

Approval body for construction products  
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and  
Laender Governments



## European Technical Assessment

**ETA-10/0462**  
**of 6 March 2018**

English translation prepared by DIBt - Original version in German language

### General Part

Technical Assessment Body issuing the  
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

Powder actuated fasteners: W-HMF 14, W-HMF 14/M  
and W-HMF 14/S  
Fastening tools: BSG MF-14 and BSG MF-14 S

Product family  
to which the construction product belongs

Würth powder actuated fasteners W-HMF 14,  
W-HMF 14/M and W-HMF 14/S in combination with Würth  
fastening tools BSG MF-14 and BSG MF-14 S for  
fastening of steel sheeting to steel members.

Manufacturer

Adolf Würth GmbH & Co. KG  
Reinhold-Würth-Straße 12-17  
74653 Künzelsau  
DEUTSCHLAND

Manufacturing plant

Würth, Plant 20

This European Technical Assessment  
contains

9 pages including 4 annexes which form an integral part  
of this assessment

This European Technical Assessment is  
issued in accordance with Regulation (EU)  
No 305/2011, on the basis of

EAD 330153-00-0602

**European Technical Assessment**

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**Specific Part****1 Technical description of the product**

The products are mechanical fasteners (powder actuated fasteners / cartridge fired pins)<sup>1</sup> made of steel. The fasteners comprise a pin (nominal diameter: 4.5 mm) which is assembled with one washer. The washer in connection with the same diameter pin-head serves to guide the fasteners while they are being driven into the base material. The washer also serves to improve the bearing area. Special fastening tools are used in order to install the fasteners. The driving force of the fastening tools is provided by the power load of the used cartridge (several cartridge strengths available). The application limit depends on the strength and thickness of the base material.

The dimensions and materials of the fastener are given in Annex 1. The difference of the fastening tools is the kind of feeding: single fasteners or collated in tube magazines or strip-magazines. Table 1 provides an overview of the 3 powder actuated fastening systems approved.

Fastening Tool	Fastener	Features
<b>BSG MF-14</b>	W-HMF 14	The BSG MF-14 is used to drive single fasteners.
<b>BSG MF-14 with magazine adapter</b>	W-HMF 14/M	The BSG MF-14 in combination with the magazine adapter is used to drive fasteners in magazine strips.
<b>BSG MF-14 S</b>	W-HMF 14/S	The BSG MF-14 S is a standup tool which is based on the BSG MF-14. The fasteners are collated in tube magazines.

Fasteners, fastening tools and cartridges are shown in Annex 1.

The fastener and the corresponding connections are subject to tension and/or shear forces (see Annex 3).

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

The intended use is specified in Annex 2 and 3.

The performances given in Section 3 are only valid if the fastener is used in compliance with the specifications and conditions given in Annex 2 to 3.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the fastener of at least 25 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.

<sup>1</sup> Both terms (powder actuated fastener and cartridge fired pin) are commonly used.

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

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

Essential characteristic	Performance
Tension resistance of connection	See Annex 4
Shear resistance of connection	See Annex 4
Design resistance in case of combined tension and shear forces (interaction)	See Annex 2
Check of deformation capacity in case of constraining forces due to temperature	See Annex 2
Determination and check of application limits	See Annex 4

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

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex 2

#### 3.3 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Content and/or release of dangerous substances	no performance determined

#### 3.4 Safety and assessability in use (BWR 4)

Essential characteristic	Performance
Tension resistance of connection	See Annex 4
Shear resistance of connection	See Annex 4
Design resistance in case of combined tension and shear forces (interaction)	See Annex 2
Check of deformation capacity in case of constraining forces due to temperature	See Annex 2
Determination and check of application limits	See Annex 4

#### 3.5 Sustainable use of natural resources (BWR 7)

Essential characteristic	Performance
Durability	See Annex 2, use conditions

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

In accordance with EAD No. 330153-00-0602, the applicable European legal act is: Decision 1998/214/EC, amended by 2001/596/EC.

The system to be applied is: 2+

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

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

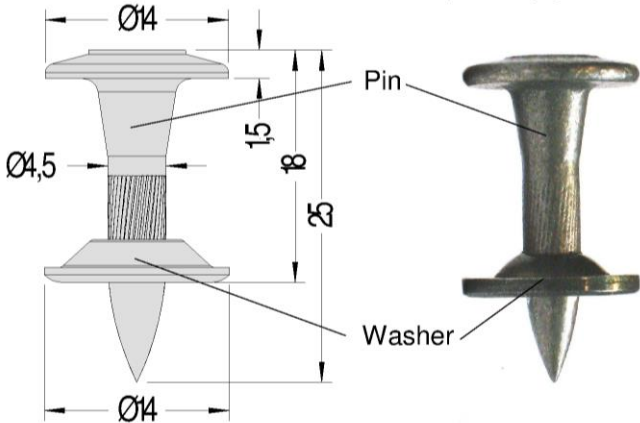
Issued in Berlin on 6 March 2018 by Deutsches Institut für Bautechnik

Dr.-Ing. Lars Eckfeldt  
p. p. Head of Department

*beglaubigt:*  
Hahn

Powder-actuated fastener / Cartridge fired pin

Material: Pin Steel Ck60 (1.1221) quenched and tempered, galvanised  
Washer Steel Ck35 (1.1181) galvanised

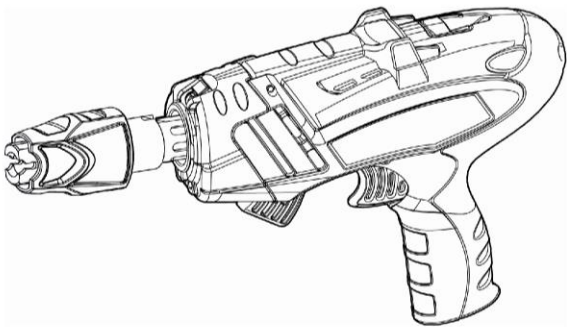


Cartridge KFZT MF Cal. 6,3 / 16

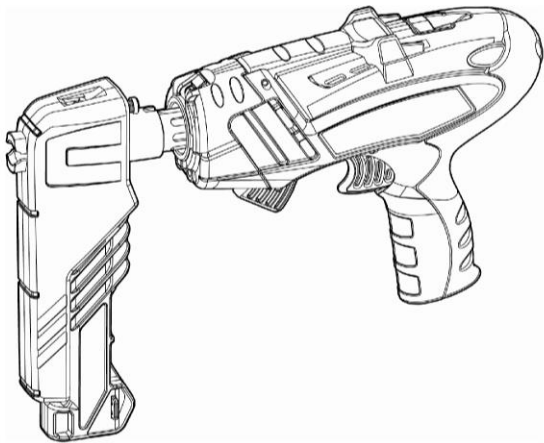


Yellow: Medium load  
Blue: High load  
Red: Very high load  
Black: Extra high load (see above)

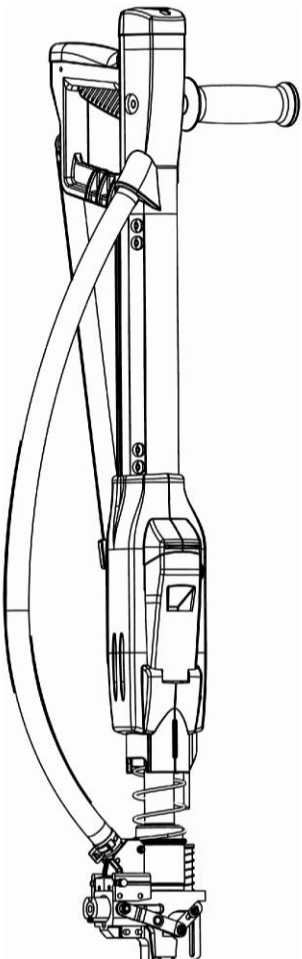
Powder-actuated fastening tools



BSG MF-14



BSG MF-14 (with magazin)



BSG MF-14 S

Powder actueted fasteners: W-HMF 14, W-HMF 14/M and W-HMF 14/S  
Fastening tools: BSG MF-14 and BSG MF-14 S

Fastener and corresponding fastening tools

Annex 1

## Specification of intended use

The fasteners are intended to be used for fastening of steel sheeting to steel members. The sheeting can either be used as cladding or as load bearing wall and roof element.

### Anchorage subject to:

- Predominantly static and quasi-static loads. Wind loads are generally regarded as predominantly static.

### Fixed material sheeting (flat products and therewith produced profiled products):

- Steel sheeting of steel grades  $\geq$  S280 according to EN 10346:2015 and a thickness  $t_l = 0.63$  mm to 2.5 mm (with max 4 mm for 2 to 4 layers).
- Other thin gauge steel members.

### Base materials:

- Structural steel  $\geq$  S235 with a thickness  $t_l \geq 6$  mm provided the relevant application limits (Annex 4) are taken into account.
- For hot-dipped galvanized base materials a zinc coating up to approximately 150  $\mu\text{m}$  is allowed, for powder-coated or painted base materials a dry coat thickness of up to 160  $\mu\text{m}$  is allowed.

### Use conditions (Environmental conditions):

- The intended use only comprises fasteners and connections which are not directly exposed to external weather conditions or moist atmospheres.

### Design:

- The verification concept stated in EN 1990:2002 + A1:2005 + A1:2005/AC:2010 is used for the design of the connection made with the fasteners. The characteristic values (shear and tension resistance) according to Annex 4 are used for the design of the entire connection.
- The partial safety factor of  $\gamma_M = 1.25$  is used in order to determine the corresponding design resistance, provided no values are given in national regulations of the member state in which the fastener is used or in the respective National Annex to Eurocode 3.
- In case of combined tension and shear forces the linear interaction formula according to EN 1993-1-3:2006 + AC:2009, section 8.3 (8) is taken into account.
- The possibly required reduction of the tension resistance due to the position of the fastener is taken into account in accordance with EN 1993-1-3:2006 + AC:2009, section 8.3 (7) and Fig. 8.2.
- For the type of connection (a, b, c, d) listed in Annex 4 it is not necessary to take into account the effect of constraints due to temperature for the steel grades S280 and S320 in accordance with EN 10346:2015. For steel grades  $\geq$  S350 in accordance with EN 10346:2015 it shall be considered for design.
- Dimensions, material properties, application limits and nail head standoffs as stated in the ETA are observed.
- Resistance to fire: The part of the structure in which the powder-actuated fasteners are intended to be installed shall be tested, using the test method relevant for the corresponding fire resistance class, in order to be classified according to the appropriate part of EN 13501.

### Installation:





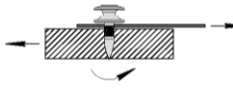
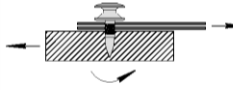
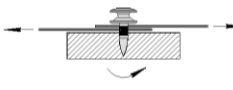
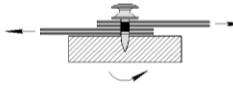
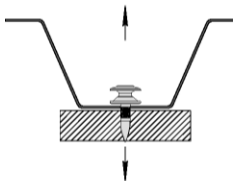
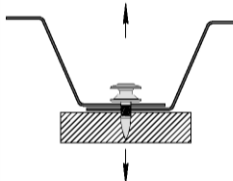
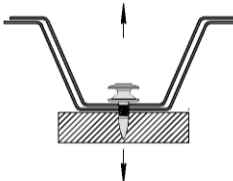
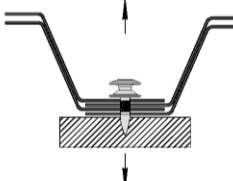
- The installation is only carried out according to the manufacturer's instructions. The manufacturer hands over the assembly instructions to the assembler.
- The installation is carried out such that the fasteners are replaceable if necessary.
- The steel sheeting is in direct contact with the steel base material in the area of the connection.
- The conformity of the installed fastener with the provisions of the ETA is attested by the executing company.

Powder actuated fasteners: W-HMF 14, W-HMF 14/M and W-HMF 14/S  
Fastening tools: BSG MF-14 and BSG MF-14 S

**Intended use**  
Specification

Annex 2

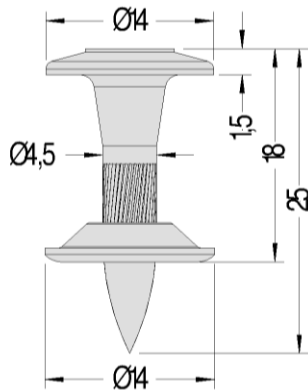
## Types of connection and corresponding loading conditions

	Types of connection			
	Type a	Type b	Type c	Type d
				
Type of loading	Single connection	Side lap connection	End overlap connection	Side lap + end overlap connection
Shear loading				
Tension loading				

Powder actuated fasteners: W-HMF 14, W-HMF 14/M and W-HMF 14/S  
Fastening tools: BSG MF-14 and BSG MF-14 S

Types of connections

Annex 3

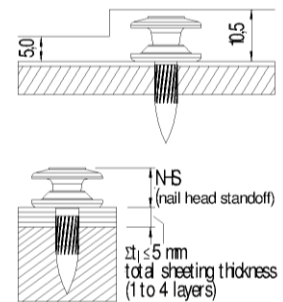


Powder-actuated fastener and fastening tools:

**W-HMF 14 with: BSG MF-14 or, BSG MF-14 S**

Cartridges: **KFZT MF Cal. 6.3/16 - Yellow**  
**KFZT MF Cal. 6.3/16 - Blue**  
**KFZT MF Cal. 6.3/16 - Red**  
**KFZT MF Cal. 6.3/16 - Black**

Installation control:



$$5 \text{ mm} \leq \text{NHS} \leq 11.5 \text{ mm} - \Sigma t_i$$

**Characteristic shear and tension resistance  $V_{Rk}$  and  $N_{Rk}$**

sheeting thickness $t_i$ [mm]	Shear $V_{Rk}$ [kN]	Tension $N_{Rk}$ [kN]	Types of connection
0.63	4.2	5.3	a,b,c,d
0.75	5.8	6.6	a,b,c,d
0.88	7.5	7.7	a,b,c,d
1.00	8.6	8.2	a,b,c,d
1.13	9.1	9.1	a,c
1.25	9.5	9.5	a,c
1.50	10.0	10.0	a
1.75	10.0	10.1	a
2.00	10.0	10.3	a
2.50	10.0	10.4	a
3.00	10.0	10.5	a

**Design shear and tension resistance  $V_{Rd}$  and  $N_{Rd}$**

$$V_{Rd} = V_{Rk} / \gamma_M$$

$\gamma_M = 1.25$  in the absence of national regulations

$$N_{Rd} = \alpha_{cycl} N_{Rk} / \gamma_M$$

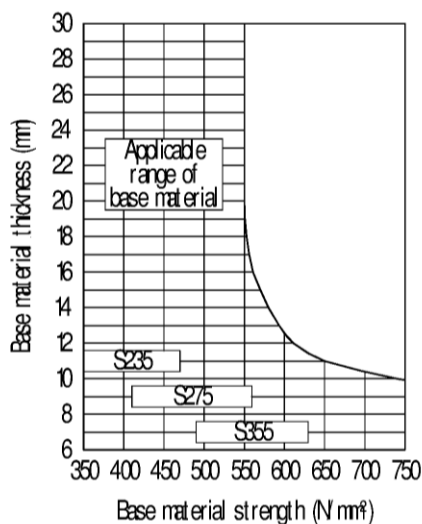
$$\alpha_{cycl} = 1.0$$

$\alpha_{cycl}$  considers the effect of repeated wind loads

$\alpha_{cycl} = 1.0$  for all sheeting thickness  $t_i$

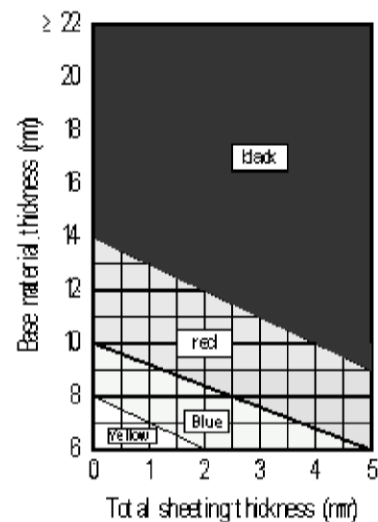
$\gamma_M = 1.25$  in the absence of national regulations

**Application limit diagram**



Base material:  
Structural steel S235, S275 and S355 according to EN 10025-1:2004; minimum thickness = 6 mm

**Cartridge selection**



Note:  
In case of too much energy, change of cartridge colour till correct stand-offs NHS are achieved.

Powder actuated fasteners: W-HMF 14, W-HMF 14/M and W-HMF 14/S  
Fastening tools: BSG MF-14 and BSG MF-14 S

Characteristic and design resistance,  
application limit,  
cartridge selection and nail head standoff

Annex 4