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Designated according to Article 29 of Regulation (EU) No 305/2011

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European Technical Assessment

ETA 14/0153 of 19/05/2014

(English language translation, the original version in Czech language)

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011	Technical and Test Institute for Construction Prague
Trade name of the construction product	Würth Injection System WIT-EA 200
Product family to which the construction product belongs	Product area code: 33 Bonded injection type anchor for use in non-cracked concrete
Manufacturer	Adolf Würth GmbH & Co. KG Reinhold-Würth-Strasse 12-17 74653 Künzelsau Deutschland
Manufacturing plant(s)	Plant 3
This European Technical Assessment contains	14 pages including 10 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	ETAG 001-Part 1 and Part 5, edition 2013, used as European Assessment Document (EAD)

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

1. Technical description of the product

The Würth Injection System WIT-EA 200 modified Epoxy acrylate resin without styrene for non-cracked concrete is bonded anchor consisting of cartridge with injection mortar and a steel element. The steel elements are the commercial threaded rods with hexagon nut and washer. The steel elements are made of galvanized steel or stainless steel.

The steel element is placed into a drilled hole filled with injection mortar and is anchored via the bond between metal part, injection mortar and concrete.

The illustration and the description of the product are given in Annex A.

2. Specification of the intended use in accordance with the applicable EAD

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 provisions made in this European Technical Assessment 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 products in relation to the expected economically reasonable working life of the works.

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

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance for tension loads	See Annex C 1
Characteristic resistance for shear loads	See Annex C 2
Displacement	See Annex C 3

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A1
Resistance to fire	No performance determined

3.3 Hygiene, health and environment (BWR 3)

Regarding dangerous substances contained in this European Technical Assessment, there may be 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 Regulation (EU) No 305/2011), these requirements need also to be complied with, when and where they apply.

3.4 Safety in use (BWR 4)

For basic requirement safety in use the same criteria are valid as for Basic Requirement Mechanical resistance and stability.

3.5 Protection against noise (BWR 5)

Not relevant.

3.6 Energy economy and heat retention (BWR 6)

Not relevant.

3.7 Sustainable use of natural resources (BWR 7)

For the sustainable use of natural resources no performance was determined for this product.

3.8 General aspects relating to fitness for use

Durability and serviceability are only ensured if the specifications of intended use according to Annex B 1 are kept.

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

According to the Decision 96/582/EC of the European Commission[1] the system of assessment verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) given in the following table apply.

Product	Intended use	Level or class	System
Metal anchors for use in concrete	For fixing and/or supporting to concrete, structural elements (which contributes to the stability of the works) or heavy units	-	1

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

5.1 Tasks of the manufacturer

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 Assessment.

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

The factory production control shall be in accordance with the control plan which is a part of the technical documentation of this European Technical Assessment. The control plan is laid down in the context of the factory production control system operated by the manufacturer and deposited at Technický a zkušební ústav stavební Praha, s.p.[2] The results of factory production control shall be recorded and evaluated in accordance with the provisions of the control plan.

The manufacturer shall, on the basis of a contract, involve a body which is notified for the tasks referred to in section 4 in the field of anchors in order to undertake the actions laid down in section 5.2. For this purpose, the control plan referred to in this section and section 5.2 shall be handed over by the manufacturer to the notified body involved.

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

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1 Official Journal of the European Communities L 254 of 08.10.1996

2 The control plan is a confidential part of the documentation of the European Technical Assessment, but not published together with the ETA and only handed over to the approved body involved in the procedure of AVCP.

5.2 Tasks of the notified bodies

The notified 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 notified certification body involved by the manufacturer shall issue an certificate of constancy of performance of the product stating the conformity with the provisions of this European Technical Assessment.

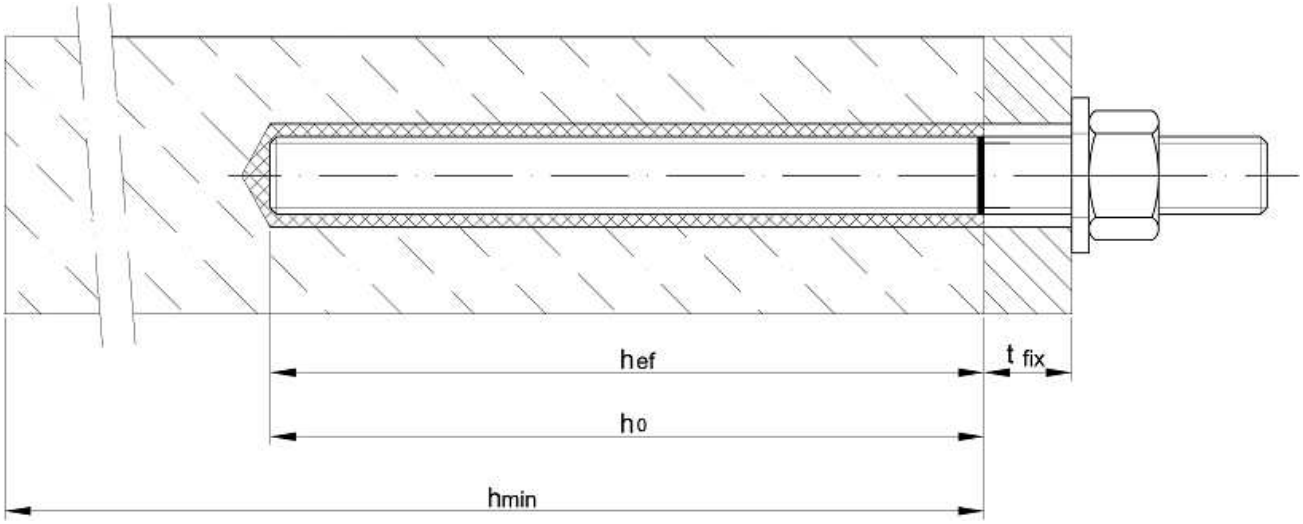
In cases where the provisions of the European Technical Assessment and its control plan are no longer fulfilled the notified body shall withdraw the certificate of constancy of performance and inform Technický a zkušební ústav stavební Praha, s.p without delay.

Issued in Prague on 19.05.2014

signed by

Ing. Václav Hadrava
Head of the department Technical Assessment Body

Installation in concrete

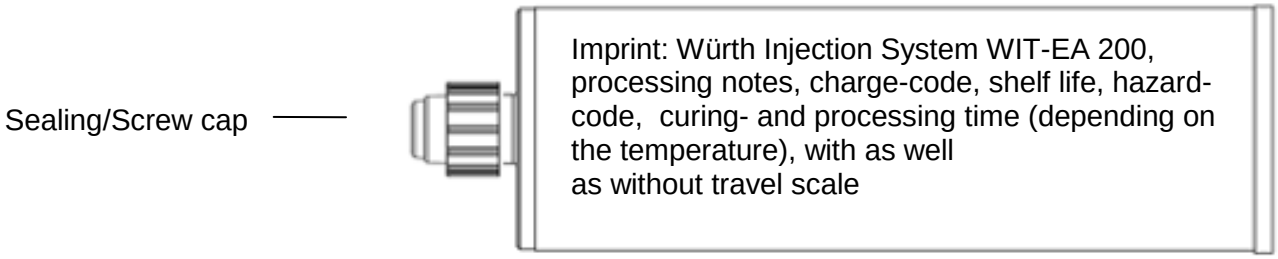


h_{ef} = effective setting depth
h_0 = bore hole depth
t_{fix} = thickness of fixture
t_{min} = thickness of member

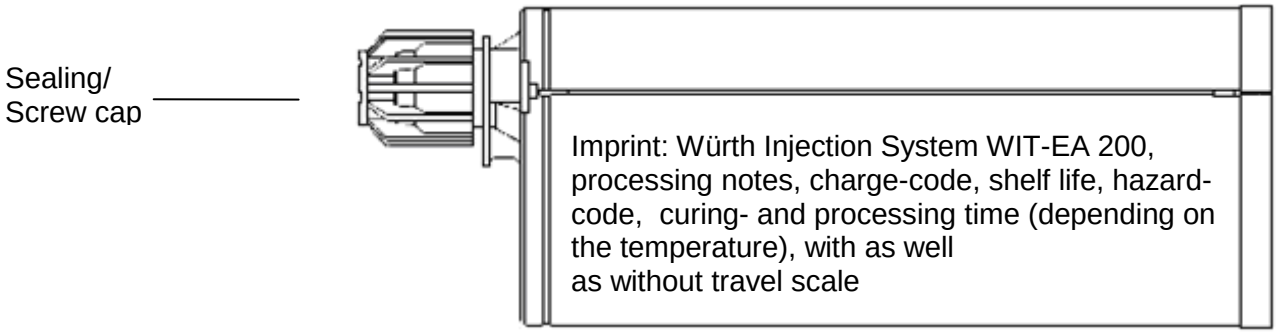
Würth Injection system WIT-EA 200	**Annex A 1**
Product description Installed conditions	

Cartridge: Würth Injection System WIT-EA 200

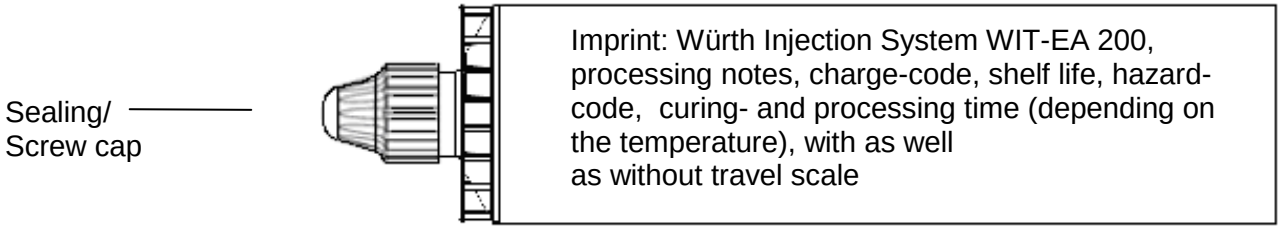
150 ml, 280 ml, 300 ml, 330 ml, 380 ml, 410 ml and 420 ml cartridge (Type: coaxial)



235 ml, 345 ml and 825 ml cartridge (Type: "side-by-side")



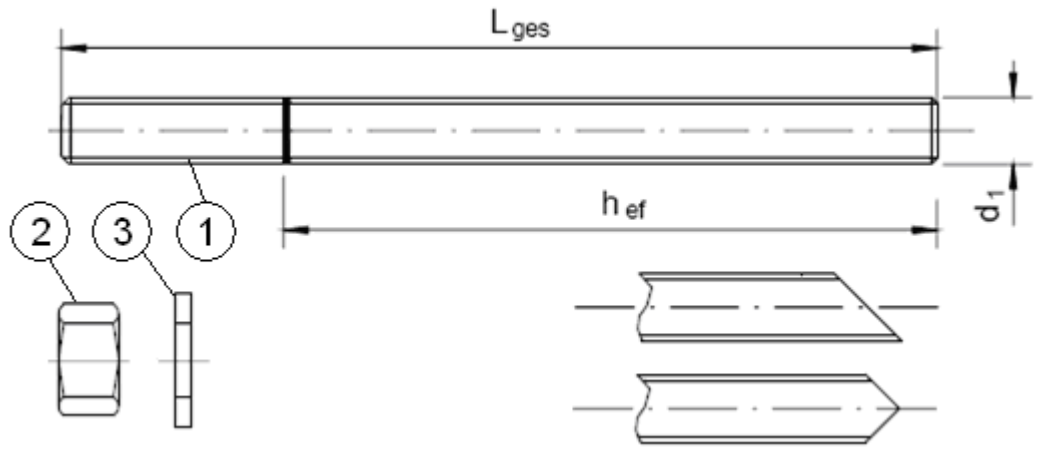
165 ml and 300 ml cartridge (Type: "foil tube")



Static mixer

Würth Injection system WIT-EA 200	**Annex A 2**
Product description Injection system	

Threaded rod M8, M10, M12, M16, M20, M24



Standard commercial threaded rod with marked embedment depth

Part	Designation	Material
Steel, zinc plated ≥ 5 µm acc. to EN ISO 4042 or Steel, Hot-dip galvanized ≥ 40 µm acc. to EN ISO 1461 and EN ISO 10684		
1	Anchor rod	Steel, EN 10087 or EN 10263 Property class 4.8, 5.8, 8.8, EN ISO 898-1:1999
2	Hexagon nut, EN ISO 4032	EN 20898-2
3	Washer, EN ISO 887, EN ISO 7089, EN ISO 7093 or EN ISO 7094	Steel, zinc plated or hot-dip galvanised
Stainless steel		
1	Anchor rod	Material: A4-70, A4-80, EN ISO 3506
2	Hexagon nut, EN ISO 4032	Material: A4-70, A4-80, EN ISO 3506
3	Washer, EN ISO 887, EN ISO 7089, EN ISO 7093 or EN ISO 7094	Material: A4-70, A4-80, EN ISO 3506

Würth Injection system WIT-EA 200	**Annex A 3**
Product description Threaded rod and materials	

Specifications of intended use

Anchorages subject to:
- Static and quasi-static load.

Base materials
- Non-cracked concrete.
- Reinforced or unreinforced normal weight concrete of strength class C20/25 at minimum and C50/60 at maximum according EN 206-1:2000-12.

Temperature range:
- -40°C to +40°C (max. short. term temperature +40°C and max. long term temperature +24°C)

Use conditions (Environmental conditions)
- Structures subject to dry internal conditions (zinc coated steel, stainless steel).
- Structures subject to external atmospheric exposure including industrial and marine environment, if no particular aggressive conditions exist (stainless steel).
- Structures subject to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel).

Note: 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).

Use categories:
- Category 1 – installation in dry or wet concrete

Design:
- The anchorages are designed in accordance with the EOTA Technical Report TR 029 “Design of bonded anchors” under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings.

Installation:
- Dry or wet concrete.
- Hole drilling by hammer or compressed air drill mode.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.

Würth Injection system WIT-EA 200	**Annex B 1**
Intended use Specifications	

Table B1: Cleaning

Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Nominal drill hole diameter	$Ød_0$	[mm]	10	12	14	18	24	28
Diameter of brush	d_b	[mm]	12,0	14,0	16,3	20,0	26,0	30,0
Minimum brush diameter	$d_{b,min}$	[mm]	10,5	12,5	14,5	18,5	24,5	28,5
Brush length	L	[mm]	170	170	170	200	250	300
Cleaning			4 x blow out 4 x brush out 4 x blow out					

Table B2: Installation parameters

Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Nominal drill hole diameter	$Ød_0$	[mm]	10	12	14	18	24	28
Depth of drill hole	h_0	[mm]	80	90	110	125	170	210
Edge distance	$C_{cr,N}$	[mm]	80	90	110	125	170	210
Minimum edge distance	C_{min}	[mm]	40	50	60	80	100	120
Spacing	$S_{cr,N}$	[mm]	160	180	220	250	340	420
Minimum spacing	S_{min}	[mm]	40	50	60	80	100	120
Minimum thickness of member	h_{min}	[mm]	110	120	140	160	215	260
Torque moment	T_{inst}	[Nm]	10	20	40	60	120	150
Embedment depth	h_{ef}	[mm]	80	90	110	125	170	210

Steel brush

Hand pump (volume 750 ml)
Drill bit diameter (d_o): 10 mm to 20 mm

Compressed air
Drill bit diameter (d_o): 10 mm to 28 mm

Table B3: Minimum curing time

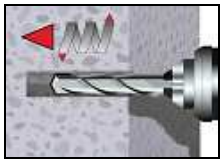
Temperature of base material [°C]	**Gelling and working time [min]**	**Full curing time [min]**
-5 to 0	90	360
0 to +5	45	180
+5 to +10	25	120
+10 to +20	15	80
+20 to +30	6	45
+30 to +35	4	25
+35	2	20

Würth Injection system WIT-EA 200

Intended use
Cleaning
Installation parameters
Curing time

Annex B 2

Assembly instructions



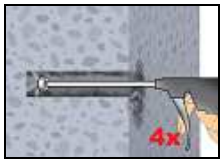
1. Drill with hammer drill a hole into the base material to the size and embedment depth required by the selected anchor (Table B2).

Attention! Standing water in the bore hole must be removed before cleaning.

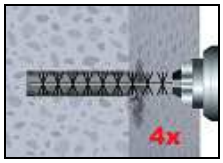
2a. Starting from the bottom or back of the bore hole, blow the hole clean with compressed air or a hand pump (Annex B 2) a minimum of four times. If the bore hole ground is not reached an extension shall be used.

The hand-pump can be used for anchor sizes up to bore hole diameter 20 mm.

or



For bore holes larger then 20 mm or deeper 240 mm, compressed air (min. 6 bar) **must** be used.

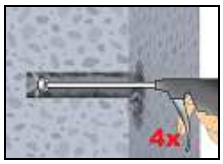


2b. Check brush diameter (Table B1) and attach the brush to a drilling machine or a battery screwdriver. Brush the hole with an appropriate sized wire brush > db,min (Table B1) a minimum of four times. If the bore hole ground is not reached with the brush, a brush extension shall be used (Table B1).

2c. Finally blow the hole clean again with compressed air or a hand pump (Annex B 2) a minimum of four times. If the bore hole ground is not reached an extension shall be used.

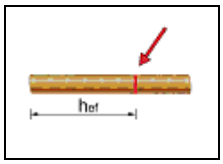
The hand pump can be used for anchor sizes up to bore hole diameter 20 mm.
For bore holes larger then 20 mm or deeper 240 mm, compressed air (min. 6 bar) **must** be used.

or

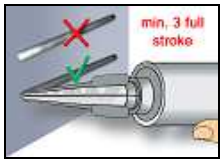


After cleaning, the bore hole has to be protected against re-contamination in an appropriate way, until dispensing the mortar in the bore hole. If necessary, the cleaning repeated has to be directly before dispensing the mortar.
In-flowing water must not contaminate the bore hole again

3. Attach a supplied static-mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool. For foil tube cartridges, cut off the foil tube clip before use.
For every working interruption longer than the recommended working time (Table B3) as well as for new cartridges, a new static-mixer shall be used.



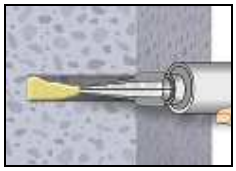
4. Prior to inserting the anchor rod into the filled bore hole, the position of the embedment depth shall be marked on the anchor rods



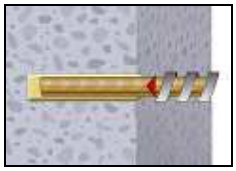
5. Prior to dispensing into the anchor hole, squeeze out separately a minimum of three full strokes and discard non-uniformly mixed adhesive components until the mortar shows a consistent grey colour.

Würth Injection system WIT-EA 200	
Intended use Assembly instructions I	**Annex B 3**

Assembly instructions (continuation)

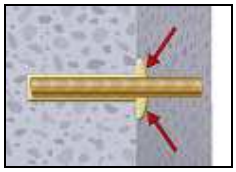


6. Starting from the bottom or back of the cleaned anchor hole fill the hole up to approximately two-thirds with adhesive. Slowly withdraw the static mixing nozzle as the hole fills to avoid creating air pockets. For embedment larger than 190 mm an extension nozzle shall be used. Observe the gel-/ working times given in Table B3.

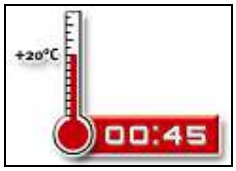


7. Push the threaded rod into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached.

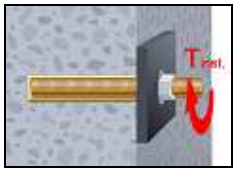
   The anchor should be free of dirt, grease, oil or other foreign material.



8. Be sure that the anchor is fully seated at the bottom of the hole and that excess mortar is visible at the top of the hole. If these requirements are not maintained, the application has to be renewed.



9. Allow the adhesive to cure to the specified time prior to applying any load or torque. Do not move or load the anchor until it is fully cured (attend Table B3).



10. After full curing, the add-on part can be installed with the max. torque (Table B2) by using a calibrated torque wrench.

Würth Injection system WIT-EA 200	
Intended use Assembly instructions II	**Annex B 4**

Table C1: Design method TR 029
Characteristic values of resistance to tension load

Steel failure – Characteristic resistance								
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Steel grade **4.8**	$N_{Rk,s}$	[kN]	15	23	34	63	98	141
Partial safety factor	γ_{Ms} [1)]	[-]	1,5					
Steel grade **5.8**	$N_{Rk,s}$	[kN]	18	29	42	79	123	177
Partial safety factor	γ_{Ms} [1)]	[-]	1,5					
Steel grade **8.8**	$N_{Rk,s}$	[kN]	29	46	67	126	196	282
Partial safety factor	γ_{Ms} [1)]	[-]	1,5					
Stainless steel grade **A4-70**	$N_{Rk,s}$	[kN]	26	41	59	110	172	247
Partial safety factor	γ_{Ms} [1)]	[-]	1,9					
Stainless steel grade **A4-80**	$N_{Rk,s}$	[kN]	29	46	67	126	196	282
Partial safety factor	γ_{Ms} [1)]	[-]	1,6					

Combined pullout and concrete cone failure in non-cracked concrete C20/25								
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Characteristic resistance in non-cracked concrete	$N_{Rk,p}$	[kN]	**16**	**35**	**35**	**50**	**75**	**95**
Partial safety factor	γ_{Mc} [1)]	[-]	1,8 [2)]					
Factor for concrete C30/37	ψ_c	[-]	1,08					
Factor for concrete C40/50	ψ_c	[-]	1,15					
Factor for concrete C50/60	ψ_c	[-]	1,19					

Splitting failure								
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Edge distance	$c_{cr,sp}$	[mm]	120	135	165	188	255	315
Spacing	$s_{cr,sp}$	[mm]	240	270	330	375	510	630
Partial safety factor	γ_{Msp} [1)]	[-]	1,8					

[1)] In absence of national regulations
[2)] The partial safety factor γ_2=1,2 is included

Würth Injection system WIT-EA 200

Performances
Characteristic resistance for tension loads

Annex C 1

Table C2: Design method TR 029
Characteristic values of resistance to shear load of threaded rod

Steel failure without lever arm								
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Steel grade **4.8**	$V_{Rk,s}$	[kN]	7	12	17	31	49	71
Partial safety factor	γ_{Ms} [1)]	[-]	1,25					
Steel grade **5.8**	$V_{Rk,s}$	[kN]	9	15	21	39	61	88
Partial safety factor	γ_{Ms} [1)]	[-]	1,25					
Steel grade **8.8**	$V_{Rk,s}$	[kN]	15	23	34	63	98	141
Partial safety factor	γ_{Ms} [1)]	[-]	1,25					
Stainless steel grade **A4-70**	$V_{Rk,s}$	[kN]	13	20	30	55	86	124
Partial safety factor	γ_{Ms} [1)]	[-]	1,56					
Stainless steel grade **A4-80**	$V_{Rk,s}$	[kN]	15	23	34	63	98	141
Partial safety factor	γ_{Ms} [1)]	[-]	1,33					

Steel failure with lever arm								
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Steel grade **4.8**	$M^0_{Rk,s}$	[N.m]	15	30	52	133	260	449
Partial safety factor	γ_{Ms} [1)]	[-]	1,25					
Steel grade **5.8**	$M^0_{Rk,s}$	[N.m]	19	37	66	166	325	561
Partial safety factor	γ_{Ms} [1)]	[-]	1,25					
Steel grade **8.8**	$M^0_{Rk,s}$	[N.m]	30	60	105	266	519	898
Partial safety factor	γ_{Ms} [1)]	[-]	1,25					
Stainless steel grade **A4-70**	$M^0_{Rk,s}$	[N.m]	26	52	92	233	454	786
Partial safety factor	γ_{Ms} [1)]	[-]	1,56					
Stainless steel grade **A4-80**	$M^0_{Rk,s}$	[N.m]	30	60	105	266	519	898
Partial safety factor	γ_{Ms} [1)]	[-]	1,33					

Concrete pryout failure								
Size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Factor *k* from TR 029 Design of bonded anchors, Part 5.2.3.3			2					
Partial safety factor	γ_{Mp} [1)]	[-]	1,5					

Concrete edge failure			
See section 5.2.3.4 of Technical Report TR 029 for the Design of Bonded Anchors			
Partial safety factor	γ_{Mc} [1)]	[-]	1,5

[1)] In absence of national regulations

Würth Injection system WIT-EA 200

Performances
Characteristic resistance for shear loads

Annex C 2

Table C3: Displacement under tension and shear load

Anchor size			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**
Tension load	F	[kN]	6,3	13,9	13,9	19,8	29,8	37,7
Displacement	δ_{N0}	[mm]	0,3	0,3	0,3	0,4	0,5	0,6
Shear load	F	[kN]	4,2	6,6	9,6	17,9	28,0	40,3
Displacement	δ_{V0}	[mm]	0,3	0,3	0,5	0,7	0,9	1,2
	$\delta_{V\infty}$	[mm]	0,5	0,5	0,8	1,1	1,4	1,8

Würth Injection system WIT-EA 200

Performances
Displacement

Annex C 3