also be taken for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$.

The distance between single plastic anchors or a group of anchors should be $a_{min} \geq 250$ mm.

If the vertical joints of the wall are designed not to be filled with mortar then the design resistance $N_{Rd}$ has to be limited to 2.0 kN to ensure that a pull-out of one brick out of the wall will be prevented. This limitation can be omitted if interlocking units are used for the wall or when the joints are designed to be filled with mortar.

If the joints of the masonry are not visible the characteristic resistance $F_{Rk}$ has to be reduced with the factor $\alpha_j = 0.5$.

If the joints of the masonry are visible (e.g. unplastered wall) following has to be taken into account:

- The characteristic resistance $F_{Rk}$ may be used only, if the wall is designed such that the joints are to be filled with mortar or that the joints are glued together (AAC) or interlocking units are used.
- If the wall is designed such that the joints are not to be filled with mortar or if the joints are not to be glued together (AAC) or interlocking units

  are used then the characteristic resistance $F_{Rk}$ may be used only, if the minimum edge distance $c_{min}$ to the vertical joints is observed. If this minimum edge distance $c_{min}$ can not be observed then the characteristic resistance $F_{Rk}$ has to be reduced with the factor $\alpha_j = 0.5$.

No reduction factor $\alpha_j$ and no limitation of the design resistance $N_{Rd}$ has to be considered for anchorages in vertical joints (butt joints) and horizontal joints (bed joints) in masonry made of vertically perforated clay bricks made of interlocking units with thin bed joints.

**4.2.7 Characteristic values, spacing and dimensions of anchorage member**

The minimum spacing and dimensions of anchorage member according to Annex 15, Table 8 and Annex 16, Table 9 shall be observed depending on the base material.

**4.2.8 Displacement behaviour**

The displacements under tension and shear loading in concrete and masonry are given in Annex 15, Table 7.1 and 7.2.

**4.3 Installation of anchor**

The fitness for use of the anchor can only be assumed if the following conditions of installation are met:

- Anchor installation carried out by appropriately qualified personnel under the supervision of the person responsible for technical matters on site.
- Use of the anchor only as supplied by the manufacturer without exchanging any component of the anchor.
- Anchor installation in accordance with the manufacturer's specifications and drawings using the tools indicated in this European technical approval:
- Checks before placing the anchor, to ensure that the characteristic values of the base material in which the anchor is to be placed, is identical with the values, which the characteristic loads apply for.
- Observation of the drill method according Annex 19 – 28, 31 – 33 and 38 (Drill holes in hollow or perforated masonry may only be drilled using the rotary drill. Other drilling methods may also be used if job-site tests according to 4.4 evaluate the influence of hammer or impact drilling.)
- Placing drill holes without damaging the reinforcement.
- In the absence of national regulations, it is recommended that the distance between the side of the drill hole and the outside of prestressed reinforcement is at least 50 mm; for determining the position of the prestressed reinforcement in the structure, a suitable device (e.g. reinforcement detector) should be used. Annex 40 show the admissible anchor positions.
- Holes to be cleaned of drilling dust.
- In case of aborted hole: New drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted drill hole is filled with high strength mortar.
- The plastic sleeve is inserted through the fixture by slight hammer blows and the special screw is screwed in until the head of the screw touches the sleeve. The anchor is correct mounted, if there is no turn-through of the plastic sleeve in the drill hole and if slightly move on turning of the screw is impossible after the complete turn-in of the screw.
- Temperature during installation of the anchor (plastic sleeve and base material):

  W-UR 6 SymCon, W-UR 10 SymCon, W-UR 14 SymCon: $\geq$ -40 °C

**4.4 Job site tests according to ETAG 020, Annex B**

**4.4.1 General**

In the absence of national requirements the characteristic resistance of the plastic anchor may be determined by job site tests, if the plastic anchor has already characteristic values given in Annex 17 to 38 for the same base material as it is present on the construction works.

Furthermore job site tests for use in (different) solid masonry are possible only if the plastic anchor has already characteristic values given in solid masonry are given in Annex 17, 18, 29, 30, 34 - 37 for use in solid masonry.

Job site tests for use in (different) hollow or perforated masonry are possible only if the plastic anchor has already characteristic values given in Annex 19 – 28, 31 – 33 and 38 for use in hollow or perforated masonry.

Job site tests are also possible, if another drill method is been used as it is given in Annex 19 – 28, 31 – 33 and 38.

The characteristic resistance to be applied to a plastic anchor should be determined by means of at least 15 pull-out tests carried out on the construction work with a centric tension load acting on the plastic anchor. These tests may also performed in a laboratory under equivalent conditions as used on construction work

Execution and evaluation of the tests as well as issue of the test report and determination of the characteristic resistance should be supervised by the person responsible for execution of works on site and be carried out by a competent person.

Number and position of the plastic anchors to be tested should be adapted to the relevant special conditions of the construction work in question and, for example, in the case of blind and larger areas be increased such that a reliable information about the characteristic resistance of the plastic anchor embedded in the base material in question can be derived. The tests should take account of the unfavourable conditions of practical execution.

### 4.4.2 Assembly

The plastic anchor to be tested shall be installed (e. g. preparation of drill hole, drilling tool to be used, drill bit, type of drilling hammer or rotation, thickness of fixture) and as far as spacing and edge distances are concerned be distributed in the same way as foreseen for the intended use.

Depending on the drilling tool hard metal hammer drill bits or hard metal percussion drill bits, respectively, according to ISO 5468 should be used. New drill bits should be used for one test series or drill bits with $d_{cut,m} = 6{,}2$ mm $< d_{cut} \leq 6{,}4$ mm $= d_{cut,max}$ (W-UR 6 SymCon), $d_{cut,m} = 10{,}25$ mm $< d_{cut} \leq 10{,}45$ mm $= d_{cut,max}$ (W-UR 10 SymCon) or $d_{cut,m} = 14{,}25$ mm $< d_{cut} \leq 14{,}5$ mm $= d_{cut,max}$ (W-UR 14 SymCon) respectively.

### 4.4.3 Execution of test

The test rig used for the pull-out tests shall provide a continuous slow increase of the load, controlled by a calibrated load cell. The load shall apply perpendicular to the surface of the base material and shall be transmitted to the anchor via a hinge. The reaction forces shall be transmitted into the base material such that possible breakout of the masonry is not restricted. This condition is considered as fulfilled, if the support reaction forces are transmitted either in adjacent masonry units or at a distance of at least 150 mm from the plastic anchors. The load shall be increased continuously in a way that the ultimate load is reached after about 1 minute. The load is measured when the ultimate load ($N_1$) is achieved.

If no pull-out failure occurs, other test methods are needed, e.g. proof-loading.

### 4.4.4 Test report

The test report shall include all information necessary to assess the resistance of the tested anchor. It shall be given to the person responsible for the design of the fastening and shall be included in the construction dossier.

The minimum data required are:

- Name of product
- Construction site, owner of building; date and location of the tests, air temperature

- Test rig
- Type of structure to be fixed
- Masonry (type of brick, strength class, all dimensions of bricks, mortar group if possible); visual assessment of masonry (flush joints, joint clearance, regularity)
- Plastic anchor and special screw
- value of the cutting diameter of hard metal hammer-drill bits, measured before and after drilling if no new drill bits are used
- Results of tests including the indication of value $N_1$; mode of failure
- Tests carried out or supervised by …; signature

### 4.4.5 Evaluation of test results

The characteristic resistance $F_{Rk1}$ is derived from the measured values $N_1$ as follows

$F_{Rk1}$ = $0{,}5 \cdot N_1$

The characteristic resistance $F_{Rk1}$ has to be equal or smaller than the characteristic resistance $F_{Rk}$ which is given in the ETA for similar masonry (bricks or blocks)

$N_1$ = the mean value of the five smallest measured values at ultimate load

In absence of national regulations the partial safety factors for the resistance of the plastic anchor may be taken as $\gamma_{Mc} = 2.5$ for use in masonry (only W-UR 10 SymCon and W-UR 14 SymCon), $\gamma_{MAAC} = 2.0$ for use in AAC (only W-UR 10 SymCon) and $\gamma_{Mc} = 1.8$ for use in concrete.

## 5 Indications to the manufacturer

### 5.1 Responsibility of the manufacturer

It is in the responsibility of the manufacturer to ensure that the information on the specific conditions according to 1 and 2 including Annexes referred to 4 is given to those who are concerned. This information may be made by reproduction of the respective parts of the European technical approval. In addition, all installation data shall be shown clearly on the packaging and/or on an enclosed instruction sheet, preferably using illustrations.

The minimum data required are:

- base material for the intended use,
- ambient temperature of the base material during installation of the anchor,
- drill bit diameter ($d_{cut}$),
- overall anchor embedment depth in the base material ($h_{nom}$),
- minimum hole depth ($h_0$),
- information on the installation procedure,
- identification of the manufacturing batch.

All data shall be presented in a clear and explicit form.

## 5.2 Packaging, transport and storage

The anchor shall only be packaged and supplied as a complete unit.

The anchor shall be stored under normal climatic conditions in its original light-proof packaging. Before installation, it shall not be extremely dried nor frozen.

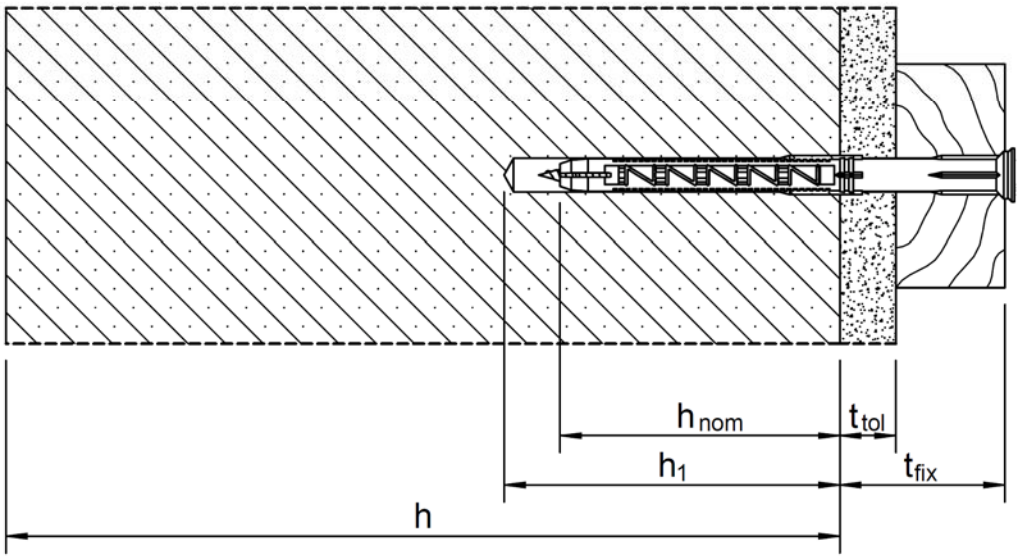
Uwe Bender
Head of Department

*beglaubigt:*
Aksünger

Deutsches Institut für Bautechnik

DIBt

## Plastic Anchor W-UR 6 SymCon




| | |
|---|---|
| $h_{nom}$: | Overall plastic anchor embedment depth in the base material |
| $h_1$: | Depth of drill hole to deepest point |
| h: | Thickness of member |
| $t_{fix}$: | Thickness of fixture |
| $t_{tol}$: | Thickness of non-load-bearing layer |

| | |
|---|---|
| **Würth Plastic Anchor W-UR SymCon** | Annex 1 |
| Intended use: W-UR 6 SymCon | |

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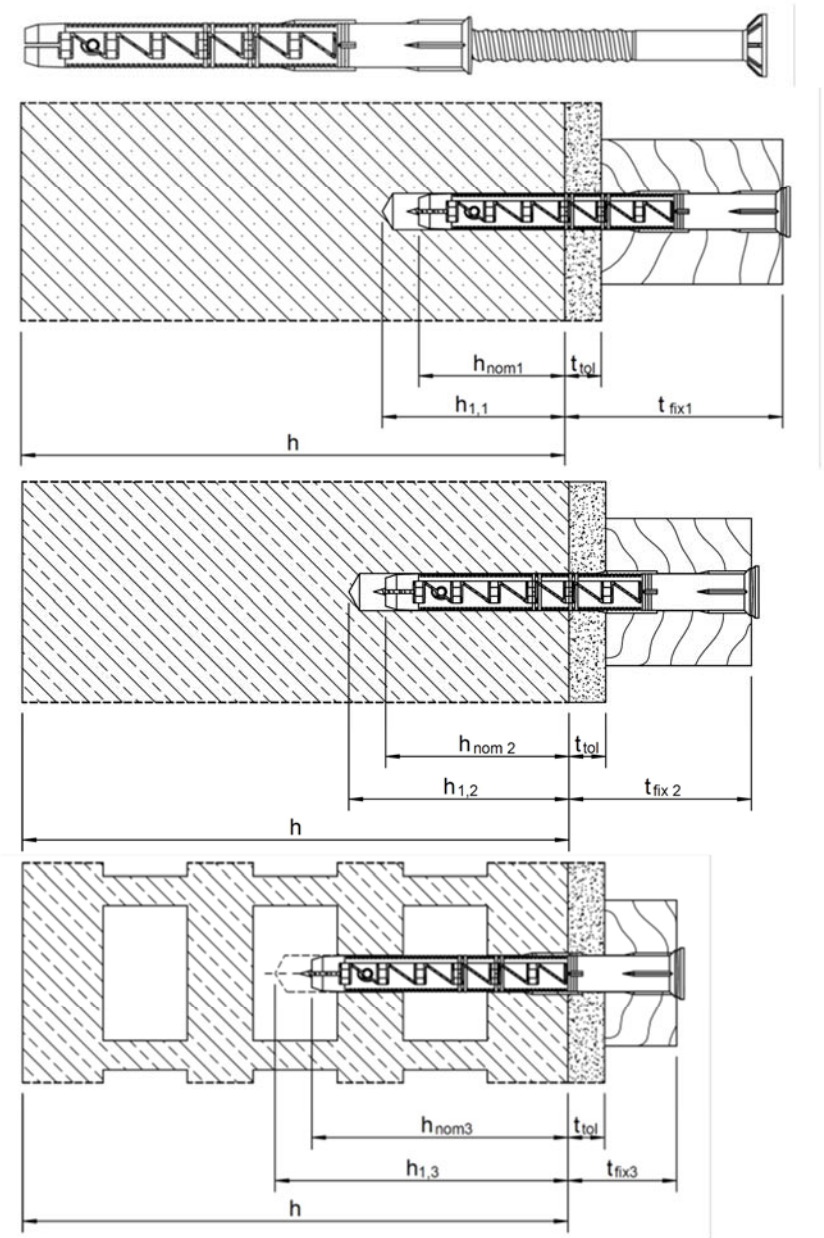
## Plastic Anchor W-UR 10 SymCon




$h_{nom1}$: Overall plastic anchor embedment depth 1 in the base material
$h_{nom2}$: Overall plastic anchor embedment depth 2 in the base material
$h_{nom3}$: Overall plastic anchor embedment depth 3 in the base material
$h_{1,1}$: Depth of drill hole to deepest point (1)
$h_{1,2}$: Depth of drill hole to deepest point (2)
$h_{1,3}$: Depth of drill hole to deepest point (3)
h: Thickness of member
$t_{fix1}$: Thickness of fixture (1)
$t_{fix2}$: Thickness of fixture (2)
$t_{fix3}$: Thickness of fixture (3)
$t_{tol}$: Thickness of non-load-bearing layer

| **Würth Plastic Anchor W-UR SymCon** | Annex 2 |
|---|---|
| Intended use: W-UR 10 SymCon | |

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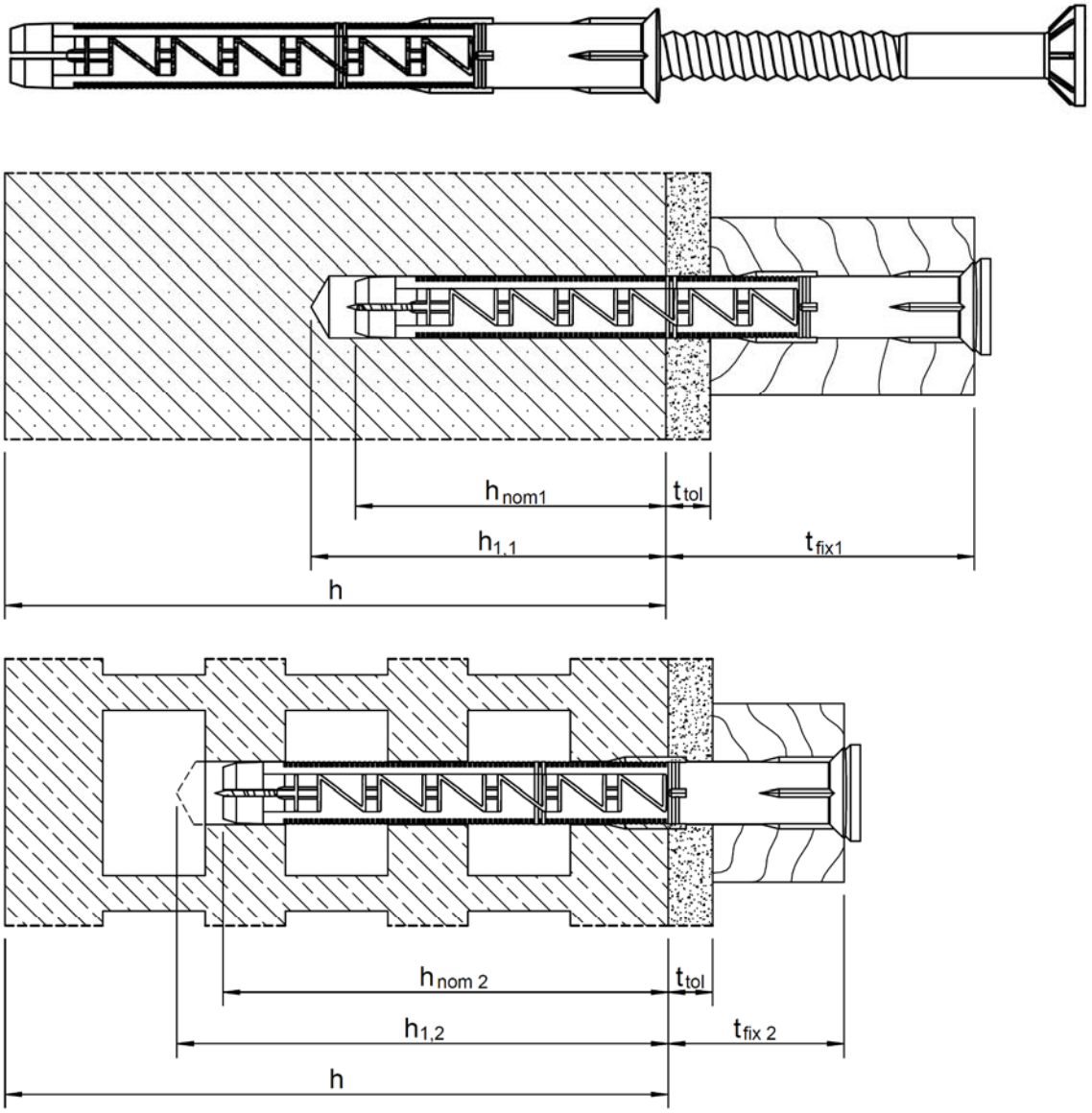
## Plastic Anchor W-UR 14 SymCon




$h_{nom1}$: Overall plastic anchor embedment depth 1 in the base material
$h_{nom2}$: Overall plastic anchor embedment depth 2 in the base material
$h_{1,1}$: Depth of drill hole to deepest point (1)
$h_{1,2}$: Depth of drill hole to deepest point (2)
h: Thickness of member
$t_{fix1}$: Thickness of fixture (1)
$t_{fix2}$: Thickness of fixture (2)
$t_{tol}$: Thickness of non-load-bearing layer

| **Würth Plastic Anchor W-UR SymCon** | Annex 3 |
|---|---|
| Intended use: W-UR 14 SymCon | |

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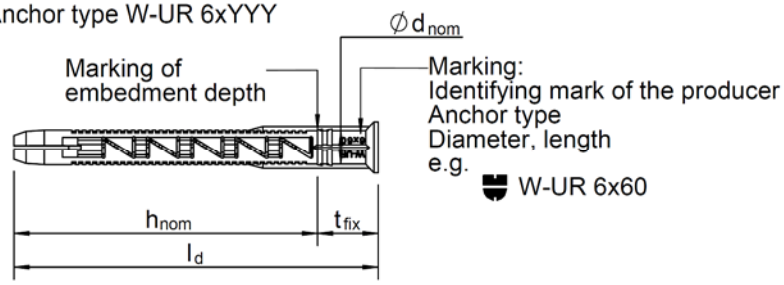
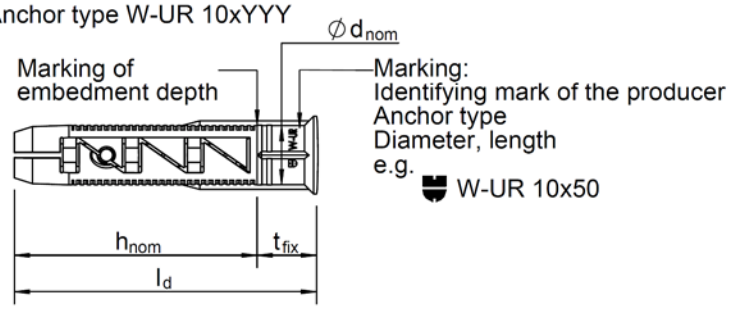
## Plastic Anchor

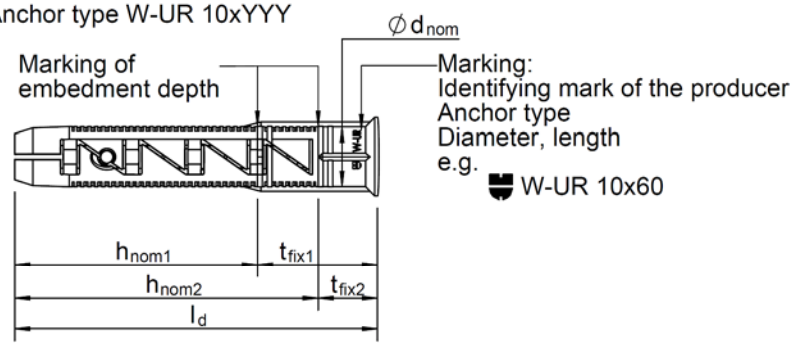
Anchor type W-UR 6xYYY



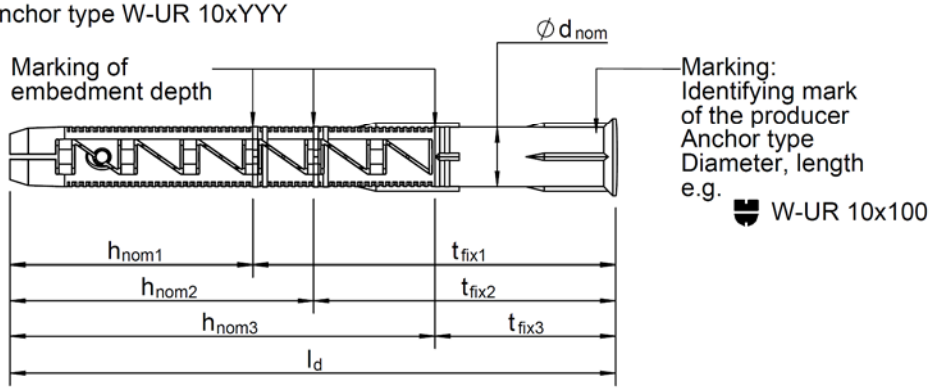

Anchor type W-UR 10xYYY




Anchor type W-UR 10xYYY




Anchor type W-UR 10xYYY




| | |
|---|---|
| **Würth Plastic Anchor W-UR SymCon** | |
| Plastic Anchor W-UR 6 and W-UR 10 | Annex 4 |

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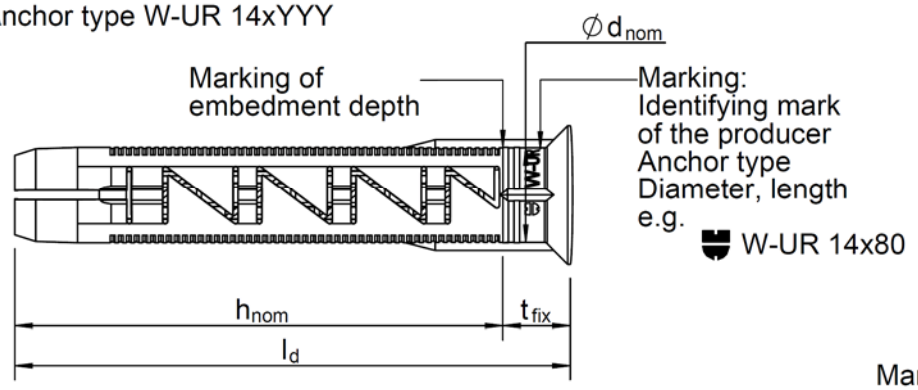
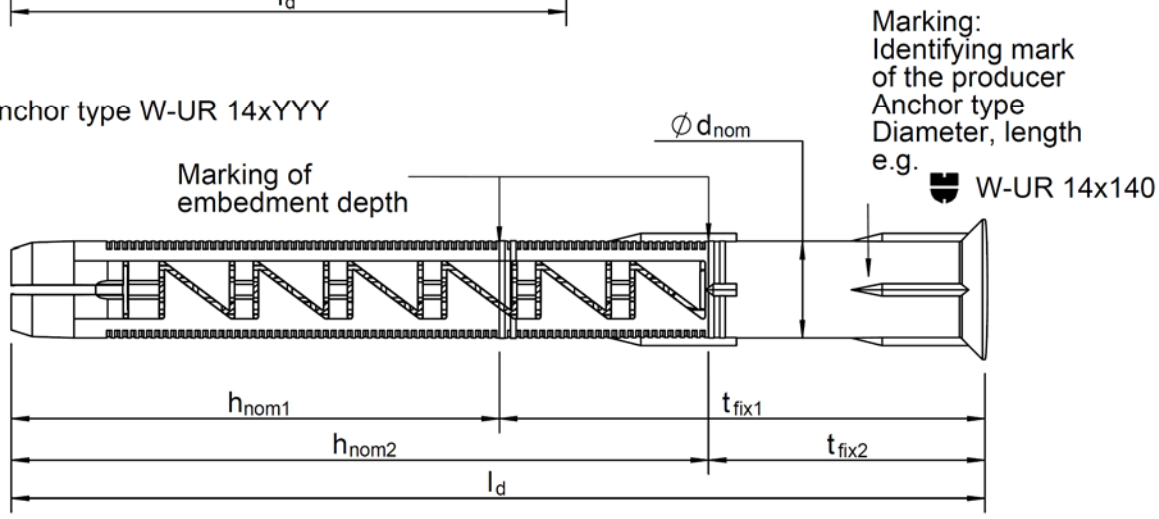
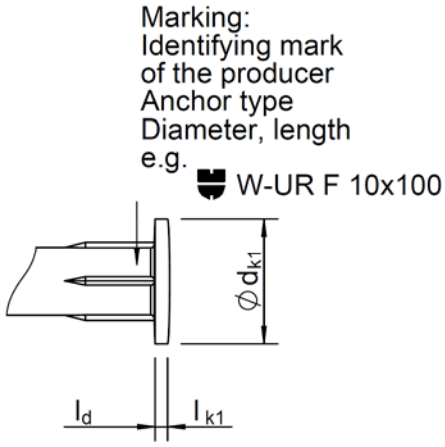
Anchor type W-UR 14xYYY



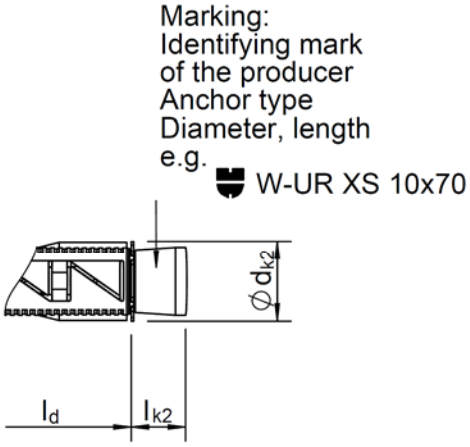

Anchor type W-UR 14xYYY




Anchor type W-UR F 6, 10 und 14




Anchor type W-UR XS 6, 10 und 14




| | |
|---|---|
| **Würth Plastic Anchor W-UR SymCon** | Annex 5 |
| Plastic Anchor W-UR 14 | |

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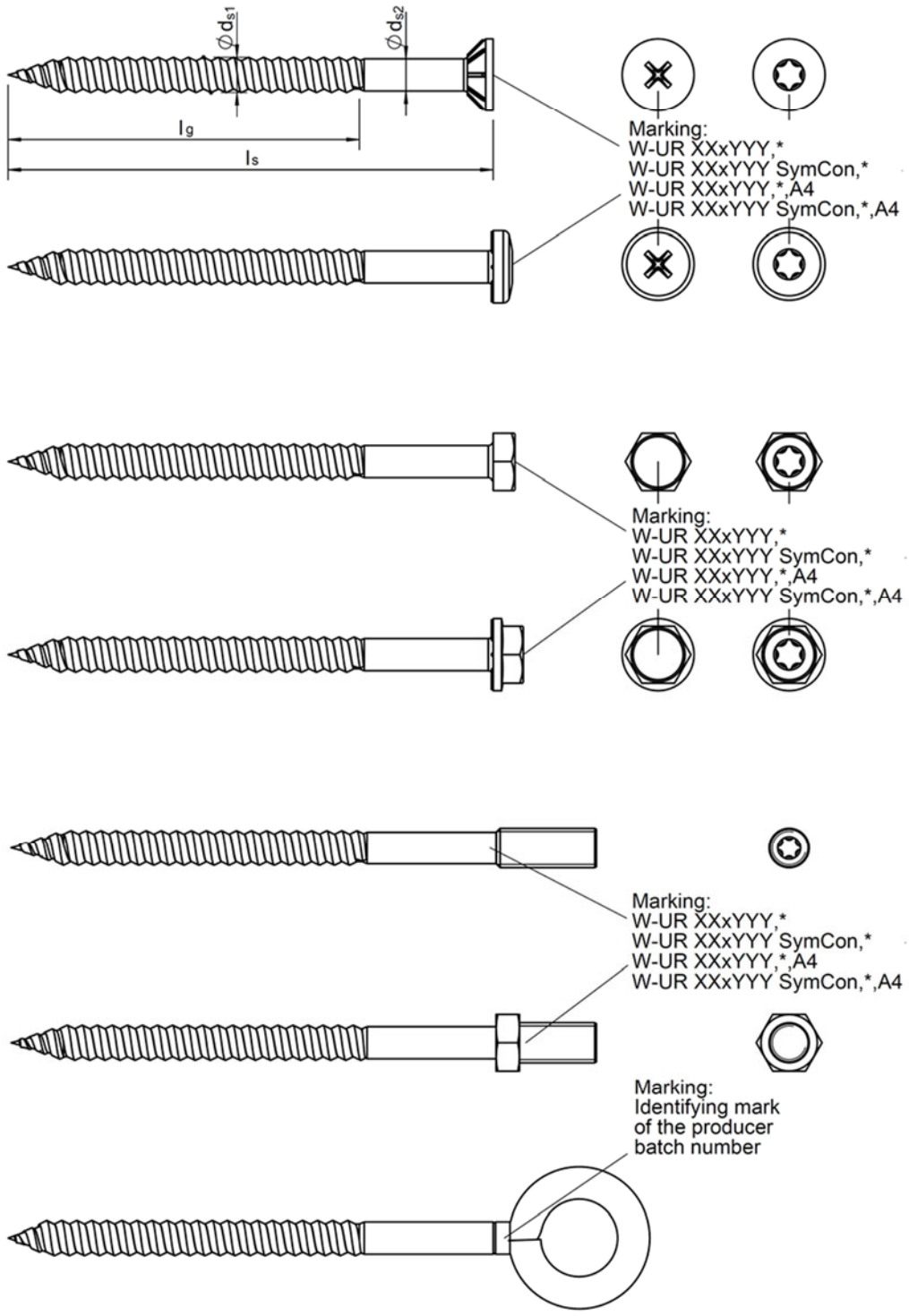
## Special screw




| **Würth Plastic Anchor W-UR SymCon** | Annex 6 |
|---|---|
| Special screw | |

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**Table 1.1: Anchor dimensions W-UR 6 SymCon, W-UR 10 SymCon**

| **Anchor type** | | | **W-UR 6 SymCon** | **W-UR 10 SymCon** | | |
|---|---|---|---|---|---|---|
| | | | **6 x $l_d$** | **10 x $l_d$** | | |
| Overall plastic anchor embedment depth [1),2)] | $h_{nom} \geq$ | [mm] | 50 | 40 | 40 ($h_{nom1}$) or 50 ($h_{nom2}$) | 40 ($h_{nom1}$) 50 ($h_{nom2}$) or 70 ($h_{nom3}$) |
| **Plastic sleeve** | | | | | | |
| Plastic sleeve diameter | $\varnothing d_{nom} =$ | [mm] | 6 | 10 | | |
| Length of plastic sleeve | $l_d$ | [mm] | ≥ 50 | ≥ 40 | ≥ 50 | ≥ 70 |
| Flat collar diameter | $\varnothing d_{k1} =$ | [mm] | 12.5 | 18 | | |
| | $\varnothing d_{k2} =$ | [mm] | - | 11.5 | | |
| Thickness of flat collar | $l_{k1} \geq$ | [mm] | 1.2 | 2 | | |
| | $l_{k2} \geq$ | [mm] | - | 7.8 | | |
| Thickness of fixture | $t_{fix} \geq$ | [mm] | 0 | 0 | | |
| **Special screw** | | | | | | |
| Screw diameter | $d_{s1} =$ | [mm] | 5 | 7.2 | | |
| Screw diameter | $d_{s2} =$ | [mm] | 4.55 | 7 | | |
| Length of screw | $l_s =$ | [mm] | $l_d$ + 5 mm | $l_d$ + 5 mm | | |
| Length of thread | $l_g =$ | [mm] | 55 | 45 | 75 | 75 |

1) See Annex 1, 2 and 3
2) For hollow and perforated masonry the influence of $h_{nom}$ > 70 mm (W-UR 10 SymCon) has to be detected by job site tests according 4.4.

**Table 1.2: Anchor dimensions W-UR 14 SymCon**

| **Anchor type** | | | **W-UR 14 SymCon** | |
|---|---|---|---|---|
| | | | **14 x 80** | **14 x $l_d$** |
| Overall plastic anchor embedment depth [1),2)] | $h_{nom} \geq$ | [mm] | 70 | 70 ($h_{nom1}$) or 100 ($h_{nom2}$) |
| **Plastic sleeve** | | | | |
| Plastic sleeve diameter | $\varnothing d_{nom} =$ | [mm] | 14 | |
| Length of plastic sleeve | $l_d$ | [mm] | = 80 | ≥ 110 |
| Flat collar diameter | $\varnothing d_{k1} =$ | [mm] | 24 | |
| Thickness of flat collar | $l_{k1} \geq$ | [mm] | 3 | |
| Thickness of fixture | $t_{fix} \geq$ | [mm] | 0 | |
| **Special screw** | | | | |
| Screw diameter | $d_{s1} =$ | [mm] | 10.5 | |
| Screw diameter | $d_{s2} =$ | [mm] | 9.6 | 9.6 (head-form loop: 9.6 or 12.0) |
| Length of screw | $l_s =$ | [mm] | $l_d$ + 5 mm | |
| Length of thread | $l_g =$ | [mm] | 75 | 105 |

1) See Annex 1, 2 and 3
2) For hollow and perforated masonry the influence of $h_{nom}$ > 100 mm (W-UR 14 SymCon) has to be detected by job site tests according 4.4.
For anchorages in hollow and perforated masonry with anchor type W-UR 14 SymCon 14 x ld (with $h_{nom1}$ = 70 mm and $h_{nom2}$ = 100 mm) variable set in the range $h_{nom1}$ = 70 mm ≤ $h_{nom}$ < 100 mm = $h_{nom2}$ the characteristic values $F_{RK}$ for $h_{nom1}$ = 70 mm may be taken without performing additional job site tests (compare Annex 26, 30 and 33).
For anchorages in hollow and perforated masonry with anchor type W-UR 14 x 80 SymCon ($h_{nom}$ = 70 mm) the influence 70 < $h_{nom}$ ≤ 79 mm always has to be detected by job site tests.



| **Würth Plastic Anchor W-UR SymCon** | Annex 7 |
|---|---|
| Anchor dimensions | |

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**Table 2: Materials**

| Designation | Material |
|---|---|
| Plastic sleeve | Polyamide, colour brown |
| Special screw | Carbon steel, according to DIN EN ISO 4042, galvanised<br>Stainless steel, 1.4401, 1.4571 or 1.4578 |
| Special screw – head-form loop $d_{s2}$ = 9.6 mm | Carbon steel, according to DIN EN ISO 4042, galvanised |
| Special screw – head-form loop $d_{s2}$ = 12 mm | Carbon steel, according to DIN EN ISO 4042, galvanised |

**Table 3.1: Installation parameters W-UR 6 SymCon, W-UR 10 SymCon**

| Anchor type | | | W-UR 6 SymCon 6 x $l_d$ | W-UR 10 SymCon 10 x $l_d$ | | |
|---|---|---|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 6 | 10 | | |
| Overall plastic anchor embedment depth [1),2)] | $h_{nom} \geq$ | [mm] | 50 | 37 | 40 ($h_{nom1}$) or 50 ($h_{nom2}$) | 40 ($h_{nom1}$) 50 ($h_{nom2}$) or 70 ($h_{nom3}$) |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 6.4 | 10.45 | | |
| Depth of drill hole to deepest point [1)] | $h_1 \geq$ | [mm] | 60 | 50 | 50 ($h_{1,1}$) or 60 ($h_{1,2}$) | 50 ($h_{1,1}$) 60 ($h_{1,2}$) or 80 ($h_{1,3}$) |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 6.5 | 10.5 | | |

1) See Annex 1, 2 and 3

2) For hollow and perforated masonry the influence of $h_{nom}$ > 70 mm (W-UR 10 SymCon) has to be detected by job site tests according 4.4.

**Table 3.2: Installation parameters W-UR 14 SymCon**

| Anchor type | | | W-UR 14 SymCon 14 x 80 | W-UR 14 SymCon 14 x $l_d$ |
|---|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 14 | |
| Overall plastic anchor embedment depth [1),2)] | $h_{nom} \geq$ | [mm] | 70 | 70 ($h_{nom1}$) or 100 ($h_{nom2}$) |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 14.45 | |
| Depth of drill hole to deepest point [1)] | $h_1 \geq$ | [mm] | 80 | 80 ($h_{1,1}$) or 110 ($h_{1,2}$) |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 14.5 | |

1) See Annex 1, 2 and 3

2) For hollow and perforated masonry the influence of $h_{nom}$ > 100 mm (W-UR 14 SymCon) has to be detected by job site tests according 4.4.
For anchorages in hollow and perforated masonry with anchor type W-UR 14 SymCon 14 x ld (with $h_{nom1}$ = 70 mm and $h_{nom2}$ = 100 mm) variable set in the range $h_{nom1}$ = 70 mm ≤ $h_{nom}$ < 100 mm = $h_{nom2}$ the characteristic values $F_{RK}$ for $h_{nom1}$ = 70 mm may be taken without performing additional job site tests (compare Annex 26, 30 and 33).
For anchorages in hollow and perforated masonry with anchor type W-UR 14 x 80 SymCon ($h_{nom}$ = 70 mm) the influence 70 < $h_{nom}$ ≤ 79 mm always has to be detected by job site tests.



| Würth Plastic Anchor W-UR SymCon | |
|---|---|
| Materials<br>Installation parameters | Annex 8 |

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**Table 4.1: Characteristic bending resistance of the special screw in concrete (W-UR 6 SymCon and W-UR 10 SymCon) and masonry (only W-UR 10 SymCon)**

| | | | Galvanised steel | | Stainless steel | |
|---|---|---|---|---|---|---|
| | | | **W-UR 6 SymCon** | **W-UR 10 SymCon** | **W-UR 6 SymCon A4** | **W-UR 10 SymCon A4** |
| Screw diameter | $d_{s1}$ / $d_{s2}$ | [mm] | 5 / 4.55 | 7.2 / 6.6 | 5 / 4.55 | 7.2 / 6.6 |
| Characteristic bending resistance | $M_{Rk,s}$ | [Nm] | 4.19 | 17.67 | 4.89 | 20.62 |
| Partial safety factor | $\gamma_{Ms}$ [1)] | [mm] | 1.25 | 1.25 | 1.56 | 1.56 |

[1)] In absence of other national regulations

**Table 4.2: Characteristic bending resistance of the special screw in concrete (W-UR 14 SymCon) and masonry (W-UR 14 SymCon)**

| | | | Galvanised steel | | | Stainless steel |
|---|---|---|---|---|---|---|
| | | | **W-UR 14 SymCon** | **W-UR 14 SymCon** head-form loop | | **W-UR 14 SymCon A4** |
| Screw diameter | $d_{s1}$ / $d_{s2}$ | [mm] | 10.5 / 9.6 | 10.5 / 9.6 | 10.5 / 12 | 10.5 / 9.6 |
| Characteristic bending resistance | $M_{Rk,s}$ | [Nm] | 41.9 | 41.9 | 27.93 | 48.88 |
| Partial safety factor | $\gamma_{Ms}$ [1)] | [mm] | 1.25 | 1.25 | 1.25 | 1.56 |

[1)] In absence of other national regulations



**Würth Plastic Anchor W-UR SymCon**

Characteristic bending resistance

Annex 9

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**Table 5.1: Base material: Concrete (W-UR 6 SymCon, W-UR 10 SymCon and W-UR 14 SymCon) and solid masonry (W-UR 10 SymCon and W-UR 14 SymCon)**

| Base material | Format | Measurement [mm] | Minimum compressive strength [N/mm²] | Bulk density class [kg/dm³] | Annex |
|---|---|---|---|---|---|
| **Concrete (use category "a")** | | | | | |
| **Concrete ≥ C12/15** | | | | | **Annex 13**<br>**Annex 14** |
| **Solid masonry (use category "b")** | | | | | |
| **Solid brick Mz** acc. to DIN 105-100<br>EN 771-1<br>e.g. Wienerberger GmbH | ≥ NF | ≥ 240x115x71 | 10<br>20 | ≥ 1.8 | **Annex 17**<br>771-1-020 |
| | ≥ 3DF | ≥ 240x175x113 | 28<br>36 | | **Annex 18**<br>771-1-041 |
| **Sand-lime solid brick KS** acc. to DIN V 106<br>EN 771-2 | ≥ NF | ≥ 240x115x71 | 10<br>20 | ≥ 2.0 | **Annex 29**<br>771-2-011 |
| **Sand-lime solid brick Silka XL Basic,**<br>**Sand-lime solid brick Silka XL Plus,**<br>acc. to DIN V 106<br>EN 771-2<br>Z-17.1-997<br>e.g. Xella International GmbH | | ≥ 248x175x498 | 10<br>20<br>28 | ≥ 2.0 | **Annex 30**<br>771-2-010 |
| **Concrete solid block - Vn** and **Vbn** acc. to DIN 18153-100<br>EN 771-3<br>Bisotherm GmbH | ≥ NF | ≥ 240x115x71 | 10<br>20<br>28 | ≥ 2.0 | **Annex 34**<br>771-3-004 |
| **Lightweight concrete solid block – V** and **Vbl;**<br>**e.g. Bisophon** acc. to DIN V 18152-100<br>EN 771-3<br>Bisotherm GmbH | ≥ 3DF | ≥ 240x175x113 | 10<br>20 | ≥ 2.0 | **Annex 35**<br>771-3-017 |
| **Lightweight concrete solid brick**<br>**e.g. BisoBims V** and **Vbl** acc. to DIN V 18152-100<br>EN 771-3<br>Bisotherm GmbH | ≥ NF | ≥ 240x115x71 | 2<br>4 | ≥ 1.0 | **Annex 36**<br>771-3-007 |
| **Lightweight concrete solid brick**<br>**e.g. BisoBims V** and **Vbl** acc. to DIN V 18152-100<br>EN 771-3<br>Bisotherm GmbH | ≥ 3DF | ≥ 240x175x113 | 2<br>4 | ≥ 1.0 | **Annex 37**<br>771-3-015 |



**Würth Plastic Anchor W-UR SymCon**

**Base material: Concrete and solid masonry (use category "a" and "b")**
Format, measurement, minimum compressive strength, Annex

Annex 10

Deutsches Institut für Bautechnik DIBt

**Table 5.2: Base material: Hollow or perforated masonry (W-UR 10 SymCon and W-UR 14 SymCon)**

| Base material | Format | Measurement [mm] | Minimum compressive strength [N/mm²] | Bulk density class [kg/dm³] | Annex |
|---|---|---|---|---|---|
| **Hollow or perforated masonry (use category "c")** | | | | | |
| **Hollow brick HLz** acc. to<br>DIN 105-100<br>EN 771-1<br>e.g. Wienerberger GmbH<br>e.g. Schlagmann Baustoffwerke GmbH & Co. KG | ≥ 2DF | ≥ 240x115x113 | 10<br>20 | ≥ 1.2 | **Annex 19**<br>771-1-036 |
| **Hollow brick HLz** acc. to<br>DIN 105-100<br>EN 771-1<br>e.g. Wienerberger GmbH<br>e.g. Schlagmann Baustoffwerke GmbH & Co. KG | ≥ 12DF | ≥ 373x240x238 | 6<br>8<br>10 | ≥ 1.2 | **Annex 20**<br>771-1-036 |
| **Hollow brick HLz T14-24,0**<br>EN 771-1<br>Z-17.1-651<br>Wienerberger GmbH | ≥ 10DF | ≥ 308x240x249 | 6 | ≥ 0.7 | **Annex 21**<br>771-1-048 |
| **Hollow brick POROTON-T8-P** acc. to<br>T8: EN 771-1; Z-17.1-982<br>Wienerberger GmbH<br>Schlagmann Baustoffwerke GmbH & Co. KG | ≥ 10DF | ≥ 248x300x249 | 4<br>6<br>8 | ≥ 0.6 | **Annex 22**<br>771-1-022 |
| **Hollow brick POROTON-T9-P** acc. to<br>T9: EN 771-1; Z-17.1-674<br>Wienerberger GmbH<br>Schlagmann Baustoffwerke GmbH & Co. KG | ≥ 10DF | ≥ 248x300x249 | 6<br>8 | ≥ 0.6 | **Annex 23**<br>771-1-022 |
| **Hollow brick POROTON S10** acc. to<br>EN 771-1<br>Z-17.1-1017<br>Wienerberger GmbH<br>Schlagmann Baustoffwerke GmbH & Co. KG | ≥ 10DF | ≥ 248x300x249 | 6<br>8<br>10 | ≥ 0.75 | **Annex 24**<br>771-1-032 |
| **Hollow brick POROTON-S11-P 30,0** acc. to<br>EN 771-1<br>Z-17.1-812<br>Wienerberger GmbH<br>Schlagmann Baustoffwerke GmbH & Co. KG | ≥ 10DF | ≥ 248x300x249 | 8 | ≥ 0.9 | **Annex 25**<br>771-1-046 |
| **Hollow brick ThermoPlan MZ10**<br>EN 771-1<br>Z-17.1-1015<br>Mein Ziegelhaus GmbH & Co. KG | ≥ 10DF | ≥ 248x300x249 | 8 | ≥ 0.75 | **Annex 26**<br>771-1-034 |

**Würth Plastic Anchor W-UR SymCon**

**Base material: Hollow masonry (use category "c")**
Format, measurement, minimum compressive strength, Annex

Annex 11

Deutsches Institut für Bautechnik DIBt

## Table 5.3: Base material: Hollow or perforated masonry (W-UR 10 SymCon and W-UR 14 SymCon)

| Base material | Format | Measurement [mm] | Minimum compressive strength [N/mm²] | Bulk density class [kg/dm³] | Annex |
|---|---|---|---|---|---|
| **Hollow or perforated masonry (use category "c")** | | | | | |
| **Hollow brick ThermoPlan TS**[2]<br>EN 771-1<br>Z-17.1-993<br>Mein Ziegelhaus GmbH & Co. KG | ≥ 9DF | ≥ 373x175x249 | 6<br>8<br>10<br>12<br>20 | ≥ 0.9 | **Annex 27**<br>771-1-024 |
| **Hollow brick THERMOPOR TV 9-Plan**<br>EN 771-1<br>Z-17.1-1006<br>Thermopor Ziegel-Kontor Ulm GmbH | ≥ 10DF | ≥ 247x300x249 | 4<br>6<br>8 | ≥ 0.75 | **Annex 28**<br>771-1-029 |
| **Sand-lime perforated brick KS L** acc. to<br>DIN V 106<br>EN 771-2 | ≥ 2DF | ≥ 240x115x113 | 6<br>8<br>10<br>12 | ≥ 1.4 | **Annex 31**<br>771-2-004 |
| **Sand-lime perforated brick KS L** acc. to<br>DIN V 106<br>EN 771-2<br>e.g. Xella International GmbH | ≥ 8DF | ≥ 248x240x238 | 6<br>8<br>10<br>12 | ≥ 1.4 | **Annex 32**<br>771-2-013 |
| **Sand-lime perforated brick KS L** acc. to<br>DIN V 106<br>EN 771-2<br>e.g. Xella International GmbH | ≥ 9DF | ≥ 373x175x238 | 6<br>8<br>10<br>12<br>20 | ≥ 1.4 | **Annex 33**<br>771-2-008 |
| **Hollow brick lightweight concrete 3K Hbl**<br>DIN 18151<br>EN 771-3<br>e.g. Heinzmann Baustoffe GmbH,<br>Liapor GmbH & Co. KG | ≥ 16DF | ≥ 498x240x238 | 2<br>4<br>6 | ≥ 0.7 | **Annex 38**<br>771-3-005 |
| **Autoclaved aerated concrete masonry (use category "d")** | | | | | |
| **Autoclaved aerated concrete AAC** e.g.<br>DIN 4165<br>EN 771-4 | | ≥ 498x100x249 | 2 - 7 | ≥ 0.3 | **Annex 39** |
| | | | | | |
| **Precast prestressed hollow core slabs** e.g.<br>DIN EN 1168 | | | ≥ C30/37 | | **Annex 40** |
| **Thin concrete plates, Weather Resistant Skins of External Wall Panels** | | | ≥ C16/20 | | **Annex 41** |

**Würth Plastic Anchor W-UR SymCon**

**Base material: Hollow masonry, AAC, precast prestressed hollow core slabs, weather resistant skins of external wall panels**
Format, measurement, minimum compressive strength, Annex

Annex 12

Deutsches Institut für Bautechnik DIBt

## Table 6.1: Characteristic resistance for use in concrete (W-UR 6 SymCon, W-UR 10 SymCon)

| **Anchor type** | | | Galvanised steel W-UR SymCon | | | | Stainless steel W-UR SymCon | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Failure of expansion element (special screw)** | | | **6** | **10** | | | **6** | **10** | | |
| Overall plastic anchor embedment depth | $h_{nom}$ | [mm] | **50** | **40** | **50** | **70** | **50** | **40** | **50** | **70** |
| Screw diameter | $d_{s1}/d_{s2}$ | [mm] | 5 / 4.55 | 7.2 / 6.6 | | | 5 / 4.55 | 7.2 / 6.6 | | |
| Characteristic tension resistance | $N_{Rk,s}$ | [kN] | 7.17 | 18.70 | | | 8.36 | 21.82 | | |
| Partial safety factor | $\gamma_{Ms}$ [1] | [-] | 1.5 | 1.5 | | | 1.87 | 1.87 | | |
| Characteristic shear resistance | $V_{Rk,s}$ | [kN] | 3.58 | 9.35 | | | 4.18 | 10.91 | | |
| Partial safety factor | $\gamma_{Ms}$ [1] | [-] | 1.25 | 1.25 | | | 1.56 | 1.56 | | |
| **Pull-out failure (plastic sleeve)** | | | | | | | | | | |
| **Concrete ≥ C16/20** | | | | | | | | | | |
| Characteristic resistance | 30℃ [2] / 50℃ [3] $N_{Rk,p}$ | [kN] | 2.0 | 4.5 | 5.0 | 8.5 | 2.0 | 4.5 | 5.0 | 8.5 |
| | 50℃ [2] / 80℃ [3] $N_{Rk,p}$ | [kN] | - | 4.0 | 4.5 | 7.5 | - | 4.0 | 4.5 | 7.5 |
| Partial safety factor | $\gamma_{Mc}$ [1] | [-] | 1.8 | 1.8 | | | 1.8 | 1.8 | | |
| **Concrete C12/15** | | | | | | | | | | |
| Characteristic resistance | 30℃ [2] / 50℃ [3] $N_{Rk,p}$ | [kN] | 2.0 | 3.5 | 4.0 | 6.0 | 2.0 | 3.5 | 4.0 | 6.0 |
| | 50℃ [2] / 80℃ [3] $N_{Rk,p}$ | [kN] | - | 3.0 | 3.5 | 5.0 | - | 3.0 | 3.5 | 5.0 |
| Partial safety factor | $\gamma_{Mc}$ [1] | [-] | 1.8 | 1.8 | | | 1.8 | 1.8 | | |
| **Concrete cone failure and concrete edge failure for single anchor and anchor group** | | | | | | | | | | |
| **Tension load** [4] | | | | | | | | | | |
| $N_{Rk,c} = 7.2 \cdot \sqrt{f_{ck,cube}} \cdot h_{ef}^{1.5} \cdot \frac{c}{c_{cr,N}} = N_{Rk,p} \cdot \frac{c}{c_{cr,N}}$ with: $h_{ef}^{1.5} = \frac{N_{Rk,p}}{7.2 \cdot \sqrt{f_{ck,cube}}}$ ; $\frac{c}{c_{cr,N}} \le 1$ | | | | | | | | | | |
| **Shear load** [4] | | | | | | | | | | |
| $V_{Rk,c} = 0.45 \cdot \sqrt{d_{nom}} \cdot (h_{nom}/d_{nom})^{0.2} \cdot \sqrt{f_{ck,cube}} \cdot c_1^{1.5} \cdot \left(\frac{c_2}{1.5c_1}\right)^{0.5} \cdot \left(\frac{h}{1.5c_1}\right)^{0.5}$ with: $\left(\frac{c_2}{1.5 \cdot c_1}\right)^{0.5} \le 1$ ; $\left(\frac{h}{1.5 \cdot c_1}\right)^{0.5} \le 1$ | | | | | | | | | | |
| $c_1$ edge distance closest to the edge in loading direction | | | | | | | | | | |
| $c_2$ edge distance perpendicular to direction 1 | | | | | | | | | | |
| $f_{ck,cube}$ nominal characteristic concrete compression strength (based on cubes), values for C50/60 at maximum | | | | | | | | | | |
| Partial safety factor | $\gamma_{Mc}$ [1] | [-] | 1.8 | | | | | | | |

1) In absence of other national regulations
2) Maximum long term temperature
3) Maximum short term temperature
4) The design method according to ETAG 020, Annex C is to be used

**Würth Plastic Anchor W-UR SymCon**

Characteristic resistance for use in concrete (W-UR 6 SymCon, W-UR 10 SymCon)

Annex 13

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## Table 6.2: Characteristic resistance for use in concrete (W-UR 14 SymCon)

| **Anchor type** | | | Galvanised steel **W-UR SymCon** | | | | | | Stainless steel **W-UR SymCon** | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Failure of expansion element (special screw)** | | | **14** | | **Head-form Loop 14** | | | | **14** | |
| Overall plastic anchor embedment depth | $h_{nom}$ | [mm] | **70** | **100** | **70** | | **100** | | **70** | **100** |
| Screw diameter | $d_{s1}/d_{s2}$ | [mm] | 10.5 / 9.6 | | 10.5 / 9.6 | 10.5 / 12.0 | 10.5 / 9.6 | 10.5 / 12.0 | 10.5 / 9.6 | |
| Characteristic tension resistance | $N_{Rk,s}$ | [kN] | 33.25 | | 33.25 | 22.17 | 33.25 | 22.17 | 38.79 | |
| Partial safety factor | $\gamma_{Ms}$ [1] | [-] | 1.5 | | 1.5 | | 1.5 | | 1.87 | |
| Characteristic shear resistance | $V_{Rk,s}$ | [kN] | 16.63 | | 16.63 | 11.08 | 16.63 | 11.08 | 19.4 | |
| Partial safety factor | $\gamma_{Ms}$ [1] | [-] | 1.25 | | 1.25 | | 1.25 | | 1.56 | |
| **Pull-out failure (plastic sleeve)** | | | | | | | | | | |
| **Concrete ≥ C16/20** | | | | | | | | | | |
| Characteristic resistance | 30°C [2] / 50°C [3] $N_{Rk,p}$ | [kN] | 8.5 | 8.5 | 8.5 | | 8.5 | | 8.5 | 8.5 |
| | 50°C [2] / 80°C [3] $N_{Rk,p}$ | [kN] | 7.5 | 8.5 | 7.5 | | 8.5 | | 7.5 | 8.5 |
| Partial safety factor | $\gamma_{Mc}$ [1] | [-] | 1.8 | | 1.8 | | | | 1.8 | |
| **Concrete C12/15** | | | | | | | | | | |
| Characteristic resistance | 30°C [2] / 50°C [3] $N_{Rk,p}$ | [kN] | 6.0 | 6.0 | 6.0 | | 6.0 | | 6.0 | 6.0 |
| | 50°C [2] / 80°C [3] $N_{Rk,p}$ | [kN] | 5.5 | 6.0 | 5.5 | | 6.0 | | 5.5 | 6.0 |
| Partial safety factor | $\gamma_{Mc}$ [1] | [-] | 1.8 | | 1.8 | | | | 1.8 | |
| **Concrete cone failure and concrete edge failure for single anchor and anchor group** | | | | | | | | | | |

**Tension load** [4]

$$N_{Rk,c} = 7.2 \cdot \sqrt{f_{ck,cube}} \cdot h_{ef}^{1.5} \cdot \frac{c}{c_{cr,N}} = N_{Rk,p} \cdot \frac{c}{c_{cr,N}}$$

with: $$h_{ef}^{1.5} = \frac{N_{Rk,p}}{7.2 \cdot \sqrt{f_{ck,cube}}}$$

$$\frac{c}{c_{cr,N}} \le 1$$

**Shear load** [4]

$$V_{Rk,c} = 0.45 \cdot \sqrt{d_{nom}} \cdot (h_{nom} / d_{nom})^{0.2} \cdot \sqrt{f_{ck,cube}} \cdot c_1^{1.5} \cdot \left(\frac{c_2}{1.5c_1}\right)^{0.5} \cdot \left(\frac{h}{1.5c_1}\right)^{0.5}$$

with: $$\left(\frac{c_2}{1.5 \cdot c_1}\right)^{0.5} \le 1$$

$$\left(\frac{h}{1.5 \cdot c_1}\right)^{0.5} \le 1$$

$c_1$ edge distance closest to the edge in loading direction

$c_2$ edge distance perpendicular to direction 1

$f_{ck,cube}$ nominal characteristic concrete compression strength (based on cubes), values for C50/60 at maximum

| Partial safety factor | $\gamma_{Mc}$ [1] | [-] | 1.8 |
|---|---|---|---|

1) In absence of other national regulations
2) Maximum long term temperature
3) Maximum short term temperature
4) The design method according to ETAG 020, Annex C is to be used

**Würth Plastic Anchor W-UR SymCon**

Characteristic resistance for use in concrete (W-UR 14 SymCon)

Annex 14

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**Table 7.1: Displacements[1] under tension and shear loading in concrete and masonry**

| Anchor type | | Tension load | | | Shear load | | |
|---|---|---|---|---|---|---|---|
| | $h_{nom}$ [mm] | $F_{Rk}$[2] [kN] | $\delta_{N0}$ [mm] | $\delta_{N\infty}$ [mm] | $F_{Rk}$[2] [kN] | $\delta_{V0}$ [mm] | $\delta_{V\infty}$ [mm] |
| **W-UR 6 SymCon** | 50 | 1.0 | 0.38 | 0.76 | 1.0 | 0.68 | 1.02 |
| **W-UR 10 SymCon** | 40 | 2.0 | 0.58 | 1.16 | 2.0 | 3.4 | 5.1 |
| | 50 | 2.0 | 0.58 | 1.16 | 2.0 | 3.4 | 5.1 |
| | 70 | 2.0 | 0.58 | 1.16 | 2.0 | 3.4 | 5.1 |
| **W-UR 14 SymCon** | 70 | 3.4 | 0.98 | 1.96 | 3.4 | 1.95 | 3.9 |
| | 100 | 3.4 | 0.98 | 1.96 | 3.4 | 1.95 | 3.9 |

1) Valid for all ranges of temperatures
2) Intermediate values by linear interpolation

**Table 7.2: Displacements[1] under tension and shear loading in autoclaved aerated concrete AAC**

| Anchor type | | Tension load | | | Shear load | | |
|---|---|---|---|---|---|---|---|
| | $h_{nom}$ [mm] | $F_{Rk}$[2] [kN] | $\delta_{N0}$ [mm] | $\delta_{N\infty}$ [mm] | $F_{Rk}$[2] [kN] | $\delta_{V0}$ [mm] | $\delta_{V\infty}$ [mm] |
| **W-UR 10 SymCon** | 40 | 0.27 | 0.11 | 0.22 | 0.27 | 0.54 | 0.81 |

1) Valid for all ranges of temperatures
2) Intermediate values by linear interpolation

**Table 8: Minimum thickness of member, edge distance and anchor spacing in concrete**

**W-UR 6 SymCon:** Fixing points with a spacing $a \leq 55$ mm are considered as a group with a max. characteristic resistance $N_{Rk,p}$ acc. to Table 6.1. For $a > 55$ mm, the anchors are considered as single anchors, each with a characteristic resistance $N_{Rk,p}$ acc to Table 6.1.

**W-UR 10 SymCon:** Fixing points with a spacing $a \leq 125$ mm are considered as a group with a max. characteristic resistance $N_{Rk,p}$ acc. to Table 6.1. For $a > 125$ mm, the anchors are considered as single anchors, each with a characteristic resistance $N_{Rk,p}$ acc. to Table 6.1.

**W-UR 14 SymCon:** Fixing points with a spacing $a \leq 125$ mm are considered as a group with a max. characteristic resistance $N_{Rk,p}$ acc. to Table 6.2. For $a > 125$ mm, the anchors are considered as single anchors, each with a characteristic resistance $N_{Rk,p}$ acc. to Table 6.2.

| | | $h_{nom}$ [mm] | $h_{min}$ [mm] | $c_{cr,N}$ [mm] | $c_{min}$ [mm] | $s_{min}$ [mm] |
|---|---|---|---|---|---|---|
| **W-UR 6 SymCon** | Concrete ≥ C16/20 | ≥ 50 | 90 | 40 | 40 | 40 |
| | Concrete C12/15 | ≥ 50 | 90 | 60 | 60 | 60 |
| **W-UR 10 SymCon** | Concrete ≥ C16/20 | ≥ 40 | 80 | 60 | 50 | 50 |
| | Concrete C12/15 | ≥ 40 | 80 | 80 | 70 | 70 |
| | Concrete ≥ C16/20 | ≥ 50 | 90 | 60 | 50 | 50 |
| | Concrete C12/15 | ≥ 50 | 90 | 80 | 70 | 70 |
| | Concrete ≥ C16/20 | ≥ 70 | 110 | 60 | 60 | 50 |
| | Concrete C12/15 | ≥ 70 | 110 | 80 | 80 | 70 |
| **W-UR 14 SymCon** | Concrete ≥ C16/20 | ≥ 70 | 110 | 80 | 60 | 60 |
| | Concrete C12/15 | ≥ 70 | 110 | 110 | 85 | 85 |
| | Concrete ≥ C16/20 | ≥ 100 | 140 | 100 | 80 | 80 |
| | Concrete C12/15 | ≥ 100 | 140 | 140 | 115 | 115 |



**Würth Plastic Anchor W-UR SymCon**

Displacements, minimum thickness of member, edge distance and anchor spacing

Annex 15

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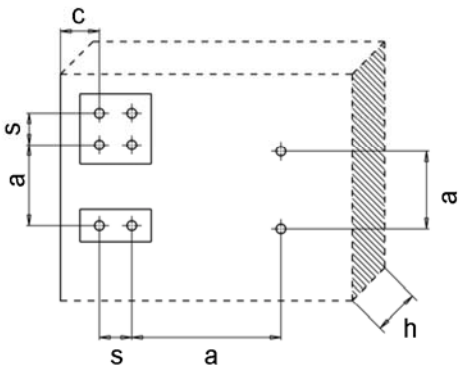
**Table 9: Minimum thickness of member, edge distance and anchor spacing in masonry and autoclaved aerated concrete**

| | | | W-UR 10 SymCon | | | | W-UR 14 SymCon |
|---|---|---|---|---|---|---|---|
| | | | Masonry | | Autoclaved Aerated Concrete | | Masonry |
| | | | | | AAC 2 | AAC 6 | |
| Overall plastic anchor embedment depth | $h_{nom}$ | [mm] | 50 | 70 | 70 | | 100 |
| Minimum thickness of member | $h_{min}$ | [mm] | 115 [1] | | 100 | | 100 [1] |
| **Single anchor** | | | | | | | |
| Minimum allowable spacing | $a_{min}$ | [mm] | 250 | | 250 | 250 | 250 |
| Minimum allowable edge distance | $c_{min}$ | [mm] | 100 [1] | | 60 | 100 | 100 (240) [2] |
| **Anchor group** | | | | | | | |
| Spacing perpendicular to free edge | $s_{1,min}$ | [mm] | 100 | | 100 | 165 | 200 (400) [2] |
| Spacing parallel to free edge | $s_{2,min}$ | [mm] | 100 | | 100 | 165 | 400 (960) [2] |
| Minimum allowable edge distance | $c_{min}$ | [mm] | 100 [1] | | 60 | 100 | 100 (240) [2] |

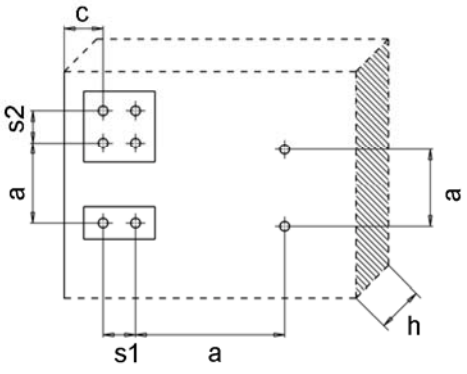
1) depends on the brick size (see the following annexes 17 to 39)

2) depends on brick (see the following annexes 17 to 39) – the values in brackets govern for masonry units with a height < 100 mm

**Concrete:**
(Table 8)




**Masonry**
(Table 9)






**Würth Plastic Anchor W-UR SymCon**

Minimum thickness of member, edge distance and anchor spacing

Annex 16

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**Base material solid masonry: Solid brick Mz, NF**

**Table 10.1.1: Brick data**

| **Description of brick** 771-1-020 | | | **Mz** |
|---|---|---|---|
| Type of brick | | | Solid brick Mz |
| Bulk density | $\rho \geq$ | [kg/dm³] | 1.8 |
| Standard, approval | | | DIN 105; EN 771-1 |
| Format (measurement) | | [mm] | ≥ NF (≥ 240x115x71) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 115 |

**Table 10.1.2: Installation parameters**

| **Anchor size** | | | **W-UR 10 SymCon** | | **W-UR 14 SymCon** |
|---|---|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 10 | | 14 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 | | 14.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 60 | 80 | 80 |
| Drill method | | [-] | Hammer drilling | | |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | 50 | 70 | 70 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 | | 14.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 250 | 100 | 240 |

**Table 10.1.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor**

| **Anchor size** | | | **W-UR 10 SymCon** | | **W-UR 14 SymCon** |
|---|---|---|---|---|---|
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | **50** | **70** | **70** |
| **Solid brick Mz, $f_b \geq 10$ N/mm²** | 30℃ [3] / 50℃ [4] | [kN] | 1.5 | 0.9 | 1.2 |
| Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | [kN] | 1.5 | 0.75 | 1.2 |
| **Solid brick Mz, $f_b \geq 20$ N/mm²** | 30℃ [3] / 50℃ [4] | [kN] | 1.5 | 1.2 | 2.0 |
| Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | [kN] | 1.5 | 1.2 | 1.5 |
| **Solid brick Mz, $f_b \geq 28$ N/mm²** | 30℃ [3] / 50℃ [4] | [kN] | 2.5 | 2.0 | 2.5 |
| Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | [kN] | 2.5 | 2.0 | 2.5 |
| **Solid brick Mz, $f_b \geq 36$ N/mm²** | 30℃ [3] / 50℃ [4] | [kN] | 3.0 | 2.5 | 3.5 |
| Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | [kN] | 3.0 | 2.5 | 3.0 |
| Partial safety factor | $\gamma_{Mm}$ [2] | [-] | 2.5 | | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature



**Würth Plastic Anchor W-UR SymCon**

**Solid masonry: Solid brick Mz, NF**
Brick data, installation parameters, characteristic resistance

Annex 17

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**Base material solid masonry: Solid brick Mz, 3DF**

**Table 10.2.1: Brick data**

| **Description of brick** 771-1-041 | | | **Mz** |
|---|---|---|---|
| Type of brick | | | Solid brick Mz |
| Bulk density | $\rho \geq$ | [kg/dm³] | 1.8 |
| Standard, approval | | | DIN 105; EN 771-1 |
| Producer of brick | | | e.g. Wienerberger GmbH |
| Format (measurement) | | [mm] | ≥ 3DF (≥ 240x175x113) |
| Minimum thickness of member | $h_{min} =$ | [mm] | 175 |

**Table 10.2.2: Installation parameters**

| **Anchor size** | | | **W-UR 10 SymCon** | **W-UR 14 SymCon** |
|---|---|---|---|---|
| Drill hole diameter | $d_0 =$ | [mm] | 10 | 14 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 | 14.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 80 | 110 |
| Drill method | | [-] | Hammer drilling | |
| Overall plastic anchor embedment depth | $h_{nom} \geq$ | [mm] | 70 | 100 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 | 14.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 | 100 |

**Table 10.2.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor**

| **Anchor size** | | | | **W-UR 10 SymCon** | **W-UR 14 SymCon** |
|---|---|---|---|---|---|
| Overall plastic anchor embedment depth | | $h_{nom} \geq$ | [mm] | **70** | **100** |
| **Solid brick Mz, $f_b \geq 10$ N/mm²** | 30℃ [3] / 50℃ [4] | | [kN] | 2.5 | 4.0 |
| Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | | [kN] | 2.5 | 3.5 |
| **Solid brick Mz, $f_b \geq 20$ N/mm²** | 30℃ [3] / 50℃ [4] | | [kN] | 4.0 | 5.5 |
| Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | | [kN] | 4.0 | 5.5 |
| **Solid brick Mz, $f_b \geq 28$ N/mm²** | 30℃ [3] / 50℃ [4] | | [kN] | 5.5 | 5.5 |
| Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | | [kN] | 5.5 | 5.5 |
| Partial safety factor | | $\gamma_{Mm}$ [2] | [-] | 2.5 | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature



**Würth Plastic Anchor W-UR SymCon**

**Solid masonry: Solid brick Mz, 3DF**
Brick data, installation parameters, characteristic resistance

Annex 18

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**Base material hollow masonry: Hollow brick HLz, 2DF**

**Table 10.3.1: Brick data**

| **Description of brick** 771-1-021 | | | **HLz** |
|---|---|---|---|
| Type of brick | | | Hollow brick |
| Bulk density | $\rho \geq$ | [kg/dm³] | 1.2 |
| Standard, approval | | | DIN 105; EN 771-1 |
| Producer of brick | | | e.g. Wienerberger GmbH |
| Format (measurement) | | [mm] | ≥ 2DF (≥ 240x115x113) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 115 |

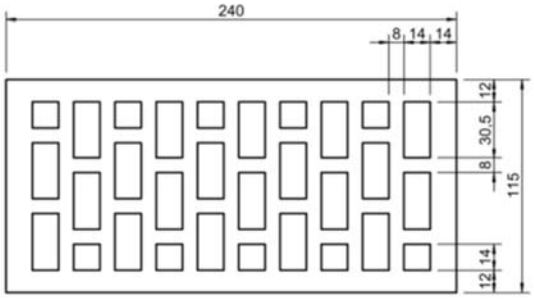


**Table 10.3.2: Installation parameters**

| **Anchor size** | | | **W-UR 10 SymCon** |
|---|---|---|---|
| Drill hole diameter | $d_0$ | [mm] | 10 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 80 |
| Drill method | | [-] | Rotary drilling |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | 70 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 |

**Table 10.3.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor**

| **Anchor size** | | | **W-UR 10 SymCon** |
|---|---|---|---|
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | **70** |
| **Hollow brick HLz, $f_b \geq 10$ N/mm²** | 30℃ [3] / 50℃ [4] | [kN] | 1.2 |
| Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | [kN] | 1.2 |
| **Hollow brick HLz, $f_b \geq 20$ N/mm²** | 30℃ [3] / 50℃ [4] | [kN] | 2.0 |
| Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | [kN] | 2.0 |
| Partial safety factor | $\gamma_{Mm}$ [2] | [-] | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading. The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature



| **Würth Plastic Anchor W-UR SymCon** | Annex 19 |
|---|---|
| **Hollow brick HLz, 2DF**<br>Brick data, installation parameters, characteristic resistance | |

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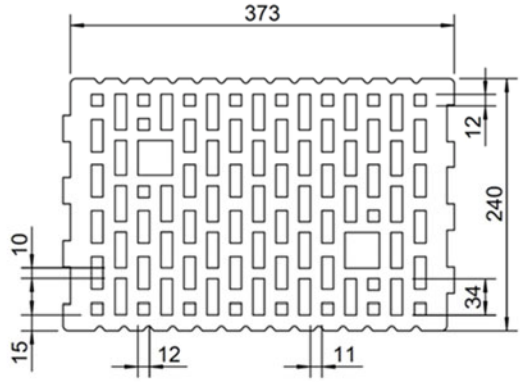
## Base material hollow masonry: Hollow brick HLz, 12DF

### Table 10.4.1: Brick data

| Description of brick 771-1-036 | | | HLz |
|---|---|---|---|
| Type of brick | | | Hollow brick |
| Bulk density | $\rho \geq$ | [kg/dm³] | 1.2 |
| Standard, approval | | | DIN 105; EN 771-1 |
| Producer of brick | | | e.g. Schlagmann Baustoffwerke GmbH & Co. KG |
| Format (measurement) | | [mm] | ≥ 12DF (≥ 373x240x238) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 240 |




### Table 10.4.2: Installation parameters

| Anchor size | | | W-UR 10 SymCon | W-UR 14 SymCon |
|---|---|---|---|---|
| Drill hole diameter | $d_0$ | [mm] | 10 | 14 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 | 14.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 80 | 110 |
| Drill method | | [-] | Rotary drilling | |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | 70 | 100 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 | 14.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 | 190 |

### Table 10.4.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor

| Anchor size | | | | W-UR 10 SymCon | W-UR 14 SymCon |
|---|---|---|---|---|---|
| Overall plastic anchor embedment depth | | $h_{nom}$ = | [mm] | **70** | **100** |
| **Hollow brick HLz, $f_b \geq 6$ N/mm²** | 30°C [3] / 50°C [4] | | [kN] | 1.2 | 1.5 |
| Characteristic resistance $F_{Rk}$ | 50°C [3] / 80°C [4] | | [kN] | 1.2 | 1.5 |
| **Hollow brick HLz, $f_b \geq 8$ N/mm²** | 30°C [3] / 50°C [4] | | [kN] | 1.5 | 2.0 |
| Characteristic resistance $F_{Rk}$ | 50°C [3] / 80°C [4] | | [kN] | 1.5 | 2.0 |
| **Hollow brick HLz, $f_b \geq 10$ N/mm²** | 30°C [3] / 50°C [4] | | [kN] | 2.0 | 2.5 |
| Characteristic resistance $F_{Rk}$ | 50°C [3] / 80°C [4] | | [kN] | 2.0 | 2.5 |
| Partial safety factor | | $\gamma_{Mm}$ [2] | [-] | 2.5 | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading. The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature

**Würth Plastic Anchor W-UR SymCon**

**Hollow brick HLz, 12DF**
Brick data, installation parameters, characteristic resistance

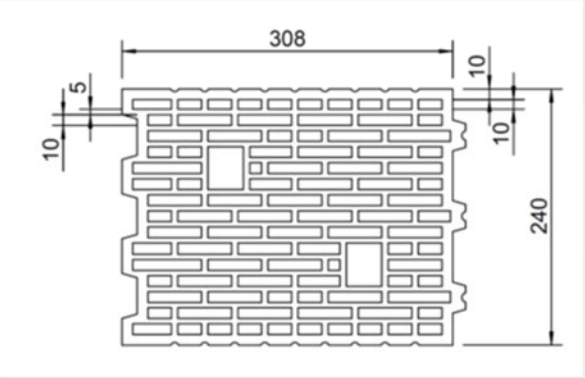
Annex 20

Deutsches Institut für Bautechnik DIBt

## Base material hollow masonry: Hollow brick HLz, T14-24,0

### Table 10.5.1: Brick data

| Description of brick 771-1-048 | | | HLz T14-24,0 |
|---|---|---|---|
| Type of brick | | | Hollow brick |
| Bulk density | ρ ≥ | [kg/dm³] | 0.7 |
| Standard, approval | | | EN 771-1, Z-17.1-651 |
| Producer of brick | | | Wienerberger GmbH<br>Oldenburger Allee 26<br>D-30659 Hannover |
| Format (measurement) | | [mm] | ≥ 10DF (≥ 308x240x249) |
| Minimum thickness of member | hmin = | [mm] | 240 |




### Table 10.5.2: Installation parameters

| Anchor size | | | W-UR 14 SymCon |
|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 14 |
| Cutting diameter of drill bit | $d_{cut}$ ≤ | [mm] | 14.45 |
| Depth of drill hole to deepest point | $h_1$ ≥ | [mm] | 110 |
| Drill method | | [-] | Rotary drilling |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | 100 |
| Diameter of clearance hole in the fixture | $d_f$ ≤ | [mm] | 14.5 |
| Minimum allowable edge distance | $c_{min}$ ≥ | [mm] | 100 |

### Table 10.5.3: Characteristic resistance $F_{Rk}$ [1)] in [kN] for single anchor

| Anchor size | | | W-UR 14 SymCon |
|---|---|---|---|
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | **100** |
| **Hollow brick HLz T14-24,0, $f_b$ ≥ 6 N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3)] / 50℃ [4)] | [kN] | 0.6 |
| | 50℃ [3)] / 80℃ [4)] | [kN] | 0.6 |
| Partial safety factor | $\gamma_{Mm}$ [2)] | [-] | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature

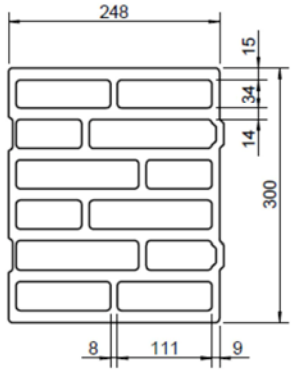
| Würth Plastic Anchor W-UR SymCon | |
|---|---|
| **Hollow brick HLz, T14-24,0**<br>Brick data, installation parameters, characteristic resistance | Annex 21 |

Deutsches Institut für Bautechnik DIBt

## Base material hollow masonry: Hollow brick POROTON-T8-30,0-P

### Table 10.6.1: Brick data

| Description of brick 771-1-022 | | | POROTON-T8-30,0-P |
|---|---|---|---|
| Type of brick | | | Hollow brick POROTON-T8-P |
| Bulk density | $\rho \geq$ | [kg/dm³] | 0.6 |
| Standard, approval | | | T8: EN 771-1; Z-17.1-982 |
| Producer of brick | | | Wienerberger GmbH<br>Oldenburger Allee 26, D-30659 Hannover<br>Schlagmann Baustoffwerke GmbH & Co. KG<br>Ziegeleistraße 1, D-84367 Zeilarn |
| Measurement | | [mm] | ≥ 10DF (≥ 248x300x249) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 300 |




### Table 10.6.2: Installation parameters

| Anchor size | | | W-UR 10 SymCon | W-UR 14 SymCon |
|---|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 10 | 14 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 | 14.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 80 | 110 |
| Drill method | | [-] | Rotary drilling | |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | 70 | 100 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 | 14.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 | 100 |

### Table 10.6.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor

| Anchor size | | | | W-UR 10 SymCon | W-UR 14 SymCon |
|---|---|---|---|---|---|
| Overall plastic anchor embedment depth | | $h_{nom}$ = | [mm] | **70** | **100** |
| **POROTON-T8-30,0-P, $f_b \geq 4$ N/mm²** | 30℃ [3] / 50℃ [4] | | [kN] | 0.6 | - |
| Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | | [kN] | 0.6 | - |
| **POROTON-T8-30,0-P, $f_b \geq 6$ N/mm²** | 30℃ [3] / 50℃ [4] | | [kN] | 0.9 | 1.5 |
| Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | | [kN] | 0.9 | 1.5 |
| **POROTON-T8-30,0-P, $f_b \geq 8$ N/mm²** | 30℃ [3] / 50℃ [4] | | [kN] | 0.9 | 2.0 |
| Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | | [kN] | 0.9 | 2.0 |
| Partial safety factor | | $\gamma_{Mm}$ [2] | [-] | 2.5 | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature

**Würth Plastic Anchor W-UR SymCon**

**Hollow brick: POROTON-T8-30,0-P**
Brick data, installation parameters, characteristic resistance

Annex 22

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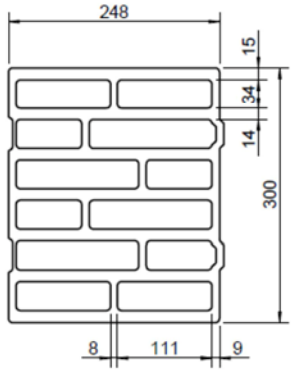
## Base material hollow masonry: Hollow brick POROTON-T9-30,0-P

### Table 10.7.1: Brick data

| Description of brick 771-1-045 | | | POROTON-T9-30,0-P |
|---|---|---|---|
| Type of brick | | | Hollow brick POROTON-T9-P |
| Bulk density | $\rho \geq$ | [kg/dm³] | 0.6 |
| Standard, approval | | | T9: EN 771-1; Z-17.1-674 |
| Producer of brick | | | Wienerberger GmbH<br>Oldenburger Allee 26, D-30659 Hannover<br>Schlagmann Baustoffwerke GmbH & Co. KG<br>Ziegeleistraße 1, D-84367 Zeilarn |
| Measurement | | [mm] | ≥ 10DF (≥ 248x300x249) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 300 |




### Table 10.7.2: Installation parameters

| Anchor size | | | W-UR 14 SymCon |
|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 14 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 14.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 110 |
| Drill method | | [-] | Rotary drilling |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | 100 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 14.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 |

### Table 10.7.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor

| Anchor size | | | W-UR 14 SymCon |
|---|---|---|---|
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | **100** |
| **POROTON-T9-30,0-P, $f_b \geq 6$ N/mm²** | 30℃ [3] / 50℃ [4] | [kN] | 1.5 |
| Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | [kN] | 1.5 |
| **POROTON-T9-30,0-P, $f_b \geq 8$ N/mm²** | 30℃ [3] / 50℃ [4] | [kN] | 2.0 |
| Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | [kN] | 2.0 |
| Partial safety factor | $\gamma_{Mm}$ [2] | [-] | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature

**Würth Plastic Anchor W-UR SymCon**

**Hollow brick: POROTON-T9-30,0-P**
Brick data, installation parameters, characteristic resistance

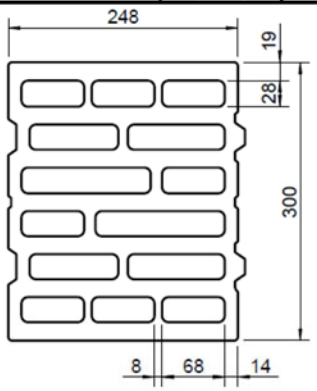
Annex 23

Deutsches Institut für Bautechnik DIBt

## Base material hollow masonry: Hollow brick POROTON S10

### Table 10.8.1: Brick data

| Description of brick 771-1-032 | | | POROTON S10 |
|---|---|---|---|
| Type of brick | | | Hollow brick POROTON S10 |
| Bulk density | $\rho \geq$ | [kg/dm³] | 0.75 |
| Standard, approval | | | S10: EN 771-1; Z-17.1-1017 |
| Producer of brick | | | Wienerberger GmbH<br>Oldenburger Allee 26<br>D-30659 Hannover<br><br>Schlagmann Baustoffwerke GmbH & Co. KG<br>Ziegeleistraße 1<br>D-84367 Zeilarn |
| Measurement | | [mm] | ≥ 10DF (≥ 248x300x249) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 300 |




### Table 10.8.2: Installation parameters

| Anchor size | | | W-UR 14 SymCon |
|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 14 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 14.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 110 |
| Drill method | | [-] | Rotary drilling |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | 100 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 14.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 |

### Table 10.8.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor

| Anchor size | | | W-UR 14 SymCon |
|---|---|---|---|
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | **100** |
| **POROTON S10-30, $f_b \geq 8$ N/mm²** | 30°C [3] / 50°C [4] | [kN] | 1.5 |
| Characteristic resistance $F_{Rk}$ | 50°C [3] / 80°C [4] | [kN] | 1.5 |
| Partial safety factor | $\gamma_{Mm}$ [2] | [-] | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing smin according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.
2) In absence of other national regulations
3) Maximum long term temperature
4) Maximum short term temperature

**Würth Plastic Anchor W-UR SymCon**

**Hollow brick: POROTON S10**
Brick data, installation parameters, characteristic resistance

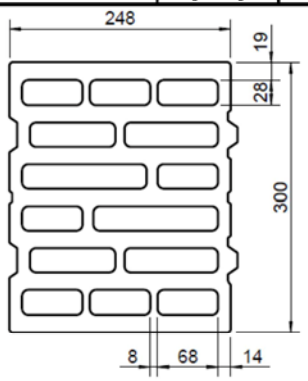
Annex 24

Deutsches Institut für Bautechnik DIBt

## Base material hollow masonry: Hollow brick POROTON S11

### Table 10.9.1: Brick data

| Description of brick 771-1-046 | | | POROTON S11-30,0-P |
|---|---|---|---|
| Type of brick | | | Hollow brick POROTON S11-30,0-P |
| Bulk density | $\rho \geq$ | [kg/dm³] | 0,9 |
| Standard, approval | | | EN 771-1; Z-17.1-812 |
| Producer of brick | | | Wienerberger GmbH<br>Oldenburger Allee 26<br>D-30659 Hannover<br>Schlagmann Baustoffwerke GmbH & Co. KG<br>Ziegeleistraße 1<br>D-84367 Zeilarn |
| Measurement | | [mm] | ≥ 10DF (≥ 248x300x249) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 300 |




### Table 10.9.2: Installation parameters

| Anchor size | | | W-UR 14 SymCon |
|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 14 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 14.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 110 |
| Drill method | | [-] | Rotary drilling |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | 100 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 14.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 |

### Table 10.9.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor

| Anchor size | | | W-UR 14 SymCon |
|---|---|---|---|
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | **100** |
| **POROTON S11-30-P, $f_b \geq 8$ N/mm²** | 30℃ [3] / 50℃ [4] | [kN] | 2.5 |
| Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | [kN] | 2.5 |
| Partial safety factor | $\gamma_{Mm}$ [2] | [-] | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading. The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.
2) In absence of other national regulations
3) Maximum long term temperature
4) Maximum short term temperature

**Würth Plastic Anchor W-UR SymCon**

**Hollow brick: POROTON S11-30,0-P**
Brick data, installation parameters, characteristic resistance

Annex 25

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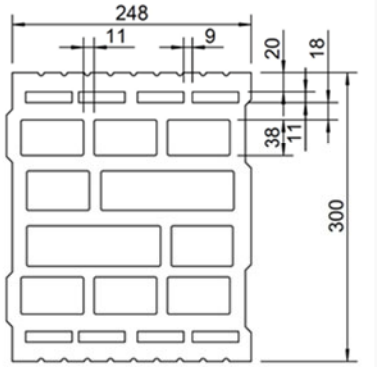
## Base material hollow masonry: Hollow brick ThermoPlan MZ10

### Table 10.10.1: Brick data

| Brick data 771-1-034 | | | ThermoPlan MZ10 |
|---|---|---|---|
| Type of brick | | | Hollow brick |
| Bulk density | $\rho \geq$ | [kg/dm³] | 0.75 |
| Standard, approval | | | EN 771-1, Z-17.1-1015 |
| Producer of brick | | | Mein Ziegelhaus GmbH & Co. KG<br>Märkerstraße 44<br>D-63755 Alzenau |
| Measurement | | [mm] | ≥ 10DF (≥ 248x300x249) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 300 |




### Table 10.10.2: Installation parameters

| Anchor size | | | W-UR 14 SymCon | |
|---|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 14 | |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 14.45 | |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 80 | 110 |
| Drill method | | [-] | Rotary drilling | |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | ≥ 70 | 100 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 14.5 | |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 | |

### Table 10.10.3: Characteristic resistance $F_{Rk}$ [1)] in [kN] for single anchor

| Anchor size | | | | W-UR 14 SymCon | |
|---|---|---|---|---|---|
| Overall plastic anchor embedment depth | | $h_{nom}$ | [mm] | **≥ 70** [5)] | **= 100** |
| **Hollow brick ThermoPlan MZ10, $f_b \geq 8$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3)] / 50℃ [4)] | | [kN] | 2.0 | 2.5 |
| | 50℃ [3)] / 80℃ [4)] | | [kN] | 2.0 | 2.5 |
| Partial safety factor | | $\gamma_{Mm}$ [2)] | [-] | 2.5 | |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature

5) The given values $F_{Rk}$ in this column are valid for the embedment depth range 70 mm ≤ $h_{nom}$ < 100 mm (see Annex 8, Table 3.2).
For Plastic anchors W-UR 14 SymCon set variable in this range no additional job site tests have necessarily to be performed.

**Würth Plastic Anchor W-UR SymCon**

**Hollow brick: ThermoPlan MZ10**
Brick data, installation parameters, characteristic resistance

Annex 26

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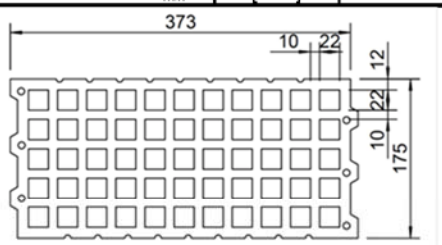
## Base material hollow masonry: Hollow brick ThermoPlan TS²

### Table 10.11.1: Brick data

| Brick data | 771-1-024 | | ThermoPlan TS² |
|---|---|---|---|
| Type of brick | | | Hollow brick |
| Bulk density | ρ ≥ | [kg/dm³] | 0.9 |
| Standard, approval | | | EN 771-1, Z-17.1-993 |
| Producer of brick | | | Mein Ziegelhaus GmbH & Co. KG<br>Märkerstraße 44<br>D-63755 Alzenau |
| Measurement | | [mm] | ≥ 9DF (≥ 373x175x249) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 175 |




### Table 10.11.2: Installation parameters

| Anchor size | | | W-UR 14 SymCon | |
|---|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 14 | |
| Cutting diameter of drill bit | $d_{cut}$ ≤ | [mm] | 14.45 | |
| Depth of drill hole to deepest point | $h_1$ ≥ | [mm] | 80 | 110 |
| Drill method | | [-] | Rotary drilling | |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | 70 | 100 |
| Diameter of clearance hole in the fixture | $d_f$ ≤ | [mm] | 14.5 | |
| Minimum allowable edge distance | $c_{min}$ ≥ | [mm] | 100 | |

### Table 10.11.3: Characteristic resistance $F_{Rk}$ [1)] in [kN] for single anchor

| Anchor size | | | | W-UR 14 SymCon |
|---|---|---|---|---|
| Overall plastic anchor embedment depth | | $h_{nom}$ = | [mm] | **70 mm ≤ hnom ≤ 100 mm** [5)] |
| **Hollow brick ThermoPlan TS², $f_b$ ≥ 6 N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3)] / 50℃ [4)] | | [kN] | 0.4 |
| | 50℃ [3)] / 80℃ [4)] | | [kN] | 0.4 |
| **Hollow brick ThermoPlan TS², $f_b$ ≥ 8 N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3)] / 50℃ [4)] | | [kN] | 0.6 |
| | 50℃ [3)] / 80℃ [4)] | | [kN] | 0.6 |
| **Hollow brick ThermoPlan TS², $f_b$ ≥ 10 N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3)] / 50℃ [4)] | | [kN] | 0.75 |
| | 50℃ [3)] / 80℃ [4)] | | [kN] | 0.75 |
| **Hollow brick ThermoPlan TS², $f_b$ ≥ 12 N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3)] / 50℃ [4)] | | [kN] | 0.9 |
| | 50℃ [3)] / 80℃ [4)] | | [kN] | 0.9 |
| **Hollow brick ThermoPlan TS², $f_b$ ≥ 20 N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3)] / 50℃ [4)] | | [kN] | 1.5 |
| | 50℃ [3)] / 80℃ [4)] | | [kN] | 1.5 |
| Partial safety factor | | $\gamma_{Mm}$ [2)] | [-] | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature

5) The influence of $h_{nom}$ > 100 mm has to be detected by job site tests according 4.4.

**Würth Plastic Anchor W-UR SymCon**

**Hollow brick: ThermoPlan TS²**
Brick data, installation parameters, characteristic resistance

Annex 27

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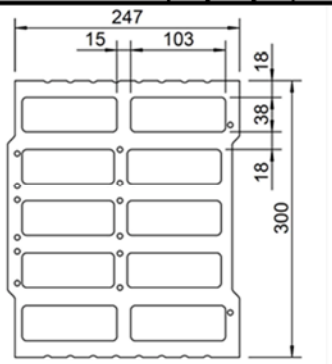
## Base material hollow masonry: Hollow brick THERMOPOR TV 9-Plan

### Table 10.12.1: Brick data

| Brick data 771-1-029 | | | THERMOPOR TV 9-Plan |
|---|---|---|---|
| Type of brick | | | Hollow brick |
| Bulk density | $\rho \geq$ | [kg/dm³] | 0.75 |
| Standard, approval | | | EN 771-1, Z-17.1-1006 |
| Producer of brick | | | Thermopor Ziegel-Kontor Ulm GmbH<br>Olgastraße 94<br>D-89073 Ulm |
| Measurement | | [mm] | ≥247x300x249 |
| Minimum thickness of member | $h_{min}$ = | [mm] | 300 |




### Table 10.12.2: Installation parameters

| Anchor size | | | W-UR 14 SymCon |
|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 14 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 14.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 110 |
| Drill method | | [-] | Rotary drilling |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | 100 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 14.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 |

### Table 10.12.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor

| Anchor size | | | | W-UR 14 SymCon |
|---|---|---|---|---|
| Overall plastic anchor embedment depth | | $h_{nom}$ = | [mm] | **100** |
| **Hollow brick THERMOPOR TV 9-Plan, $f_b \geq 4$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | | [kN] | 0.9 |
| | 50℃ [3] / 80℃ [4] | | [kN] | 0.9 |
| **Hollow brick THERMOPOR TV 9-Plan, $f_b \geq 6$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | | [kN] | 1.5 |
| | 50℃ [3] / 80℃ [4] | | [kN] | 1.5 |
| **Hollow brick THERMOPOR TV 9-Plan, $f_b \geq 8$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | | [kN] | 2.0 |
| | 50℃ [3] / 80℃ [4] | | [kN] | 2.0 |
| Partial safety factor | | $\gamma_{Mm}$ [2] | [-] | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading. The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.
2) In absence of other national regulations
3) Maximum long term temperature
4) Maximum short term temperature

**Würth Plastic Anchor W-UR SymCon**

**Hollow brick: THERMOPOR TV 9-Plan**
Brick data, installation parameters, characteristic resistance

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## Base material solid masonry, sand-lime solid brick KS, NF

### Table 10.13.1: Brick data

| **Description of brick** 771-2-011 | | | **KS** |
|---|---|---|---|
| Type of brick | | | Sand-lime solid brick |
| Bulk density | $\rho \geq$ | [kg/dm³] | 2.0 |
| Standard, approval | | | DIN V 106; EN 771-2 |
| Producer of brick | | | e.g. Xella International GmbH<br>Dr.-Hammacher-Str. 49<br>D-47119 Duisburg |
| Format (measurement) | | [mm] | ≥ NF (≥240x115x71) |
| Minimum thickness of member | $h_{min} =$ | [mm] | 115 |

### Table 10.13.2: Installation parameters

| **Anchor size** | | | **W-UR 10 SymCon** | |
|---|---|---|---|---|
| Drill hole diameter | $d_0 =$ | [mm] | 10 | |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 | |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 60 | 80 |
| Drill method | | [-] | Hammer drilling | |
| Overall plastic anchor embedment depth | $h_{nom} \geq$ | [mm] | 50 | 70 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 | |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 250 | 100 |

### Table 10.13.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor

| **Anchor size** | | | | **W-UR 10 SymCon** | |
|---|---|---|---|---|---|
| Overall plastic anchor embedment depth | | $h_{nom}$ | [mm] | **≥ 50** | **≥ 70** |
| **Sand-lime solid brick KS,** **$f_b \geq 10$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | | [kN] | 0.6 | 1.2 |
| | 50℃ [3] / 80℃ [4] | | [kN] | 0.6 | 1.2 |
| **Sand-lime solid brick KS,** **$f_b \geq 20$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | | [kN] | 1.2 | 2.0 |
| | 50℃ [3] / 80℃ [4] | | [kN] | 1.2 | 2.0 |
| Partial safety factor | | $\gamma_{Mm}$ [2] | [-] | 2.5 | |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading. The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature



**Würth Plastic Anchor W-UR SymCon**

**Sand-lime solid brick KS, NF**
Brick data, installation parameters, characteristic resistance

Annex 29

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## Base material solid masonry, sand-lime solid brick Silka XL Basic, Silka XL Plus

### Table 10.14.1: Brick data

| **Description of brick** 771-2-010 | | | **Silka XL Basic, Silka XL Plus** |
|---|---|---|---|
| Type of brick | | | Sand-lime solid brick |
| Bulk density | $\rho \geq$ | [kg/dm³] | 2.0 |
| Standard, approval | | | DIN V 106; EN 771-2, Z-17.1-997 |
| Producer of brick | | | Xella International GmbH<br>Dr.-Hammacher-Str. 49<br>D-47119 Duisburg |
| Format (measurement) | | [mm] | ≥ 248x175x498 |
| Minimum thickness of member | $h_{min} =$ | [mm] | 175 |

### Table 10.14.2: Installation parameters

| **Anchor size** | | | **W-UR 14 SymCon** | | |
|---|---|---|---|---|---|
| Drill hole diameter | $d_0 =$ | [mm] | 14 | | |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 14.45 | | |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 80 | 110 | |
| Drill method | | [-] | Hammer drilling | | |
| Overall plastic anchor embedment depth | $h_{nom} \geq$ | [mm] | 70 | 100 | |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 14.5 | | |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 | 100 | 60 |

### Table 10.14.3: Characteristic resistance $F_{Rk}$ [1)] in [kN] for single anchor

| **Anchor size** | | | **W-UR 14 SymCon** | | |
|---|---|---|---|---|---|
| Overall plastic anchor embedment depth | $h_{nom}$ | [mm] | **≥ 70** | **≥ 100** | |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 | 100 | 60 |
| **Sand-lime solid brick Silka XL Basic, Silka XL Plus, $f_b \geq 10$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3)] / 50℃ [4)] | [kN] | 3.0 | 3.0 | 2.5 |
| | 50℃ [3)] / 80℃ [4)] | [kN] | 3.0 | 3.0 | 2.5 |
| **Sand-lime solid brick Silka XL Basic, Silka XL Plus, $f_b \geq 20$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3)] / 50℃ [4)] | [kN] | 4.5 | 4.5 | 3.5 |
| | 50℃ [3)] / 80℃ [4)] | [kN] | 4.5 | 4.5 | 3.5 |
| **Sand-lime solid brick Silka XL Basic, Silka XL Plus, $f_b \geq 28$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3)] / 50℃ [4)] | [kN] | 6.0 | 6.5 | 5.0 |
| | 50℃ [3)] / 80℃ [4)] | [kN] | 6.0 | 6.5 | 5.0 |
| Partial safety factor | $\gamma_{Mm}$ [2)] | [-] | 2.5 | | |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature



**Würth Plastic Anchor W-UR SymCon**

**Sand-lime solid brick Silka XL Basic, Silka XL Plus**
Brick data, installation parameters, characteristic resistance

Annex 30

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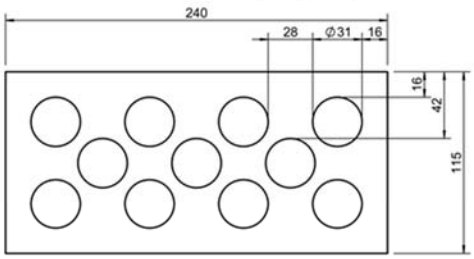
## Base material hollow masonry, sand-lime perforated brick KS L, 2DF

### Table 10.15.1: Brick data

| Description of brick 771-2-004 | | | KS L |
|---|---|---|---|
| Type of brick | | | Sand-lime perforated brick |
| Bulk density | $\rho \geq$ | [kg/dm³] | 1.4 |
| Standard, approval | | | DIN 106; EN 771-2 |
| Producer of brick | | | e.g. Xella International GmbH |
| Format (measurement) | | [mm] | ≥ 2DF (≥ 240x115x113) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 115 |




### Table 10.15.2: Installation parameters

| Anchor size | | | W-UR 10 SymCon |
|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 10 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 80 |
| Drill method | | [-] | Rotary drilling |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | 70 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 |

### Table 10.15.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor

| Anchor size | | | | W-UR 10 SymCon |
|---|---|---|---|---|
| Overall plastic anchor embedment depth | | $h_{nom} \geq$ | [mm] | **70** |
| **Sand-lime perforated brick KS L, $f_b \geq 6$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | | [kN] | 1.2 |
| | 50℃ [3] / 80℃ [4] | | [kN] | 0.9 |
| **Sand-lime perforated brick KS L, $f_b \geq 8$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | | [kN] | 1.5 |
| | 50℃ [3] / 80℃ [4] | | [kN] | 1.2 |
| **Sand-lime perforated brick KS L, $f_b \geq 10$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | | [kN] | 2.0 |
| | 50℃ [3] / 80℃ [4] | | [kN] | 1.5 |
| **Sand-lime perforated brick KS L, $f_b \geq 12$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | | [kN] | 2.5 |
| | 50℃ [3] / 80℃ [4] | | [kN] | 2.0 |
| Partial safety factor | | $\gamma_{Mm}$ [2] | [-] | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature

**Würth Plastic Anchor W-UR SymCon**

**Sand-lime perforated brick KS L, 2DF**
Brick data, installation parameters, characteristic resistance

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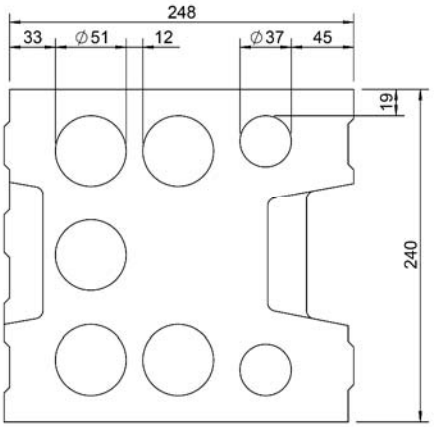
## Base material hollow masonry, sand-lime perforated brick KS L, 8DF

### Table 10.16.1: Brick data

| Description of brick 771-2-013 | | | KS L |
|---|---|---|---|
| Type of brick | | | Sand-lime perforated brick |
| Bulk density | $\rho \geq$ | [kg/dm³] | 1.4 |
| Standard, approval | | | DIN 106; EN 771-2 |
| Producer of brick | | | e.g. Xella International GmbH |
| Format (measurement) | | [mm] | ≥ 8DF (≥ 248x240x238) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 240 |




### Table 10.16.2: Installation parameters

| Anchor size | | | W-UR 10 SymCon | W-UR 14 SymCon |
|---|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 10 | 14 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 | 14.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 80 | 110 |
| Drill method | | [-] | Rotary drilling | |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | 70 | 100 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 | 14.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 | 100 |

### Table 10.16.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor

| Anchor size | | | W-UR 10 SymCon | W-UR 14 SymCon |
|---|---|---|---|---|
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | **70** | **100** |
| **Sand-lime perforated brick KS L,** | 30℃ [3] / 50℃ [4] | [kN] | 0.9 | 1.2 |
| **$f_b \geq 6$ N/mm²,** Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | [kN] | 0.75 | 1.2 |
| **Sand-lime perforated brick KS L,** | 30℃ [3] / 50℃ [4] | [kN] | 1.2 | 1.5 |
| **$f_b \geq 8$ N/mm²**, Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | [kN] | 0.9 | 1.5 |
| **Sand-lime perforated brick KS L,** | 30℃ [3] / 50℃ [4] | [kN] | 1.5 | 2.0 |
| **$f_b \geq 10$ N/mm²**, Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | [kN] | 1.2 | 2.0 |
| **Sand-lime perforated brick KS L,** | 30℃ [3] / 50℃ [4] | [kN] | 2.0 | 2.5 |
| **$f_b \geq 12$ N/mm²**, Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | [kN] | 1.5 | 2.5 |
| Partial safety factor | $\gamma_{Mm}$ [2] | [-] | 2.5 | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature

**Würth Plastic Anchor W-UR SymCon**

**Sand-lime perforated brick KS L, 8DF**
Brick data, installation parameters, characteristic resistance

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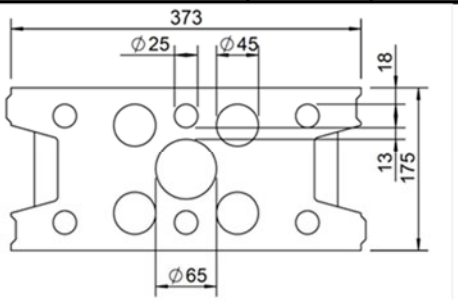
## Base material hollow masonry, sand-lime perforated brick KS L, 9DF

### Table 10.17.1: Brick data

| Description of brick 771-2-008 | | | KS L |
|---|---|---|---|
| Type of brick | | | Sand-lime perforated brick |
| Bulk density | $\rho \geq$ | [kg/dm³] | 1.4 |
| Standard, approval | | | DIN 106; EN 771-2 |
| Producer of brick | | | Xella International GmbH<br>Dr.-Hammacher-Str.49<br>D-47119 Duisburg |
| Format (measurement) | | [mm] | ≥ 9DF (≥ 373x175x238) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 175 |




### Table 10.17.2: Installation parameters

| Anchor size | | | W-UR 14 SymCon | |
|---|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 14 | |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 14.45 | |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 80 | 110 |
| Drill method | | [-] | Rotary drilling | |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | ≥ 70 | 100 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 14.5 | |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 | |

### Table 10.17.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor

| Anchor size | | | | W-UR 14 SymCon | |
|---|---|---|---|---|---|
| Overall plastic anchor embedment depth | | $h_{nom}$ | [mm] | ≥ 70 [5] | = 100 |
| **Sand-lime perforated brick KS L,** | 30℃ [3] / 50℃ [4] | | [kN] | 0.5 | 0.9 |
| **$f_b \geq 6$ N/mm²**, Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | | [kN] | 0.5 | 0.9 |
| **Sand-lime perforated brick KS L,** | 30℃ [3] / 50℃ [4] | | [kN] | 0.6 | 1.2 |
| **$f_b \geq 8$ N/mm²**, Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | | [kN] | 0.6 | 1.2 |
| **Sand-lime perforated brick KS L,** | 30℃ [3] / 50℃ [4] | | [kN] | 0.75 | 1.5 |
| **$f_b \geq 10$ N/mm²**, Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | | [kN] | 0.75 | 1.5 |
| **Sand-lime perforated brick KS L,** | 30℃ [3] / 50℃ [4] | | [kN] | 0.9 | 2.0 |
| **$f_b \geq 12$ N/mm²**, Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | | [kN] | 0.9 | 2.0 |
| **Sand-lime perforated brick KS L,** | 30℃ [3] / 50℃ [4] | | [kN] | 1.5 | 3.0 |
| **$f_b \geq 20$ N/mm²**, Characteristic resistance $F_{Rk}$ | 50℃ [3] / 80℃ [4] | | [kN] | 1.5 | 3.0 |
| Partial safety factor | | $\gamma_{Mm}$ [2] | [-] | 2.5 | |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature

5) The given values $F_{Rk}$ in this column are valid for the embedment depth range 70 mm ≤ $h_{nom}$ < 100 mm (see Annex 8, Table 3.2). For Plastic anchors W-UR 14 SymCon set variable in this range no additional job site tests have necessarily to be performed.

**Würth Plastic Anchor W-UR SymCon**

**Sand-lime perforated brick KS L, 9DF**
Brick data, installation parameters, characteristic resistance

Annex 33

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## Base material solid masonry, Concrete solid block Vn and Vbn, NF

### Table 10.18.1: Brick data

| **Description of brick** 771-3-004 (o) | | | **Vn and Vbn** |
|---|---|---|---|
| Type of brick | | | Concrete solid block |
| Bulk density | $\rho \geq$ | [kg/dm³] | 2.0 |
| Standard, approval | | | DIN 18153-100; EN 771-3 |
| Producer of brick | | | - |
| Format (measurement) | | [mm] | ≥ NF (≥ 240x115x71) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 115 |

### Table 10.18.2: Installation parameters

| **Anchor size** | | | **W-UR 10 SymCon** | | **W-UR 14 SymCon** |
|---|---|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 10 | | 14 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 | | 14.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 60 | 80 | 80 |
| Drill method | | [-] | Hammer drilling | | |
| Overall plastic anchor embedment depth | $h_{nom} \geq$ | [mm] | 50 | 70 | 70 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 | | 14.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 250 | 100 | 240 |

### Table 10.18.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor

| **Anchor size** | | | **W-UR 10 SymCon** | | **W-UR 14 SymCon** |
|---|---|---|---|---|---|
| Overall plastic anchor embedment depth | $h_{nom} \geq$ | [mm] | **50** | **70** | **70** |
| **Concrete solid block Vn and Vbn, $f_b \geq 10$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 2.0 | 1.5 | 2.0 |
| | 50℃ [3] / 80℃ [4] | [kN] | 2.0 | 1.5 | 2.0 |
| **Concrete solid block Vn and Vbn, $f_b \geq 20$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 2.5 | 2.5 | 3.0 |
| | 50℃ [3] / 80℃ [4] | [kN] | 2.5 | 2.5 | 3.0 |
| **Concrete solid block Vn and Vbn, $f_b \geq 28$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 4.0 | 4.0 | 4.5 |
| | 50℃ [3] / 80℃ [4] | [kN] | 4.0 | 4.0 | 4.0 |
| Partial safety factor | $\gamma_{Mm}$ [2] | [-] | 2.5 | | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature



**Würth Plastic Anchor W-UR SymCon**

**Concrete solid block Vn and Vbn, NF**
Brick data, installation parameters, characteristic resistance

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## Base material solid masonry, Lightweight concrete solid block V and Vbl, 3DF

### Table 10.19.1: Brick data

| Description of brick 771-3-017 | | | V and Vbl |
|---|---|---|---|
| Type of brick | | | Lightweight concrete solid block |
| Bulk density | $\rho \geq$ | [kg/dm³] | 2.0 |
| Standard, approval | | | EN 771-3, DIN V 18152-100 |
| Producer of brick | | | e.g. Bisophon<br>Bisotherm GmbH<br>Eisenbahnstraße 12<br>D-56218 Mühlheim-Kärlich |
| Format (measurement) | | [mm] | ≥ 3DF (≥ 240x175x113) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 175 |

### Table 10.19.2: Installation parameters

| Anchor size | | | W-UR 10 SymCon | W-UR 14 SymCon |
|---|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 10 | 14 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 | 14.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 80 | 110 |
| Drill method | | [-] | Hammer drilling | |
| Overall plastic anchor embedment depth | $h_{nom} \geq$ | [mm] | 70 | 100 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 | 14.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 | 100 |

### Table 10.19.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor

| Anchor size | | | | W-UR 10 SymCon | W-UR 14 SymCon |
|---|---|---|---|---|---|
| Overall plastic anchor embedment depth | | $h_{nom} \geq$ | [mm] | **70** | **100** |
| **Lightweight concrete solid block V and Vbl, $f_b \geq 10$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | | [kN] | 3.0 | 4.0 |
| | 50℃ [3] / 80℃ [4] | | [kN] | 3.0 | 4.0 |
| **Lightweight concrete solid block V and Vbl, $f_b \geq 20$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | | [kN] | 4.5 | 5.5 |
| | 50℃ [3] / 80℃ [4] | | [kN] | 4.5 | 5.5 |
| Partial safety factor | | $\gamma_{Mm}$ [2] | [-] | 2.5 | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading. The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature



**Würth Plastic Anchor W-UR SymCon**

**Lightweight concrete solid block V and Vbl, 3DF**
Brick data, installation parameters, characteristic resistance

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## Base material solid masonry, Lightweight concrete solid brick V and Vbl, NF

### Table 10.20.1: Brick data

| **Description of brick** 771-3-007 | | | **V and Vbl** |
|---|---|---|---|
| Type of brick | | | Lightweight concrete solid brick |
| Bulk density | $\rho \geq$ | [kg/dm³] | 1.0 |
| Standard, approval | | | EN 771-3, DIN V 18152-100 |
| Producer of brick | | | e.g. BisoBims,<br>Bisotherm GmbH<br>Eisenbahnstraße 12<br>D-56218 Mühlheim-Kärlich |
| Format (measurement) | | [mm] | ≥ NF (≥ 240x115x71) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 115 |

### Table 10.20.2: Installation parameters

| **Anchor size** | | | **W-UR 10 SymCon** | **W-UR 14 SymCon** |
|---|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 10 | 14 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 | 14.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 60 | 110 |
| Drill method | | [-] | Hammer drilling | |
| Overall plastic anchor embedment depth | $h_{nom} \geq$ | [mm] | 50 | 100 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 | 14.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 250 | 240 |

### Table 10.20.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor

| **Anchor size** | | | | **W-UR 10 SymCon** | **W-UR 14 SymCon** |
|---|---|---|---|---|---|
| Overall plastic anchor embedment depth | | $h_{nom} \geq$ | [mm] | **50** | **100** |
| **Lightweight concrete solid brick V 2 and Vbl 2, $f_b \geq 2$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | | [kN] | 0.75 | 1.2 |
| | 50℃ [3] / 80℃ [4] | | [kN] | 0.75 | 1.2 |
| **Lightweight concrete solid brick V 4 and Vbl 4, $f_b \geq 4$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | | [kN] | 1.5 | 2.5 |
| | 50℃ [3] / 80℃ [4] | | [kN] | 1.5 | 2.0 |
| Partial safety factor | | $\gamma_{Mm}$ [2] | [-] | 2.5 | |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature



**Würth Plastic Anchor W-UR SymCon**

**Lightweight concrete solid brick V and Vbl, NF**
Brick data, installation parameters, characteristic resistance

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Deutsches Institut für Bautechnik DIBt

## Base material solid masonry, Lightweight concrete solid brick V and Vbl, 3DF

### Table 10.21.1: Brick data

| **Description of brick** 771-3-016 | | | **V and Vbl** |
|---|---|---|---|
| Type of brick | | | Lightweight concrete solid brick |
| Bulk density | $\rho \geq$ | [kg/dm³] | 1.0 |
| Standard, approval | | | EN 771-3, DIN V 18152-100 |
| Producer of brick | | | e.g. BisoBims,<br>Bisotherm GmbH<br>Eisenbahnstraße 12<br>D-56218 Mühlheim-Kärlich |
| Format (measurement) | | [mm] | ≥ 3DF (≥ 240x175x71) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 175 |

### Table 10.21.2: Installation parameters

| **Anchor size** | | | **W-UR 10 SymCon** |
|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 10 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 80 |
| Drill method | | [-] | Hammer drilling |
| Overall plastic anchor embedment depth | $h_{nom} \geq$ | [mm] | 70 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 |

### Table 10.21.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor

| **Anchor size** | | | **W-UR 10 SymCon** |
|---|---|---|---|
| Overall plastic anchor embedment depth | $h_{nom} \geq$ | [mm] | **70** |
| **Lightweight concrete solid brick V 2 and Vbl 2, $f_b \geq 2$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 0.5 |
| | 50℃ [3] / 80℃ [4] | [kN] | 0.4 |
| **Lightweight concrete solid brick V 4 and Vbl 4, $f_b \geq 4$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 0.9 |
| | 50℃ [3] / 80℃ [4] | [kN] | 0.75 |
| Partial safety factor | $\gamma_{Mm}$ [2] | [-] | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading.
The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.

2) In absence of other national regulations

3) Maximum long term temperature

4) Maximum short term temperature



**Würth Plastic Anchor W-UR SymCon**

**Lightweight concrete solid brick V and Vbl, 3DF**
Brick data, installation parameters, characteristic resistance

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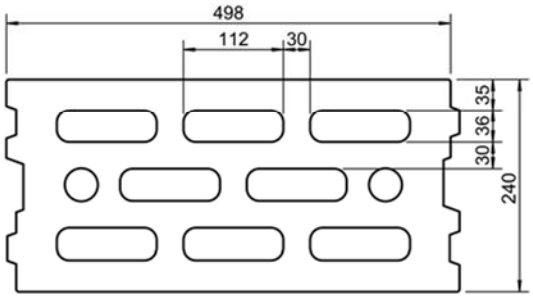
## Base material hollow brick lightweight concrete 3K Hbl

### Table 10.22.1: Brick data

| **Description of brick** 771-3-005 | | | **3K Hbl** |
|---|---|---|---|
| Type of brick | | | Hollow brick lightweight concrete 3K Hbl |
| Bulk density | $\rho \geq$ | [kg/dm³] | 0.7 |
| Standard, approval | | | DIN 18151; EN 771-3 |
| Producer of brick | | | e.g. Heinzmann Baustoffe GmbH, Liapor GmbH & Co. KG |
| Format (measurement) | | [mm] | ≥ 16DF (≥ 498x240x238) |
| Minimum thickness of member | $h_{min}$ = | [mm] | 240 |




### Table 10.22.2: Installation parameters

| **Anchor size** | | | **W-UR 10 SymCon** | **W-UR 14 SymCon** |
|---|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 10 | 14 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 | 14.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 80 | 110 |
| Drill method | | [-] | Rotary drilling | |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | 70 | 100 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 | 14.5 |
| Minimum allowable edge distance | $c_{min} \geq$ | [mm] | 100 | 100 |

### Table 10.22.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor

| **Anchor size** | | | **W-UR 10 SymCon** | **W-UR 14 SymCon** |
|---|---|---|---|---|
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | **70** | **100** |
| **Hollow brick lightweight concrete 3K Hbl, $f_b \geq 2$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 0.6 | 0.6 |
| | 50℃ [3] / 80℃ [4] | [kN] | 0.6 | 0.5 |
| **Hollow brick lightweight concrete 3K Hbl, $f_b \geq 4$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 1.2 | 1.2 |
| | 50℃ [3] / 80℃ [4] | [kN] | 1.2 | 0.9 |
| **Hollow brick lightweight concrete 3K Hbl, $f_b \geq 6$ N/mm²** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 1.2 | 1.5 |
| | 50℃ [3] / 80℃ [4] | [kN] | 1.2 | 1.5 |
| Partial safety factor | $\gamma_{Mm}$ [2] | [-] | 2.5 | 2.5 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading. The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.
2) In absence of other national regulations
3) Maximum long term temperature
4) Maximum short term temperature

**Würth Plastic Anchor W-UR SymCon**

**Hollow brick lightweight concrete 3K Hbl**
Brick data, installation parameters, characteristic resistance

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**Base material solid masonry: Autoclaved Aerated AAC**

**Table 10.23.1: Brick data**

| **Description of brick** 771-3-005 | | | **AAC** |
|---|---|---|---|
| Type of brick | | | Autoclaved Aerated Concrete |
| Bulk density | $\rho \geq$ | [kg/dm³] | 0.3 |
| Standard, approval | | | DIN 4165; EN 771-4 |
| Format (measurement) | | [mm] | ≥ 499x100x249 |
| Minimum thickness of member | $h_{min}$ = | [mm] | 100 |

**Table 10.23.2: Installation parameters**

| **Anchor size** | | | **W-UR 10 SymCon** |
|---|---|---|---|
| Drill hole diameter | $d_0$ = | [mm] | 10 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 80 |
| Drill method | | [-] | Hammer drilling |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | 70 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 |

**Table 10.23.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor**

| **Anchor size** | | | **W-UR 10 SymCon** |
|---|---|---|---|
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | **70** |
| **Autoclaved Aerated Concrete AAC** $f_b \geq 2$ N/mm² Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 0.6 |
| | 50℃ [3] / 80℃ [4] | [kN] | 0.5 |
| **Autoclaved Aerated Concrete AAC** $f_b \geq 3$ N/mm² Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 0.89 |
| | 50℃ [3] / 80℃ [4] | [kN] | 0.73 |
| **Autoclaved Aerated Concrete AAC** $f_b \geq 4$ N/mm² Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 1.17 |
| | 50℃ [3] / 80℃ [4] | [kN] | 0.95 |
| **Autoclaved Aerated Concrete AAC** $f_b \geq 5$ N/mm² Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 1.46 |
| | 50℃ [3] / 80℃ [4] | [kN] | 1.18 |
| **Autoclaved Aerated Concrete AAC** $f_b \geq 6$ N/mm² Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 1.74 |
| | 50℃ [3] / 80℃ [4] | [kN] | 1.4 |
| **Autoclaved Aerated Concrete AAC** $f_b \geq 7$ N/mm² Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 1.74 |
| | 50℃ [3] / 80℃ [4] | [kN] | 1.4 |
| Partial safety factor | $\gamma_{Mm}$ [2] | [-] | 2.0 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading. The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.
2) In absence of other national regulations
3) Maximum long term temperature
4) Maximum short term temperature



**Würth Plastic Anchor W-UR SymCon**

**Solid masonry: Autoclaved Aerated Concrete**
Brick data, installation parameters, characteristic resistance

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## Base material precast prestressed hollow core elements

**Table 10.24.1: Data**

| Description | | Precast prestressed hollow core elements |
|---|---|---|
| Base material | | Precast prestressed hollow core elements ≥ C30/37 |
| Standard, approval | | DIN EN 1168: 2008-10 |

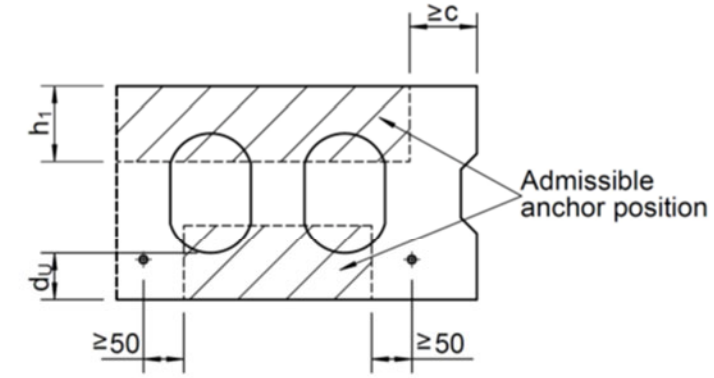


**Table 10.24.2: Installation parameters**

| Anchor size | | | W-UR 10 SymCon | | | |
|---|---|---|---|---|---|---|
| Member thickness | $d_u \geq$ | [mm] | 25 | 30 | 35 | 40 |
| Drill hole diameter | $d_0$ | [mm] | 10 | | | |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 | | | |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 80 | | | |
| Drill method | | [-] | Hammer drilling | | | |
| Overall plastic anchor embedment depth | $h_{nom}$ = | [mm] | ≥ 50 / ≤ 70 | | | |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 | | | |

**Table 10.24.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor**

| Anchor size | | | W-UR 10 SymCon | | | |
|---|---|---|---|---|---|---|
| Member thickness | $d_u \geq$ | [mm] | 25 | 30 | 35 | 40 |
| **Precast prestressed hollow core elements ≥ C30/37** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 1.0 | 2.0 | 3.0 | 4.0 |
| | 50℃ [3] / 80℃ [4] | [kN] | 1.0 | 2.0 | 3.0 | 4.0 |
| Partial safety factor | $\gamma_{Mm}$ [2] | [-] | 1.8 | | | |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading. The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 8 (concrete). The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.
2) In absence of other national regulations
3) Maximum long term temperature
4) Maximum short term temperature



**Würth Plastic Anchor W-UR SymCon**

**Precast prestressed hollow core elements ≥ C30/37**
Brick data, installation parameters, characteristic resistance

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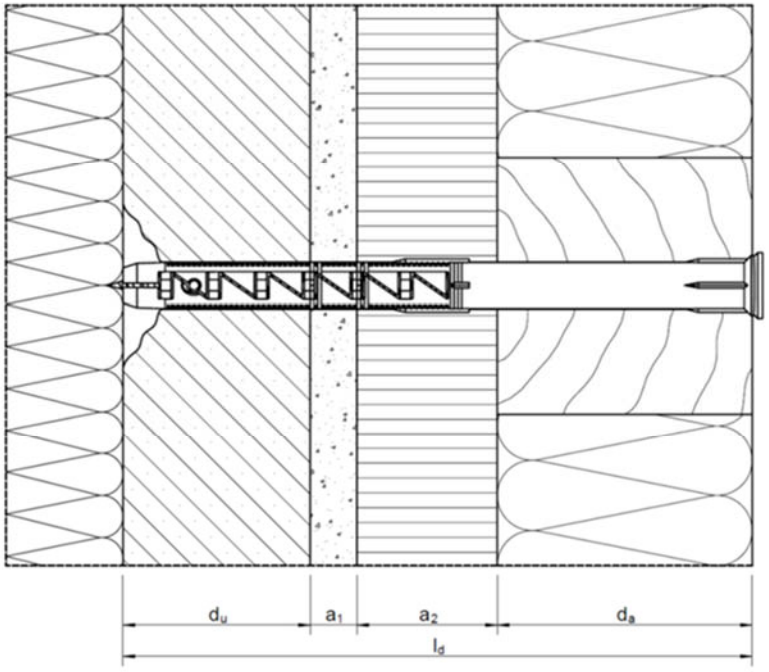
**Base material thin concrete elements, weather resistant skins of external wall panels made of concrete**

**Table 10.25.1: Data**

| **Description** | | **Thin concrete elements, weather resistant skins of external wall panels made of concrete** |
|---|---|---|
| Base material | | Thin concrete elements, Weather resistant skins of external wall panels made of concrete ≥ C16/20 |




$d_u$: Thickness of weather resistant skin of external wall panel or thin concrete elements
$a_1$: Thickness of non-load-bearing layer
$a_2$: Tolerance adjustment of facade surface
$d_a$: Thickness of fixture
$l_d$: Length of plastic sleeve

$l_d \geq d_a + 40\ mm + max\ a_1 + max\ a_2$

$l_d \leq d_a + 70mm + min\ a_1 + min\ a_2$

**Table 10.25.2: Installation parameters**

| **Anchor size** | | | **W-UR 10 SymCon** |
|---|---|---|---|
| Member thickness | $d_u \geq$ | [mm] | **40** |
| Drill hole diameter | $d_0$ | [mm] | 10 |
| Cutting diameter of drill bit | $d_{cut} \leq$ | [mm] | 10.45 |
| Depth of drill hole to deepest point | $h_1 \geq$ | [mm] | 80 |
| Drill method | | [-] | Hammer drilling |
| Overall plastic anchor embedment depth | $h_{nom} =$ | [mm] | 70 |
| Diameter of clearance hole in the fixture | $d_f \leq$ | [mm] | 10.5 |

**Würth Plastic Anchor W-UR SymCon**

**Thin concrete elements, weather resistant skins of external wall panels made of concrete ≥ C16/20,** Brick data, installation parameters, characteristic resistance

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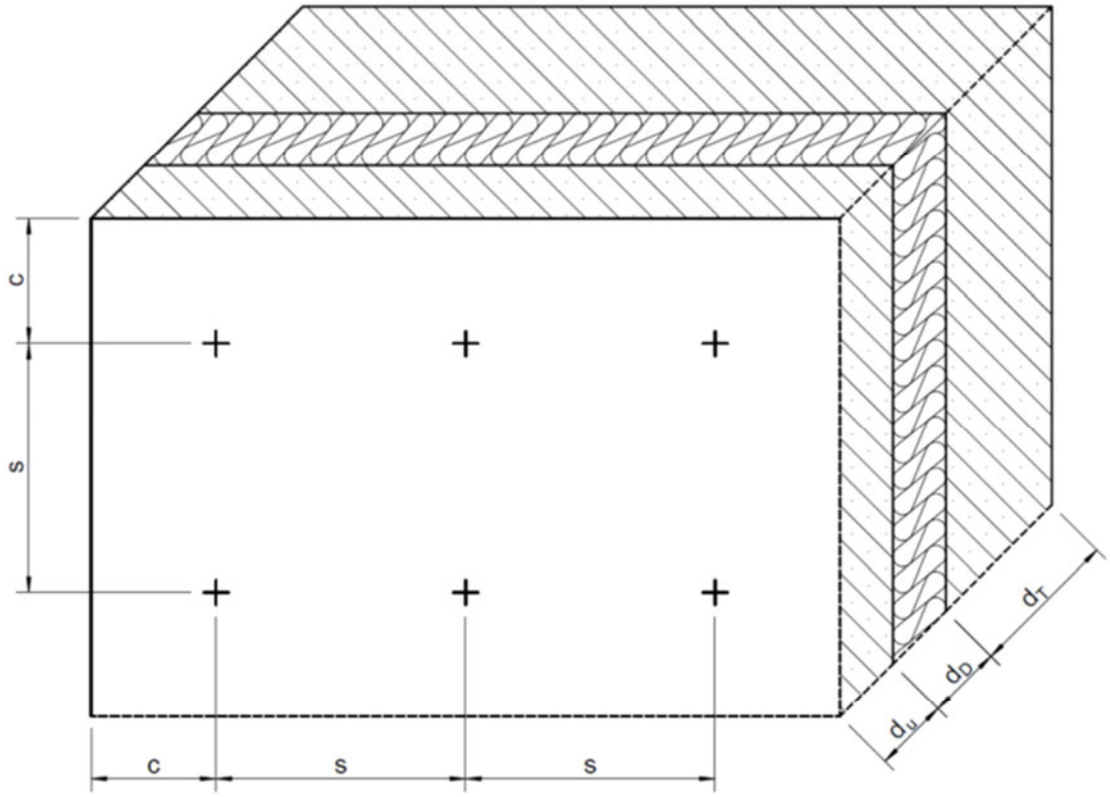


$d_u$: Thickness of weather resistant skin of external wall panel or thickness of the thin concrete element
$d_D$: Thickness of insulation
$d_T$: Thickness of member
c: Edge distance
s: Spacing

**Table 10.25.3: Characteristic resistance $F_{Rk}$ [1] in [kN] for single anchor**

| **Anchor size** | | | **W-UR 10 SymCon** |
|---|---|---|---|
| Member thickness | $d_u \geq$ | [mm] | **40** |
| **Thin concrete elements, weather resistant skins of external wall panels made of concrete ≥ C16/20,** Characteristic resistance $F_{Rk}$ | 30℃ [3] / 50℃ [4] | [kN] | 1.5 |
| | 50℃ [3] / 80℃ [4] | [kN] | 1.2 |
| Partial safety factor | $\gamma_{Mm}$ [2] | [-] | 1.8 |

1) Characteristic resistance $F_{Rk}$ for tension, shear or combined tension and shear loading. The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with a spacing equal or larger than the minimum spacing $s_{min}$ according to Table 9. The specific conditions for the design method have to be considered according to chapter 4.2.6 of the ETA.
2) In absence of other national regulations
3) Maximum long term temperature
4) Maximum short term temperature

**Würth Plastic Anchor W-UR SymCon**

**Thin concrete elements, weather resistant skins of external wall panels made of concrete ≥ C16/20,** Brick data, installation parameters, characteristic resistance

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