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European Technical Assessment Body  
for construction products



## European Technical Assessment

ETA-24/0171  
of 9 April 2024

English translation prepared by DIBt - Original version in German language

### General Part

Technical Assessment Body issuing the European Technical Assessment:

Trade name of the construction product

Product family  
to which the construction product belongs

Manufacturer

Manufacturing plant

This European Technical Assessment  
contains

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

Deutsches Institut für Bautechnik

Würth Internally Threaded Screw Anchor W-BS-I MULTI

Fasteners for use in concrete for redundant non-structural  
systems

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

Werk 9

12 pages including 3 annexes which form an integral part  
of this assessment

EAD 330747-00-0601, Edition 06/2018

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## Specific Part

### 1 Technical description of the product

The Würth Internally Threaded Screw Anchor W-BS-I MULTI is an anchor of size of 8, 10 and 12 mm made of galvanized steel or steel with zinc flake coating. The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

The product description is given in Annex A.

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

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

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

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

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

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C3

#### 3.2 Safety in use (BWR 4)

Essential characteristic	Performance
Characteristic resistance to tension load (static and quasi-static loading)	See Annex C1 and C2
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C1 and C2
Durability	See Annex B1

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

In accordance with European Assessment Document EAD No. 330747-00-0601, the applicable European legal act is: [97/161/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 European Assessment Document**

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

Issued in Berlin on 9 April 2024 by Deutsches Institut für Bautechnik

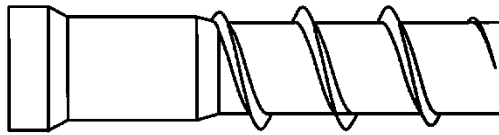
Dipl.-Ing. Beatrix Wittstock  
Head of Section

*beglaubigt:*  
Tempel

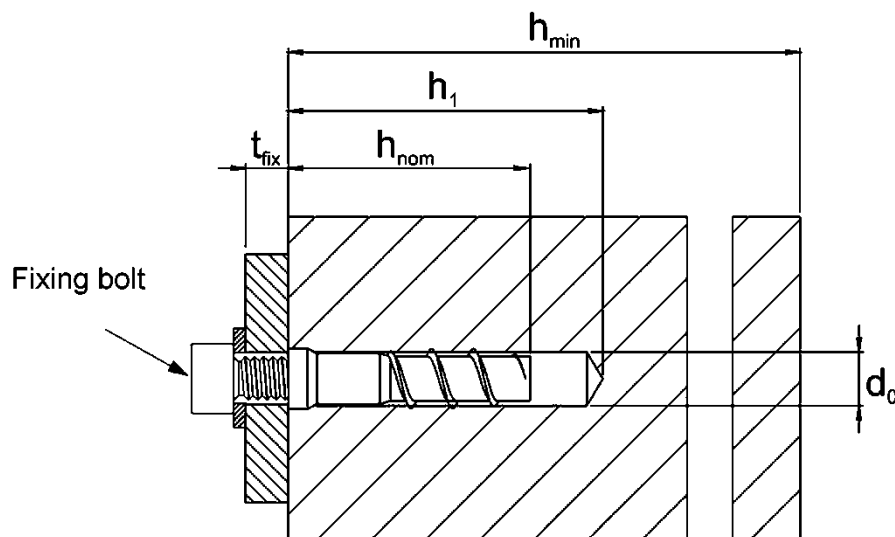
## Product in installed condition

### Würth Internally Threaded Screw Anchor W-BS-I MULTI

- Galvanized carbon steel
- Zinc flake coated carbon steel



e.g. Würth W-BS-I MULTI 8/M6 and fixture



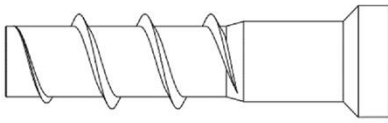
$d_0$  = nominal drill hole diameter  
 $t_{fix}$  = thickness of fixture  
 $h_1$  = drill hole depth

$h_{min}$  = minimum thickness of member  
 $h_{nom}$  = nominal embedment depth

Würth Internally Threaded Screw Anchor W-BS-I MULTI

**Product description**  
Product in installed condition

**Annex A1**



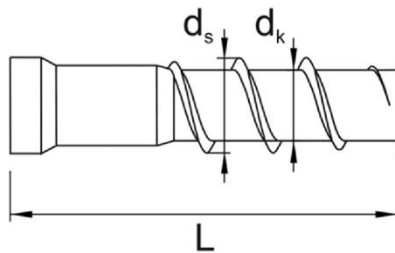
Configuration with internal thread and TX-drive  
e.g. W-BS-I MULTI 8/M6

Table 1: Material

Part	Product name	Material		
all types	W-BS-I MULTI	- carbon steel galvanized or zinc flake coated		
Part	Product name	Nominal characteristic steel		Rupture elongation $A_5$ [%]
		Yield strength $f_{yk}$ [N/mm <sup>2</sup> ]	Ultimate strength $f_{uk}$ [N/mm <sup>2</sup> ]	
all types	W-BS-I MULTI	560	700	≤ 8

Table 2: Dimensions

Anchor size			W-BS-I MULTI 8/M6	W-BS-I MULTI 10/M8	W-BS-I MULTI 12/M10
Screw length	L	[mm]	40	40	40
Thread outer diameter	$d_s$	[mm]	10,5	12,5	14,5
Core diameter	$d_k$	[mm]	7,0	9,0	11,0
Internal Thread	$d_{ith}$	[mm]	M6	M8	M10
Drive			TX50	TX55	TX60



**Marking:**

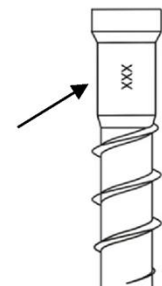
W-BS-I MULTI or TSM M

Screw type:

W-BS-I 8/M6  
or TSM 8 M

Screw size:

8



Würth Internally Threaded Screw Anchor W-BS-I MULTI

**Product description**

Screw types, material, dimensions and markings

**Annex A2**

## Specification of Intended use

### Anchorage subject to:

- Static or quasi-static loading
- Used only for redundant non-structural systems according to EN 1992-4:2018
- Fire exposure

### Base materials:

- Compacted reinforced and unreinforced concrete without fibers according to EN 206:2013
- Strength classes C20/25 to C50/60 according to EN 206:2013
- Cracked and uncracked concrete

### Use conditions (Environmental conditions):

- Concrete structures subject to dry internal conditions

### Design:

- Anchorages are to be designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are to be prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages are designed for static or quasi-static actions according to EN 1992-4:2018 and EOTA Technical Report TR 055, Edition February 2018.
- The design for shear load according to EN 1992-4:2018, Section 6.2.2 applies for all specified diameters  $d_f$  of clearance hole in the fixture in Annex B2, Table 3.

### Installation:

- Hammer drilling or hollow drilling
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on site.
- In case of aborted hole: new drilling must be drilled at a minimum distance of twice the depth of aborted hole or closer if the aborted hole is filled with high strength mortar and only if the hole is not in the direction of the oblique tensile or shear load.
- After installation further turning of the anchor must not be possible. The concrete screw must be screwed minimum in level with the concrete surface.
- The attachment is fastened by a fixing bolt/threaded rod.

Würth Internally Threaded Screw Anchor W-BS-I MULTI

Intended use  
Specification continuation

Annex B1

Table 3: Installation parameters

Fastening screws or threaded rods of strength classes 4.8, 5.8, 8.8 according to EN ISO 898-1:2013 may be used.

Würth Internally Threaded Screw Anchor			W-BS-I MULTI 8/M6	W-BS-I MULTI 10/M8	W-BS-I MULTI 12/M10
Nominal embedment depth	$h_{nom}$	[mm]	40	40	40
Nominal drill hole diameter	$d_0$	[mm]	8	10	12
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45	10,45	12,50
Drill hole depth	$h_1 \geq$	[mm]	50	50	50
Clearance hole diameter	$d_f$	[mm]	7	9	12
Diameter of the internal thread	$d_{ith}$	[mm]	M6	M8	M10
Drive			TX50	TX55	TX60
Minimum screw-in depth of the fixing bolt or threaded rod		[mm]	8	8	8
Installation torque	$T_{inst} \leq$	[Nm]	4	8	15
Impact wrench/driver	$T_{imp,max}$		Max. torque according to manufacturer's instructions 180		

Table 4: Minimum thickness of member, minimum edge distance and minimum spacing

Würth Internally Threaded Screw Anchor			W-BS-I MULTI 8/M6	W-BS-I MULTI 10/M8	W-BS-I MULTI 12/M10
Nominal embedment depth	$h_{nom}$	[mm]	40	40	40
Minimum thickness of member	$h_{min}$	[mm]	80	80	80
Minimum edge distance	$c_{min}$	[mm]	40	40	40
Minimum spacing	$s_{min}$	[mm]	30	40	40

**Würth Internally Threaded Screw Anchor W-BS-I MULTI**

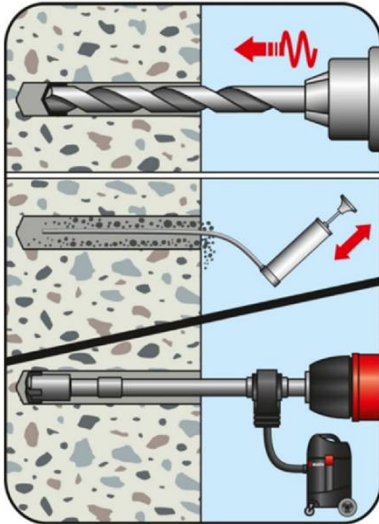
**Intended use**

Minimum thickness of member, minimum edge distance and minimum spacing

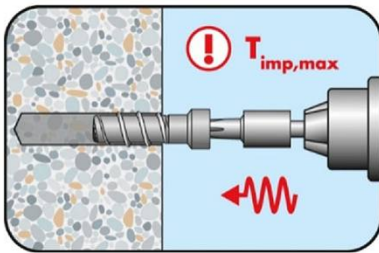
**Annex B2**



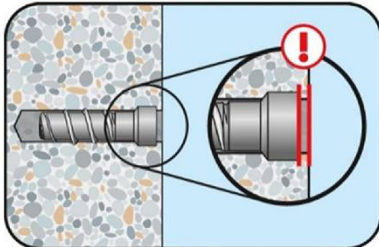
## Installation instructions



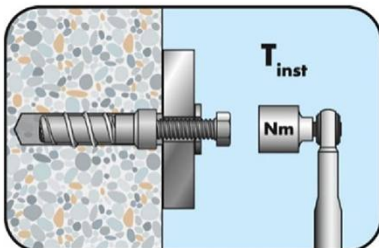
Create a hammer drilled or hollow drilled drill hole.  
Remove drill dust by vacuuming or blowing off.  
Cleaning of drill hole is not necessary when using a hollow drill bit.



Install screw anchor with an impact wrench/ driver  
or a wrench. You must not exceed the given  $T_{imp,max}$ .



The anchor must be screwed in below the concrete  
surface.



The fixture is fastened with a fixing bolt or a  
threaded rod. You must not exceed the given  $T_{inst}$ .

Würth Internally Threaded Screw Anchor W-BS-I MULTI

Intended use  
Installation instructions

Annex B3

Table 5: Steel failure for tension and shear loading

Würth Internally Threaded Screw Anchor			W-BS-I MULTI 8/M6	W-BS-I MULTI 10/M8	W-BS-I MULTI 12/M10
Nominal embedment depth	$h_{nom}$	[mm]	40	40	40
<b>Characteristic resistance to steel failure, strength class 4.8</b>					
Characteristic resistance	$N_{Rk,s}$	[kN]	8,0	9,5	10,0
Partial factor	$\gamma_{Ms,N}$	[-]	1,5		
Characteristic resistance	$V_{Rk,s}$	[kN]	4,0	7,3	9,0
Partial factor	$\gamma_{Ms,V}$	[-]	1,25		
Ductility factor	$k_7$	[-]	0,8		
Characteristic bending load	$M^0_{Rk,s}$	[Nm]	5,0	12,5	23,9
<b>Characteristic resistance to steel failure, strength class 5.8</b>					
Characteristic resistance	$N_{Rk,s}$	[kN]	8,0	9,5	10,0
Partial factor	$\gamma_{Ms,N}$	[-]	1,5		
Characteristic resistance	$V_{Rk,s}$	[kN]	5,0	7,5	9,0
Partial factor	$\gamma_{Ms,V}$	[-]	1,25		
Ductility factor	$k_7$	[-]	0,8		
Characteristic bending load	$M^0_{Rk,s}$	[Nm]	6,3	15,4	23,9
<b>Characteristic resistance to steel failure, strength class 8.8</b>					
Characteristic resistance	$N_{Rk,s}$	[kN]	8,0	9,5	10,0
Partial factor	$\gamma_{Ms,N}$	[-]	1,5		
Characteristic resistance	$V_{Rk,s}$	[kN]	6,0	7,5	9,0
Partial factor	$\gamma_{Ms,V}$	[-]	1,25		
Ductility factor	$k_7$	[-]	0,8		
Characteristic bending load	$M^0_{Rk,s}$	[Nm]	8,8	15,4	23,9

Würth Internally Threaded Screw Anchor W-BS-I MULTI

**Performances**

Steel failure for tension and shear loading

**Annex C1**

Table 6: Characteristic values for static and quasi-static loading

Würth Internally Threaded Screw Anchor			Size 8/M6	Size 10/M8	Size 12/M10
Nominal embedment depth	$h_{nom}$	[mm]	40	40	40
<b>Pull-out failure in uncracked concrete</b>					
Characteristic resistance to tension load in C20/25	$N_{Rk,p}$	[kN]	6,5	8,0	5,5
Increasing factor for $N_{Rk,p} = N_{Rk,p (C20/25)} \cdot \psi_c$	C25/30	m	[-]	0,213	0,146
with $\psi_c = \left(\frac{f_{ck}}{20}\right)^m$	C30/37				
	C40/50				
	C50/60				
<b>Pull-out failure in cracked concrete</b>					
Characteristic resistance to tension load in C20/25	$N_{Rk,p}$	[kN]	5,5	6,5	4,5
Increasing factor for $N_{Rk,p} = N_{Rk,p (C20/25)} \cdot \psi_c$	C25/30	m	[-]	0,209	0,121
with $\psi_c = \left(\frac{f_{ck}}{20}\right)^m$	C30/37				
	C40/50				
	C50/60				
<b>Concrete failure: splitting failure, concrete cone failure and pry-out failure</b>					
Effective embedment depth	$h_{ef}$	[mm]	31	31	30
k-Faktor	cracked	$k_{cr}$	[-]	7,7	
	uncracked	$k_{ucr}$	[-]	11,0	
Concrete cone failure	spacing	$S_{cr,N}$	[mm]	3,0 x $h_{ef}$	
	edge distance	$C_{cr,N}$	[mm]	1,5 x $h_{ef}$	
Splitting failure	resistance	$N^0_{Rk,sp}$		6,5	8,0
	spacing	$S_{cr,Sp}$	[mm]	$\geq 200$ mm und $\geq 4$ x $h_{ef}$	
	edge distance	$C_{cr,Sp}$	[mm]	$\geq 100$ mm und $\geq 3$ x $h_{ef}$	
Factor for pry-out failure	$k_8$	[-]		1,0	
Installation factor	$\gamma_{inst}$	[-]	1,0	1,0	1,2
<b>Concrete edge failure</b>					
Effective length in concrete	$l_f = h_{nom}$	[mm]	40	40	40
Nominal outer diameter of screw	$d_{nom}$	[mm]	8	10	12

Würth Internally Threaded Screw Anchor W-BS-I MULTI

**Performances**

Fire exposure - characteristic values of resistance

**Annex C2**

Table 7: Fire exposure – characteristic values of resistance

Würth Internally Threaded Screw Anchor				Size 8/M6	Size 10/M8	Size 12/M10
Nominal embedment depth	$h_{nom}$	[mm]		40	40	40
Steel failure for tension and shear load						
Characteristic Resistance	R30	$N_{Rk,s,fi30}$	[kN]	1,01	2,11	3,92
	R60	$N_{Rk,s,fi60}$	[kN]	0,77	1,58	2,86
	R90	$N_{Rk,s,fi90}$	[kN]	0,54	1,05	1,81
	R120	$N_{Rk,s,fi120}$	[kN]	0,43	0,79	1,28
	R30	$V_{Rk,s,fi30}$	[kN]	1,01	2,11	3,92
	R60	$V_{Rk,s,fi60}$	[kN]	0,77	1,58	2,86
	R90	$V_{Rk,s,fi90}$	[kN]	0,54	1,05	1,81
	R120	$V_{Rk,s,fi120}$	[kN]	0,43	0,79	1,28
	R30	$M^0_{Rk,s,fi30}$	[Nm]	0,63	1,81	4,28
	R60	$M^0_{Rk,s,fi60}$	[Nm]	0,49	1,36	3,12
	R90	$M^0_{Rk,s,fi90}$	[Nm]	0,34	0,91	1,97
	R120	$M^0_{Rk,s,fi120}$	[Nm]	0,27	0,68	1,39
Pull-out failure						
Characteristic Resistance	R30-R90	$N_{Rk,p,fi}$	[kN]	1,38	1,63	1,13
	R120	$N_{Rk,p,fi}$	[kN]	1,10	1,30	0,90
Concrete cone failure						
Characteristic Resistance	R30-R90	$N^0_{Rk,c,fi}$	[kN]	0,9	0,9	0,8
	R120	$N^0_{Rk,c,fi}$	[kN]	0,7	0,7	0,7
Edge distance						
R30 - R120	$c_{cr,fi}$	[mm]		2 x $h_{ef}$		
In case of fire attack from more than one side, the minimum edge distance shall be $\geq 300$ mm.						
Spacing						
R30 - R120	$s_{cr,fi}$	[mm]		4 x $h_{ef}$		
<b>Würth Internally Threaded Screw Anchor W-BS-I MULTI</b>						<b>Annex C3</b>
<b>Performances</b> Fire exposure - characteristic values of resistance						