EUROPEAN TECHNICAL ASSESSMENT

XMAX

Scell-it®

Deutsches Institut für Bautechnik

Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Member of EOTA
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Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-14/0064 of 14 July 2014

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Scell-It Injection System X-MAX for concrete
Product family to which the construction product belongs	Bonded Anchor with Anchor rod for use in non-cracked concrete
Manufacturer	SCELL-IT 28 Rue Paul Dubrule 59854 LESQUIN FRANKREICH
Manufacturing plant	Scell-It Plant 1, Germany
This European Technical Assessment contains	23 pages including 3 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	Guideline for European technical approval of "Metal anchors for use in concrete", ETAG 001 Part 5: "Bonded anchors", April 2013, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.

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Specific Part

1 Technical description of the product

The "Scell-It Injection system X-MAX for concrete" is a bonded anchor consisting of a cartridge with injection mortar X-MAX and a steel element. The steel element consist of a commercial threaded rod with washer and hexagon nut in the range of M8 to M30 or a reinforcing bar in the range of diameter 8 to 32 mm.

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 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 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance for tension loads	See Annex C 1 / C 3 / C 5 / C 7
Characteristic resistance for shear loads	See Annex C 2 / C 4 / C 6 / C 8
Displacements under tension and shear loads	See Annex C 9 / C 10

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 (NPD)

3.3 Hygiene, health and the environment (BWR 3)

Regarding dangerous substances there may be requirements (e.g. transposed European legislation and national laws, regulations and administrative provisions) applicable to the products falling within the scope of this European Technical Assessment. In order to meet the provisions of 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)

The essential characteristics regarding Safety in use are included under the Basic Works Requirement Mechanical resistance and stability.

3.5 Protection against noise (BWR 5)

Not applicable.

3.6 Energy economy and heat retention (BWR 6)

Not applicable.

3.7 Sustainable use of natural resources (BWR 7)

The sustainable use of natural resources was not investigated.

3.8 General aspects

The verification of durability is part of testing the essential characteristics. Durability is only ensured if the specifications of intended use according to Annex B are taken into account.

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

According to Decision of the Commission of 24 June 1996 (96/582/EC) (OJ L 254 of 08.10.96 p. 62-65), the system of assessment and verification of constancy of performance (see Annex V and Article 65 Paragraph 2 to Regulation (EU) No 305/2011) given in the following table applies.

Product	Intended use	Level or class	System
Metal anchors for use in concrete (heavy-duty type)	For fixing and/or supporting concrete structural elements or heavy units such as cladding and suspended ceilings	—	1

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.

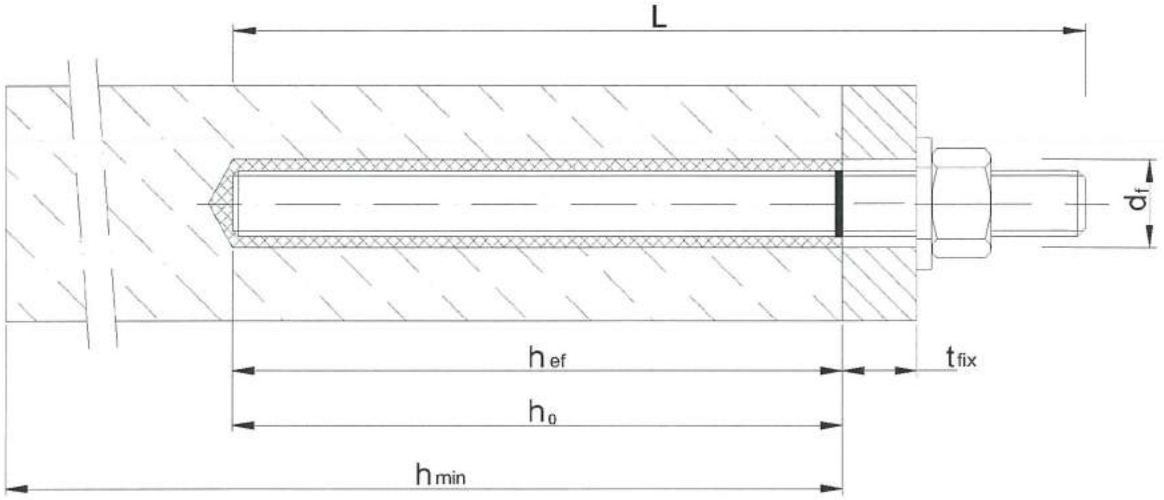
Issued in Berlin on 14 July 2014 by Deutsches Institut für Bautechnik

Uwe Bender
Head of Department

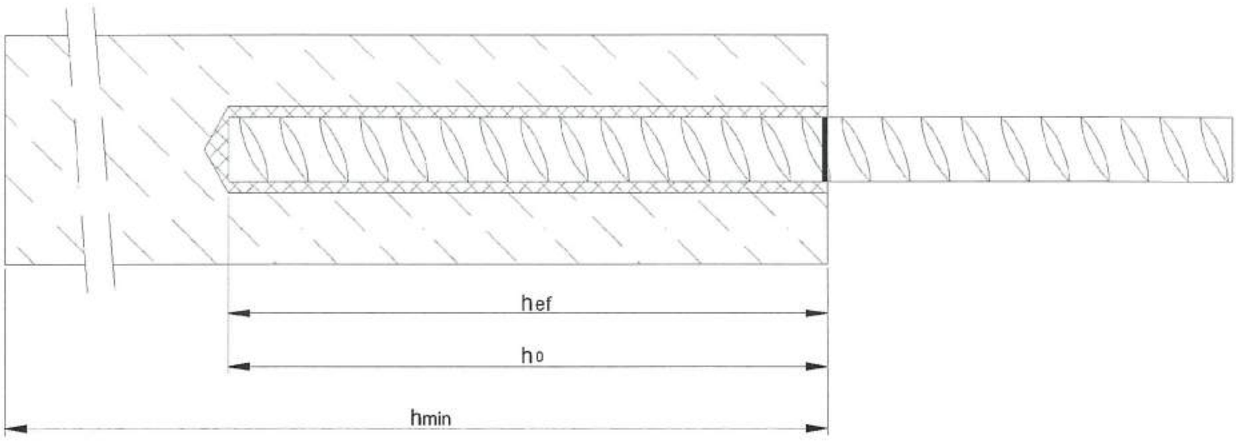
Beglaubigt:
Baderschneider

Deutsches Institut für Bautechnik DIBt

Installation threaded rod



Installation reinforcing bar



d_f	=	diameter of clearance hole in the fixture
t_{fix}	=	thickness of fixture
h_{ef}	=	effective anchorage depth
h_0	=	depth of drill hole
h_{min}	=	minimum thickness of member

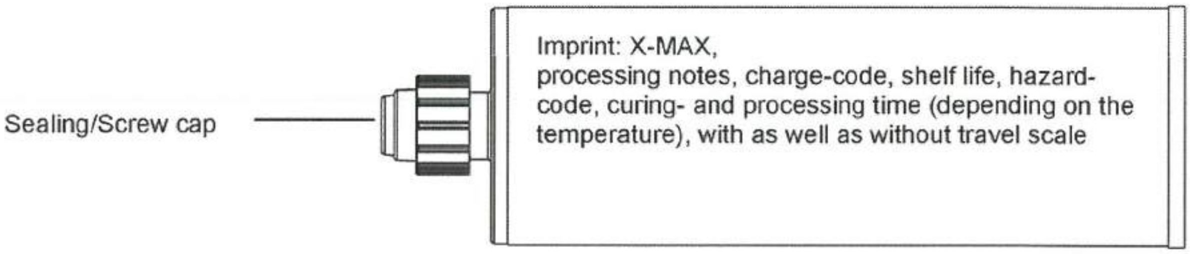
Scell-It Injection System X-MAX for concrete

Product description
Installed condition

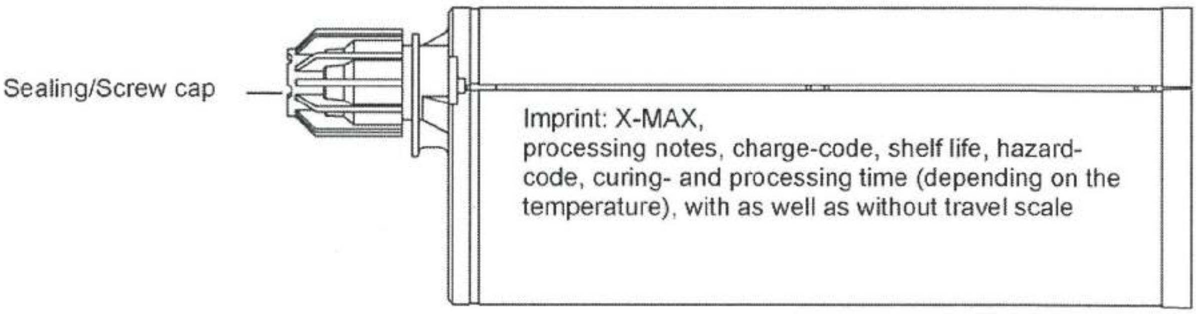
Annex A 1

Cartridge: X-MAX

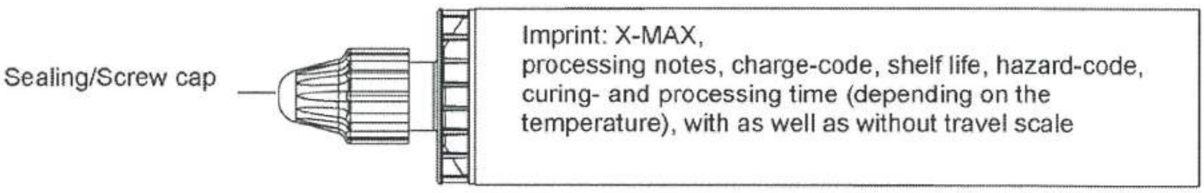
150 ml, 280 ml, 300 ml up to 333 ml and 380 ml up to 420 ml cartridge (Type: coaxial)



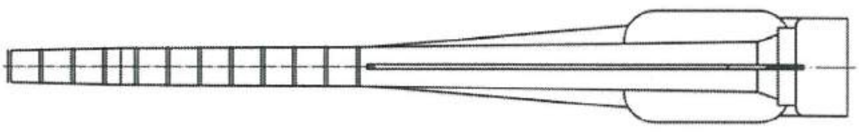
235 ml, 345 ml and 825 ml cartridge (Type: "side-by-side")



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



Static Mixer

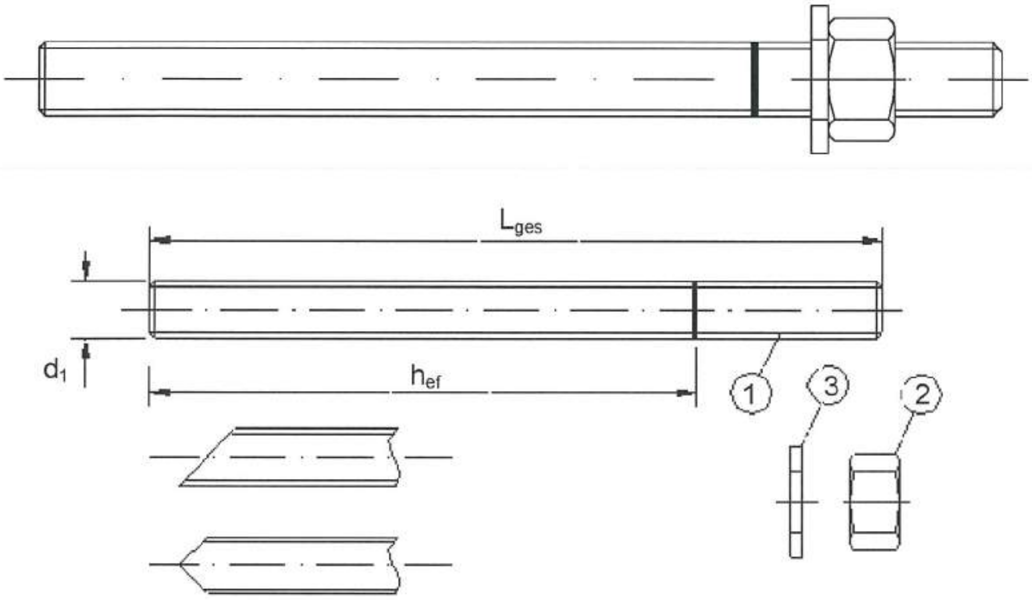


Scell-It Injection System X-MAX for concrete	**Annex A 2**
Product description Injection system	

Deutsches Institut für Bautechnik

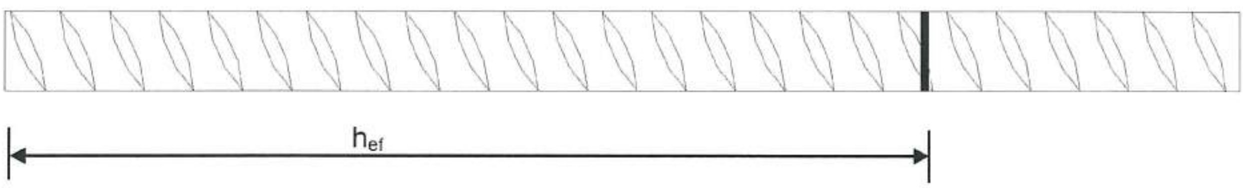
DIBt

Threaded rod M8, M10, M12, M16, M20, M24, M27, M30 with washer and hexagon nut



Commercial standard threaded rod with:
- Materials, dimensions and mechanical properties acc. Table A1
- Inspection certificate 3.1 acc. to EN 10204:2004
- Marking of embedment depth

Reinforcing bar ∅ 8, ∅ 10, ∅ 12, ∅ 14, ∅ 16, ∅ 20, ∅ 25, ∅ 28, ∅ 32



- Minimum value of related rip area $f_{R,min}$ according to EN 1992-1-1:2004+AC:2010
- Rib height of the bar shall be in the range $0{,}05d \leq h \leq 0{,}07d$
  (d: Nominal diameter of the bar; h: Rip height of the bar)

Scell-It Injection System X-MAX for concrete	Annex A 3
Product description Threaded rod and reinforcing bar	

Table A1: Materials

Part	Designation	Material
Steel, zinc plated ≥ 5 µm acc. to EN ISO 4042:1999 or Steel, hot-dip galvanised ≥ 40 µm acc. to EN ISO 1461:2009 and EN ISO 10684:2004+AC:2009		
1	Anchor rod	Steel, EN 10087:1998 or EN 10263:2001 Property class 4.6, 5.8, 8.8, EN 1993-1-8:2005+AC:2009
2	Hexagon nut, EN ISO 4032:2012	Steel acc. to EN 10087:1998 or EN 10263:2001 Property class 4 (for class 4.6 rod) EN ISO 898-2:2012, Property class 5 (for class 5.8 rod) EN ISO 898-2:2012, Property class 8 (for class 8.8 rod) EN ISO 898-2:2012
3	Washer, EN ISO 887:2006, EN ISO 7089:2000, EN ISO 7093:2000 or EN ISO 7094:2000	Steel, zinc plated or hot-dip galvanised
Stainless steel		
1	Anchor rod	Material 1.4401 / 1.4404 / 1.4571, EN 10088-1:2005, > M24: Property class 50 EN ISO 3506-1:2009 ≤ M24: Property class 70 EN ISO 3506-1:2009
2	Hexagon nut, EN ISO 4032:2012	Material 1.4401 / 1.4404 / 1.4571 EN 10088:2005, > M24: Property class 50 (for class 50 rod) EN ISO 3506-2:2009 ≤ M24: Property class 70 (for class 70 rod) EN ISO 3506-2:2009
3	Washer, EN ISO 887:2006, EN ISO 7089:2000, EN ISO 7093:2000 or EN ISO 7094:2000	Material 1.4401, 1.4404 or 1.4571, EN 10088-1:2005
High corrosion resistance steel		
1	Anchor rod	Material 1.4529 / 1.4565, EN 10088-1:2005, > M24: Property class 50 EN ISO 3506-1:2009 ≤ M24: Property class 70 EN ISO 3506-1:2009
2	Hexagon nut, EN ISO 4032:2012	Material 1.4529 / 1.4565 EN 10088-1:2005, > M24: Property class 50 (for class 50 rod) EN ISO 3506-2:2009 ≤ M24: Property class 70 (for class 70 rod) EN ISO 3506-2:2009
3	Washer, EN ISO 887:2006, EN ISO 7089:2000, EN ISO 7093:2000 or EN ISO 7094:2000	Material 1.4529 / 1.4565, EN 10088-1:2005
Reinforcing bars		
1	Rebar EN 1992-1-1:2004+AC:2010, Annex C	Bars and de-coiled rods class B or C f_{yk} and k according to NDP or NCL of EN 1992-1-1/NA:2013 $f_{uk} = f_{tk} = k \cdot f_{yk}$

Scell-It Injection System X-MAX for concrete	**Annex A 4**
Product description Materials	

Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads: M8 to M30, Rebar Ø8 to Ø32.

Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000.
- Strength classes C20/25 to C50/60 according to EN 206-1:2000.
- Non-cracked concrete: M8 to M30, Rebar Ø8 to Ø32.

Temperature Range:

- I: - 40 °C to +40 °C (max long term temperature +24 °C and max short term temperature +40 °C)
- II: - 40 °C to +80 °C (max long term temperature +50 °C and max short term temperature +80 °C)
- III: - 40 °C to +120 °C (max long term temperature +72 °C and max short term temperature +120 °C)

Use conditions (Environmental conditions):

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

Design:

- 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 (e. g. position of the anchor relative to reinforcement or to supports, etc.).
- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Anchorages under static or quasi-static actions are designed in accordance with:
  - EOTA Technical Report TR 029 "Design of bonded anchors", Edition September 2010 or
  - CEN/TS 1992-4:2009
- Anchorages under seismic actions (cracked concrete) are designed in accordance with:
  - EOTA Technical Report TR 045 "Design of Metal Anchors under Seismic Action", Edition February 2013
  - Anchorages shall be positioned outside of critical regions (e.g. plastic hinges) of the concrete structure.
  - Fastenings in stand-off installation or with a grout layer are not allowed.

Installation:

- Dry or wet concrete: M8 to M30, Rebar Ø8 to Ø32.
- Flooded holes (not sea water): M8 to M16, Rebar Ø8 to Ø16.
- Hole drilling by hammer or compressed air drill mode.
- Overhead installation allowed.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.

Scell-It Injection System X-MAX for concrete	**Annex B 1**
Intended Use Specifications	

Table B1: Installation parameters for threaded rod

Anchor size		M 8	M 10	M 12	M 16	M 20	M 24	M 27	M 30
Nominal drill hole diameter	d_0 [mm] =	10	12	14	18	24	28	32	35
Effective anchorage depth	$h_{ef,min}$ [mm] =	60	60	70	80	90	96	108	120
	$h_{ef,max}$ [mm] =	160	200	240	320	400	480	540	600
Diameter of clearance hole in the fixture	d_f [mm] ≤	9	12	14	18	22	26	30	33
Diameter of steel brush	d_b [mm] ≥	12	14	16	20	26	30	34	37
Torque moment	T_{inst} [Nm] ≤	10	20	40	80	120	160	180	200
Thickness of fixture	$t_{fix,min}$ [mm] >	0							
	$t_{fix,max}$ [mm] <	1500							
Minimum thickness of member	h_{min} [mm]	h_{ef} + 30 mm ≥ 100 mm			$h_{ef} + 2d_0$				
Minimum spacing	s_{min} [mm]	40	50	60	80	100	120	135	150
Minimum edge distance	c_{min} [mm]	40	50	60	80	100	120	135	150

Table B2: Installation parameters for rebar

Rebar size		∅ 8	∅ 10	∅ 12	∅ 14	∅ 16	∅ 20	∅ 25	∅ 28	∅ 32
Nominal drill hole diameter	d_0 [mm] =	12	14	16	18	20	24	32	35	40
Effective anchorage depth	$h_{ef,min}$ [mm] =	60	60	70	75	80	90	100	112	128
	$h_{ef,max}$ [mm] =	160	200	240	280	320	400	480	540	640
Diameter of steel brush	d_b [mm] ≥	14	16	18	20	22	26	34	37	41,5
Minimum thickness of member	h_{min} [mm]	h_{ef} + 30 mm ≥ 100 mm		$h_{ef} + 2d_0$						
Minimum spacing	s_{min} [mm]	40	50	60	70	80	100	125	140	160
Minimum edge distance	c_{min} [mm]	40	50	60	70	80	100	125	140	160

Steel brush

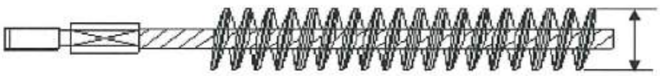
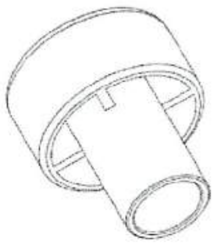


Table B3: Parameter cleaning and setting tools

Threaded Rod	Rebar	d_0 Drill bit - ∅	d_b Brush - ∅	$d_{b,min}$ min. Brush - ∅	Piston plug
(mm)	(mm)	(mm)	(mm)	(mm)	(No.)
M8		10	12	10,5	No piston plug required
M10	8	12	14	12,5	
M12	10	14	16	14,5	
	12	16	18	16,5	
M16	14	18	20	18,5	
	16	20	22	20,5	
M20	20	24	26	24,5	# 24
M24		28	30	28,5	# 28
M27	25	32	34	32,5	# 32
M30	28	35	37	35,5	# 35
	32	40	41,5	40,5	# 38

Hand pump (volume 750 ml)
Drill bit diameter (d_0): 10 mm to 20 mm

Recommended compressed air tool (min 6 bar)
Drill bit diameter (d_0): 10 mm to 40 mm



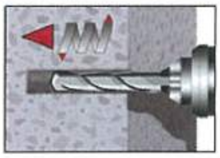
Piston plug for overhead or horizontal installation
Drill bit diameter (d_0): 24 mm to 40 mm

Scell-It Injection System X-MAX for concrete

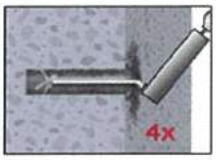
Intended Use
Cleaning and setting tools

Annex B 3

Installation instructions



1. Drill with hammer drill a hole into the base material to the size and embedment depth required by the selected anchor (Table B1 or Table B2). In case of aborted drill hole: the drill hole shall be filled with mortar



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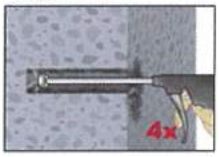
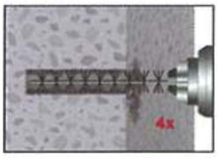


Attention! Standing water in the bore hole must be removed before cleaning.

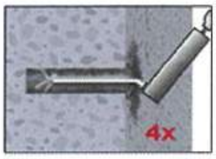
2a. Starting from the bottom or back of the bore hole, blow the hole clean with compressed air (min. 6 bar) or a hand pump (Annex B 3) a minimum of four times. If the bore hole ground is not reached an extension shall be used.

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

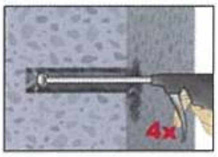
For bore holes larger than 20 mm or deeper 240 mm, compressed air (min. 6 bar) **must** be used.



2b. Check brush diameter (Table B3) and attach the brush to a drilling machine or a battery screwdriver. Brush the hole with an appropriate sized wire brush > $d_{b,min}$ (Table B3) a minimum of four times.
If the bore hole ground is not reached with the brush, a brush extension shall be used (Table B3).

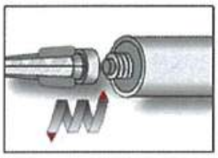


or

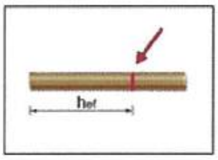


2c. Finally blow the hole clean again with compressed air (min. 6 bar) or a hand pump (Annex B 3) a minimum of four times. If the bore hole ground is not reached an extension shall be used.
The hand-pump can be used for anchor sizes up to bore hole diameter 20 mm.
For bore holes larger than 20 mm or deeper 240 mm, compressed air (min. 6 bar) **must** be used.

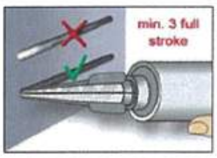
After cleaning, the bore hole has to be protected against re-contamination in an appropriate way, until dispensing the mortar in the bore hole. If necessary, the cleaning repeated has to be directly before dispensing the mortar. In-flowing water must not contaminate the bore hole again.



3. Attach a supplied static-mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool. Cut off the foil tube clip before use.
For every working interruption longer than the recommended working time (Table B4) 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.



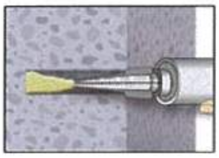
5. Prior to dispensing into the anchor hole, squeeze out separately a minimum of three full strokes and discard non-uniformly mixed adhesive components until the mortar shows a consistent grey colour. For foil tube cartridges is must be discarded a minimum of six full strokes.

Scell-It Injection System X-MAX for concrete

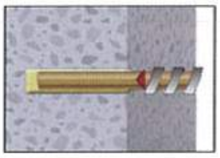
Intended Use
Installation instructions

Annex B 4

Installation instructions (continuation)

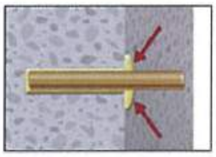


6. Starting from the bottom or back of the cleaned anchor hole fill the hole up to approximately two-thirds with adhesive. Slowly withdraw the static mixing nozzle as the hole fills to avoid creating air pockets. For embedment larger than 190 mm an extension nozzle shall be used. For overhead and horizontal installation a piston plug (Annex B 3) and extension nozzle shall be used. Observe the gel-/ working times given in Table B4.

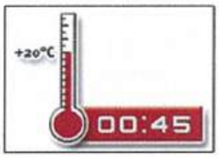


7. Push the threaded rod or reinforcing bar into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached.

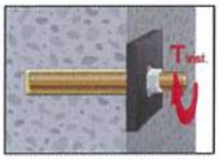
The anchor should be free of dirt, grease, oil or other foreign material.



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. For overhead application the anchor rod should be fixed (e.g. wedges).



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 B4).



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

Table B4: Minimum curing time

Concrete temperature	Gelling- / working time	Minimum curing time in dry concrete[2)]
≥ -10 °C [1)]	90 min	24 h
≥ -5 °C	90 min	14 h
≥ 0 °C	45 min	7 h
≥ + 5 °C	25 min	2 h
≥ + 10 °C	15 min	80 min
≥ + 20 °C	6 min	45 min
≥ + 30 °C	4 min	25 min
≥ + 35 °C	2 min	20 min
≥ + 40 °C	1,5 min	15 min

[1)] Cartridge temperature **must** be at min. +15°C
[2)] In wet concrete the curing time **must** be doubled

Scell-It Injection System X-MAX for concrete	Annex B 5
Intended Use Installation instructions (continuation) Curing time	

Table C1: Characteristic values of resistance for threaded rods under tension loads in non-cracked concrete (Design according to TR 029)

Anchor size threaded rod				M 8	M 10	M 12	M 16	M 20	M24	M 27	M 30
Steel failure											
Characteristic tension resistance, Steel, property class 4.6		$N_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Characteristic tension resistance, Steel, property class 5.8		$N_{Rk,s}$	[kN]	18	29	42	78	122	176	230	280
Characteristic tension resistance, Steel, property class 8.8		$N_{Rk,s}$	[kN]	29	46	67	125	196	282	368	449
Characteristic tension resistance, Stainless steel A4 and HCR, property class 50 (>M24) and 70 (≤ M24)		$N_{Rk,s}$	[kN]	26	41	59	110	171	247	230	281
Combined pull-out and concrete cone failure											
Characteristic bond resistance in non-cracked concrete C20/25											
Temperature range I: 40°C/24°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	10	12	12	12	12	11	10	9
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	7,5	8,5	8,5	8,5	not admissible			
Temperature range II: 80°C/50°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	7,5	9	9	9	9	8,5	7,5	6,5
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	5,5	6,5	6,5	6,5	not admissible			
Temperature range III: 120°C/72°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	5,5	6,5	6,5	6,5	6,5	6,5	5,5	5,0
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	4,0	5,0	5,0	5,0	not admissible			
Increasing factors for concrete ψ_c		C30/37		1,04							
		C40/50		1,08							
		C50/60		1,10							
Splitting failure											
Edge distance		$c_{cr,sp}$	[mm]	$1{,}0 \cdot h_{ef} \leq 2 \cdot h_{ef}\left(2{,}5 - \frac{h}{h_{ef}}\right) \leq 2{,}4 \cdot h_{ef}$							
Axial distance		$s_{cr,sp}$	[mm]	2 $c_{cr,sp}$							
Install safety factor (dry and wet concrete)		γ_2		1,0	1,2						
Install safety factor (flooded bore hole)		γ_2		1,4				not admissible			

Scell-It Injection System X-MAX for concrete

Performances
Characteristic values of resistance for threaded rods under tension loads in non-cracked concrete (Design according to TR 029)

Annex C 1

Table C2: Characteristic values of resistance for threaded rods under shear loads in non-cracked concrete (Design according to TR 029 or TR 045)

Anchor size threaded rod			M 8	M 10	M 12	M 16	M 20	M24	M 27	M 30
Steel failure without lever arm										
Characteristic shear resistance, Steel, property class 4.6	$V_{Rk,s}$	[kN]	7	12	17	31	49	71	92	112
Characteristic shear resistance, Steel, property class 5.8	$V_{Rk,s}$	[kN]	9	15	21	39	61	88	115	140
Characteristic shear resistance, Steel, property class 8.8	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Characteristic shear resistance, Stainless steel A4 and HCR, property class 50 (>M24) and 70 (≤ M24)	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	115	140
Steel failure with lever arm										
Characteristic bending moment, Steel, property class 4.6	$M^0_{Rk,s}$	[Nm]	15	30	52	133	260	449	666	900
Characteristic bending moment, Steel, property class 5.8	$M^0_{Rk,s}$	[Nm]	19	37	65	166	324	560	833	1123
Characteristic bending moment, Steel, property class 8.8	$M^0_{Rk,s}$	[Nm]	30	60	105	266	519	896	1333	1797
Characteristic bending moment, Stainless steel A4 and HCR, property class 50 (>M24) and 70 (≤ M24)	$M^0_{Rk,s}$	[Nm]	26	52	92	232	454	784	832	1125
Concrete pry-out failure										
Factor k in equation (5.7) of Technical Report TR 029 for the design of Bonded Anchors	k	[-]	2,0							
Installation safety factor	γ_2		1,0							
Concrete edge failure										
Installation safety factor	γ_2		1,0							

Table C3: Characteristic values of resistance for rebar under tension loads in non-cracked concrete (Design according to TR 029)

Anchor size reinforcing bar				**Ø 8**	**Ø 10**	**Ø 12**	**Ø 14**	**Ø 16**	**Ø 20**	**Ø 25**	**Ø 28**	**Ø 32**
Steel failure												
Characteristic tension resistance		$N_{Rk,s}$	[kN]	$A_s \cdot f_{uk}$								
Combined pull-out and concrete cone failure												
Characteristic bond resistance in uncracked concrete C20/25												
Temperature range I: 40°C/24°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	10	12	12	12	12	12	11	10	8,5
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	7,5	8,5	8,5	8,5	8,5	not admissible			
Temperature range II: 80°C/50°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	7,5	9	9	9	9	9	8,0	7,0	6,0
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	5,5	6,5	6,5	6,5	6,5	not admissible			
Temperature range III: 120°C/72°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	5,5	6,5	6,5	6,5	6,5	6,5	6,0	5,0	4,5
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	4,0	5,0	5,0	5,0	5,0	not admissible			
Increasing factors for concrete ψ_c		C30/37		1,04								
		C40/50		1,08								
		C50/60		1,10								
Splitting failure												
Edge distance		$c_{cr,sp}$	[mm]	$1{,}0 \cdot h_{ef} \leq 2 \cdot h_{ef} \left(2{,}5 - \frac{h}{h_{ef}}\right) \leq 2{,}4 \cdot h_{ef}$								
Axial distance		$s_{cr,sp}$	[mm]	$2\, c_{cr,sp}$								
Installation safety factor (dry and wet concrete)		γ_2		1,0	1,2							
Installation safety factor (flooded bore hole)		γ_2		1,4					not admissible			

Table C4: Characteristic values of resistance for rebar under shear loads in non-cracked concrete (Design according to TR 029 or TR 045)

Anchor size reinforcing bar			Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
Steel failure without lever arm											
Characteristic shear resistance	$V_{Rk,s}$	[kN]	$0,50 \cdot A_s \cdot f_{uk}$								
Steel failure with lever arm											
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	$1.2 \cdot W_{el} \cdot f_{uk}$								
Concrete pry-out failure											
Factor k in equation (5.7) of Technical Report TR 029 for the design of bonded anchors	k	[-]	2,0								
Installation safety factor	γ_2		1,0								
Concrete edge failure											
Installation safety factor	γ_2		1,0								

Scell-It Injection System X-MAX for concrete

Performances
Characteristic values of resistance for rebar under shear loads in non-cracked concrete, (Design according to TR 029 or TR 045)

Annex C 4

Table C5: Characteristic values of resistance for threaded rods under tension loads in non-cracked concrete (Design according to CEN/TS 1992-4)

Anchor size threaded rod				M 8	M 10	M 12	M 16	M 20	M24	M 27	M 30
Steel failure											
Characteristic tension resistance, Steel, property class 4.6		$N_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Characteristic tension resistance, Steel, property class 5.8		$N_{Rk,s}$	[kN]	18	29	42	78	122	176	230	280
Characteristic tension resistance, Steel, property class 8.8		$N_{Rk,s}$	[kN]	29	46	67	125	196	282	368	449
Characteristic tension resistance, Stainless steel A4 and HCR, property class 50 (>M24) and 70 (≤ M24)		$N_{Rk,s}$	[kN]	26	41	59	110	171	247	230	281
Combined pull-out and concrete failure											
Characteristic bond resistance in non-cracked concrete C20/25											
Temperature range I: 40°C/24°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	10	12	12	12	12	11	10	9
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	7,5	8,5	8,5	8,5	not admissible			
Temperature range II: 80°C/50°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	7,5	9	9	9	9	8,5	7,5	6,5
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	5,5	6,5	6,5	6,5	not admissible			
Temperature range III: 120°C/72°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	5,5	6,5	6,5	6,5	6,5	6,5	5,5	5,0
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	4,0	5,0	5,0	5,0	not admissible			
Increasing factors for concrete ψ_c		C30/37		1,04							
		C40/50		1,08							
		C50/60		1,10							
Factor according to CEN/TS 1992-4-5 Section 6.2.2.3		k_8	[-]	10,1							
Concrete cone failure											
Factor according to CEN/TS 1992-4-5 Section 6.2.3.1		k_{ucr}	[-]	10,1							
Edge distance		$c_{cr,N}$	[mm]	1,5 h_{ef}							
Axial distance		$s_{cr,N}$	[mm]	3,0 h_{ef}							
Splitting failure											
Edge distance		$c_{cr,sp}$	[mm]	$1{,}0 \cdot h_{ef} \leq 2 \cdot h_{ef}\left(2{,}5 - \frac{h}{h_{ef}}\right) \leq 2{,}4 \cdot h_{ef}$							
Axial distance		$s_{cr,sp}$	[mm]	2 $c_{cr,sp}$							
Installation safety factor (dry and wet concrete)		γ_2		1,0	1,2						
Installation safety factor (flooded bore hole)		γ_2		1,4				not admissible			

Scell-It Injection System X-MAX for concrete

Performances
Characteristic values of resistance for threaded rods under tension loads in non-cracked concrete (Design according to CEN/TS 1992-4)

Annex C 5

Table C6: Characteristic values of resistance for threaded rods under shear loads in non-cracked concrete (Design according to CEN/TS 1992-4 or TR 045)

Anchor size threaded rod			M 8	M 10	M 12	M 16	M 20	M24	M 27	M 30
Steel failure without lever arm										
Characteristic shear resistance, Steel, property class 4.6	$V_{Rk,s}$	[kN]	7	12	17	31	49	71	92	112
Characteristic shear resistance, Steel, property class 5.8	$V_{Rk,s}$	[kN]	9	15	21	39	61	88	115	140
Characteristic shear resistance, Steel, property class 8.8	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	184	224
Characteristic shear resistance, Stainless steel A4 and HCR, property class 50 (>M24) and 70 (≤ M24)	$V_{Rk,s}$	[kN]	13	20	30	55	86	124	115	140
Ductility factor according to CEN/TS 1992-4-5 Section 6.3.2.1	k_2		0,8							
Steel failure with lever arm										
Characteristic bending moment, Steel, property class 4.6	$M^0_{Rk,s}$	[Nm]	15	30	52	133	260	449	666	900
Characteristic bending moment, Steel, property class 5.8	$M^0_{Rk,s}$	[Nm]	19	37	65	166	324	560	833	1123
Characteristic bending moment, Steel, property class 8.8	$M^0_{Rk,s}$	[Nm]	30	60	105	266	519	896	1333	1797
Characteristic bending moment, Stainless steel A4 and HCR, property class 50 (>M24) and 70 (≤ M24)	$M^0_{Rk,s}$	[Nm]	26	52	92	232	454	784	832	1125
Concrete pry-out failure										
Factor in equation (27) of CEN/TS 1992-4-5 Section 6.3.3	k_3		2,0							
Installation safety factor	γ_2		1,0							
Concrete edge failure[3]										
Effective length of anchor	l_f	[mm]	$l_f = \min(h_{ef};\ 8\ d_{nom})$							
Outside diameter of anchor	d_{nom}	[mm]	8	10	12	16	20	24	27	30
Installation safety factor	γ_2		1,0							

Table C7: Characteristic values of resistance for rebar under tension loads in non-cracked concrete (Design according to CEN/TS 1992-4)

Anchor size reinforcing bar				Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
Steel failure												
Characteristic tension resistance		$N_{Rk,s}$	[kN]	$A_s \cdot f_{uk}$								
Combined pull-out and concrete failure												
Characteristic bond resistance in non-cracked concrete C20/25												
Temperature range I: 40°C/24°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	10	12	12	12	12	12	11	10	8,5
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	7,5	8,5	8,5	8,5	8,5	not admissible			
Temperature range II: 80°C/50°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	7,5	9	9	9	9	9	8,0	7,0	6,0
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	5,5	6,5	6,5	6,5	6,5	not admissible			
Temperature range III: 120°C/72°C	dry and wet concrete	$\tau_{Rk,ucr}$	[N/mm²]	5,5	6,5	6,5	6,5	6,5	6,5	6,0	5,0	4,5
	flooded bore hole	$\tau_{Rk,ucr}$	[N/mm²]	4,0	5,0	5,0	5,0	5,0	not admissible			
Increasing factors for concrete ψ_c		C30/37		1,04								
		C40/50		1,08								
		C50/60		1,10								
Factor according to CEN/TS 1992-4-5 Section 6.2.2.3		k_8	[-]	10,1								
Concrete cone failure												
Factor according to CEN/TS 1992-4-5 Section 6.2.3.1		k_{ucr}	[-]	10,1								
Edge distance		$c_{cr,N}$	[mm]	1,5 h_{ef}								
Axial distance		$s_{cr,N}$	[mm]	3,0 h_{ef}								
Splitting failure												
Edge distance		$c_{cr,sp}$	[mm]	$1{,}0 \cdot h_{ef} \leq 2 \cdot h_{ef} \left(2{,}5 - \frac{h}{h_{ef}} \right) \leq 2{,}4 \cdot h_{ef}$								
Axial distance		$s_{cr,sp}$	[mm]	2 $c_{cr,sp}$								
Installation safety factor (dry and wet concrete)		γ_2		1.0	1,2							
Installation safety factor (flooded bore hole)		γ_2		1,4					not admissible			

Scell-It Injection System X-MAX for concrete

Performances
Characteristic values of resistance for rebar under tension loads in non-cracked concrete (Design according to CEN/TS 1992-4)

Annex C 7

Table C8: Characteristic values of resistance for rebar under shear loads in non-cracked concrete (Design according to CEN/TS 1992-4 or TR 045)

Anchor size reinforcing bar			Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
Steel failure without lever arm											
Characteristic shear resistance	$V_{Rk,s}$	[kN]	$0{,}50 \cdot A_s \cdot f_{uk}$								
Ductility factor according to CEN/TS 1992-4-5 Section 6.3.2.1	k_2		0,8								
Steel failure with lever arm											
Characteristic bending moment	$M^0_{Rk,s}$	[Nm]	$1.2 \cdot W_{el} \cdot f_{uk}$								
Concrete pry-out failure											
Factor in equation (27) of CEN/TS 1992-4-5 Section 6.3.3	k_3		2,0								
Installation safety factor	γ_2		1,0								
Concrete edge failure											
Effective length of anchor	l_f	[mm]	$l_f = \min(h_{ef}; 8\ d_{nom})$								
Outside diameter of anchor	d_{nom}	[mm]	8	10	12	14	16	20	24	27	30
Installation safety factor	γ_2		1,0								

Scell-It Injection System X-MAX for concrete

Performances
Characteristic values of resistance for rebar under shear loads in non-cracked concrete, (Design according to CEN/TS 1992-4 or TR 045)

Annex C 8

Deutsches Institut für Bautechnik DIBt

Table C9: Displacements under tension load[1)] (threaded rod)

Anchor size threaded rod			M 8	M 10	M 12	M 16	M 20	M24	M 27	M 30
Non-cracked concrete C20/25										
Temperature range I: 40°C/24°C	δ_{N0}-factor	[mm/(N/mm²)]	0,021	0,023	0,026	0,031	0,036	0,041	0,045	0,049
	$\delta_{N\infty}$-factor	[mm/(N/mm²)]	0,030	0,033	0,037	0,045	0,052	0,060	0,065	0,071
Temperature range II: 80°C/50°C	δ_{N0}-factor	[mm/(N/mm²)]	0,050	0,056	0,063	0,075	0,088	0,100	0,110	0,119
	$\delta_{N\infty}$-factor	[mm/(N/mm²)]	0,072	0,081	0,090	0,108	0,127	0,145	0,159	0,172
Temperature range III: 120°C/72°C	δ_{N0}-factor	[mm/(N/mm²)]	0,050	0,056	0,063	0,075	0,088	0,100	0,110	0,119
	$\delta_{N\infty}$-factor	[mm/(N/mm²)]	0,072	0,081	0,090	0,108	0,127	0,145	0,159	0,172

[1)] Calculation of the displacement
$\delta_{N0} = \delta_{N0}\text{-factor} \cdot \tau$;
$\delta_{N\infty} = \delta_{N\infty}\text{-factor} \cdot \tau$;

Table C10: Displacements under shear load[1)] (threaded rod)

Anchor size threaded rod			M 8	M 10	M 12	M 16	M 20	M24	M 27	M 30
For non-cracked concrete C20/25										
All temperature ranges	δ_{V0}-factor	[mm/(kN)]	0,06	0,06	0,05	0,04	0,04	0,03	0,03	0,03
	$\delta_{V\infty}$-factor	[mm/(kN)]	0,09	0,08	0,08	0,06	0,06	0,05	0,05	0,05

[1)] Calculation of the displacement
$\delta_{V0} = \delta_{V0}\text{-factor} \cdot V$;
$\delta_{V\infty} = \delta_{V\infty}\text{-factor} \cdot V$;

Scell-It Injection System X-MAX for concrete	Annex C 9
Performances Displacements (threaded rods)	

Table C11: Displacements under tension load[1] (rebar)

Anchor size reinforcing bar			Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
Non-cracked concrete C20/25											
Temperature range I: 40°C/24°C	δ_{N0}-factor	[mm/(N/mm²)]	0,021	0,023	0,026	0,028	0,031	0,036	0,043	0,047	0,052
	$\delta_{N\infty}$-factor	[mm/(N/mm²)]	0,030	0,033	0,037	0,041	0,045	0,052	0,061	0,071	0,075
Temperature range II: 80°C/50°C	δ_{N0}-factor	[mm/(N/mm²)]	0,050	0,056	0,063	0,069	0,075	0,088	0,104	0,113	0,126
	$\delta_{N\infty}$-factor	[mm/(N/mm²)]	0,072	0,081	0,090	0,099	0,108	0,127	0,149	0,163	0,181
Temperature range III: 120°C/72°C	δ_{N0}-factor	[mm/(N/mm²)]	0,050	0,056	0,063	0,069	0,075	0,088	0,104	0,113	0,126
	$\delta_{N\infty}$-factor	[mm/(N/mm²)]	0,072	0,081	0,090	0,099	0,108	0,127	0,149	0,163	0,181

[1] Calculation of the displacement
$\delta_{N0} = \delta_{N0}\text{-factor} \cdot \tau$;
$\delta_{N\infty} = \delta_{N\infty}\text{-factor} \cdot \tau$;

Table C12: Displacement under shear load[1] (rebar)

Anchor size reinforcing bar			Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
Non-cracked concrete C20/25											
All temperature ranges	δ_{V0}-factor	[mm/(kN)]	0,06	0,05	0,05	0,04	0,04	0,04	0,03	0,03	0,03
	$\delta_{V\infty}$-factor	[mm/(kN)]	0,09	0,08	0,08	0,06	0,06	0,05	0,05	0,04	0,04

[1] Calculation of the displacement
$\delta_{V0} = \delta_{V0}\text{-factor} \cdot V$;
$\delta_{V\infty} = \delta_{V\infty}\text{-factor} \cdot V$;

EUROPEAN TECHNICAL ASSESSMENT

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European Technical Assessment

ETA-14/0065 of 27 June 2014

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Scell-It Injection system X-MAX for rebar connection
Product family to which the construction product belongs	Post-installed rebar connection with Scell-It Injection System X-MAX
Manufacturer	SCELL-IT 28 Rue Paul Dubrule 59854 LESQUIN FRANKREICH
Manufacturing plant	Scell-It Plant 1, Germany
This European Technical Assessment contains	15 pages including 3 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	Guideline for European technical approval of "Metal anchors for use in concrete", ETAG 001 Part 5: "Bonded anchors", April 2013, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.

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Specific Part

1 Technical description of the product

The subject of this European Technical Assessment is the post-installed connection, by anchoring or overlap connection joint, of reinforcing bars (rebars) in existing structures made of normal weight concrete, using the "Scell-It Injection System X-MAX for rebar connection" in accordance with the regulations for reinforced concrete construction.

Reinforcing bars made of steel with a diameter ϕ from 8 to 25 mm and injection mortar X-MAX are used for rebar connections. The reinforcing bar is placed into a drilled hole filled with injection mortar and is anchored via the bond between embedded element, injection mortar and concrete.

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 rebar connection 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 rebar connection 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 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Design values of the ultimate bond resistance	See Annex C 1

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Rebar connections satisfy requirements for Class A1
Resistance to fire	No performance determined (NPD)

3.3 Hygiene, health and the environment (BWR 3)

Regarding dangerous substances there may be requirements (e.g. transposed European legislation and national laws, regulations and administrative provisions) applicable to the products falling within the scope of this European Technical Assessment. In order to meet the provisions of 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)

The essential characteristics regarding Safety in use are included under the Basic Works Requirement Mechanical resistance and stability.

3.5 Protection against noise (BWR 5)

Not applicable.

3.6 Energy economy and heat retention (BWR 6)

Not applicable.

3.7 Sustainable use of natural resources (BWR 7)

The sustainable use of natural resources was not investigated.

3.8 General aspects

The verification of durability is part of testing the essential characteristics. Durability is only ensured if the specifications of intended use according to Annex B are taken into account.

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

According to Decision of the Commission of 24 June 1996 (96/582/EC) (OJ L 254 of 08.10.96 p. 62-65), the system of assessment and verification of constancy of performance (see Annex V and Article 65 Paragraph 2 to Regulation (EU) No 305/2011) given in the following table applies.

Product	Intended use	Level or class	System
Metal anchors for use in concrete (heavy-duty type)	For fixing and/or supporting concrete structural elements or heavy units such as cladding and suspended ceilings	—	1

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Dcoument

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 27 June 2014 by Deutsches Institut für Bautechnik

Dr.-Ing Karsten Kathage
Vice-President

Beglaubigt:
Baderschneider

Figure A1: Overlapping joint for rebar connections of slabs and beams

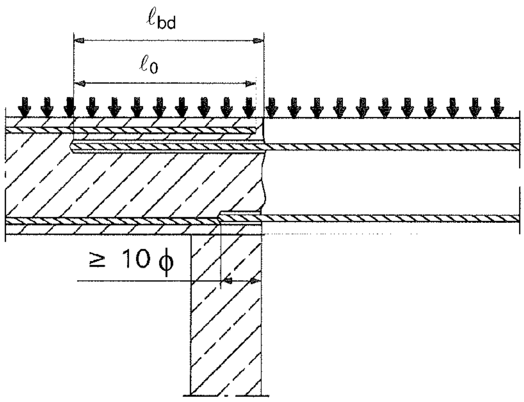


Figure A2: Overlapping joint at a foundation of a wall or column where the rebars are stressed in tension

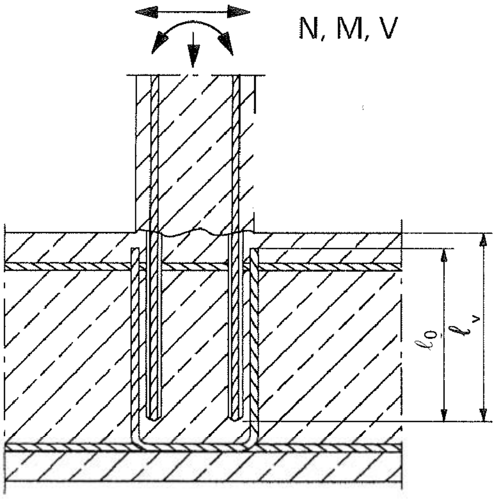


Figure A3: End anchoring of slabs or beams (e.g. designed as simply supported)

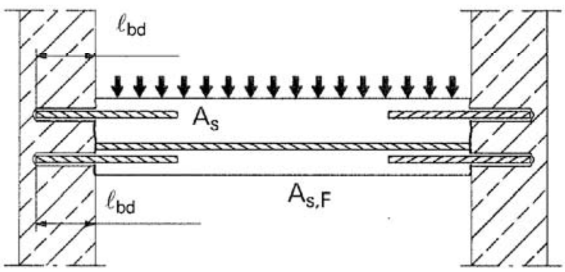


Figure A4: Rebar connection for components stressed primarily in compression. The rebars sre stressed in compression

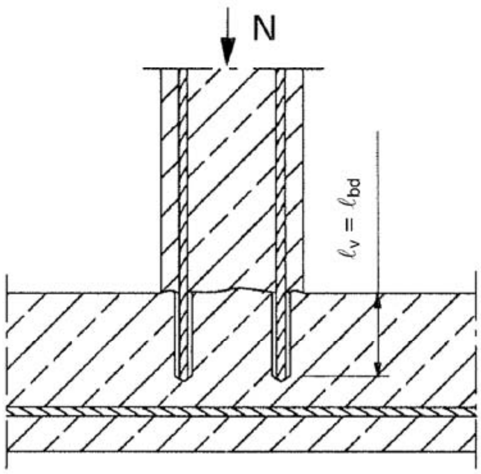
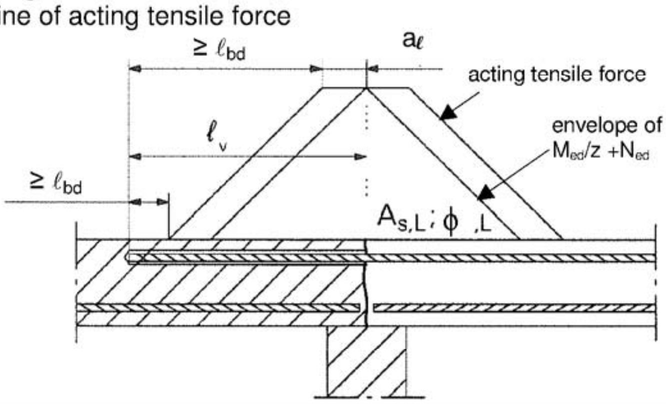


Figure A5: Anchoring of reinforcemend to cover the line of acting tensile force



Note to Figure A1 to A5:

In the Figures no transverse reinforcement is plotted, the transverse reinforcement shall comply with EN 1992-1-1:2004+AC:2010.

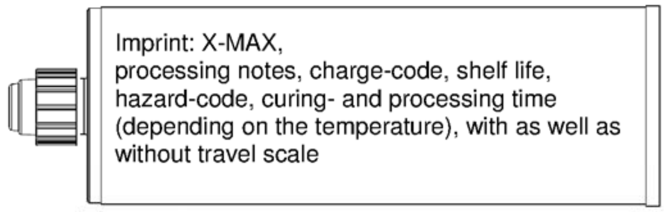
Preparing of joints according to Annex B 2

Scell-It Injection System X-MAX for rebar connection	**Annex A 1**
Product description Installed condition and examples of use for rebars	

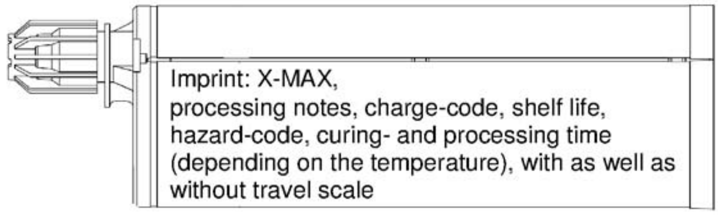
Scell-It Injection System X-MAX:

Injection mortar: X-MAX

Typ "coaxial": 150 ml, 280 ml,
300 ml up to 333 ml and
380 ml up to 420 ml Kartusche



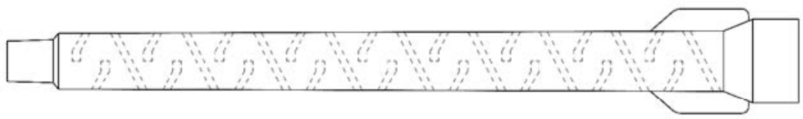
Type "side-by-side":
235 ml, 345 ml and 825 ml cartridge



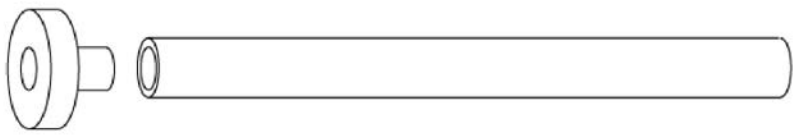
Static Mixer

CRW 14W

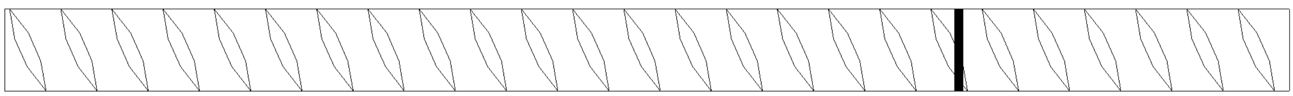
TAH 18W



Piston plug and mixer extension



Reinforcing bar (rebar): ø8, ø10, ø12, ø14, ø16, ø20, ø22, ø24, ø25



- Minimum value of related rip area $f_{R,min}$ according to EN 1992-1-1:2004+AC:2010
- Rib height of the bar shall be in the range $0{,}05\phi \leq h \leq 0{,}07\phi$
  (ϕ: Nominal diameter of the bar; h: Rip height of the bar)

Table A1: Materials

Designation	Material
Rebar EN 1992-1-1:2004+AC:2010, Annex C	Bars and de-coiled rods class B or C f_{yk} and k according to NDP or NCL of EN 1992-1-1/NA:2013 $f_{uk} = f_{tk} = k \cdot f_{yk}$

Scell-It Injection System X-MAX for rebar connection

Product description
Injection mortar / Static mixer / Rebar
Materials

Annex A 2

Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads.

Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206-1:2000.
- Strength classes C12/15 to C50/60 according to EN 206-1:2000.
- Maximum chloride concrete of 0,40% (CL 0.40) related to the cement content according to EN 206-1:2000.
- Non-carbonated concrete.

  Note: In case of a carbonated surface of the existing concrete structure the carbonated layer shall be removed in the area of the post-installed rebar connection with a diameter of ϕ + 60 mm prior to the installation of the new rebar.

  The depth of concrete to be removed shall correspond to at least the minimum concrete cover in accordance with EN 1992-1-1:2004+AC:2010.

  The foregoing may be neglected if building components are new and not carbonated and if building components are in dry conditions.

Temperature Range:

- - 40°C to +80°C (max. short term temperature +80°C and max long term temperature +50°C).

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the forces to be transmitted.
- Design according to EN 1992-1-1:2004+AC:2010 and Annex B 2.
- The actual position of the reinforcement in the existing structure shall be determined on the basis of the construction documentation and taken into account when designing.

Installation:

- Dry or wet concrete.
- It must not be installed in flooded holes.
- Hole drilling by hammer drill or compressed air drill mode.
- The installation of post-installed rebar shall be done only by suitable trained installer and under supervision on site; the conditions under which an installer may be considered as suitable trained and the conditions for supervision on site are up to the Member States in which the installation is done.
- Check the position of the existing rebars (if the position of existing rebars is not known, it shall be determined using a rebar detector suitable for this purpose as well as on the basis of the construction documentation and then marked on the building component for the overlap joint).

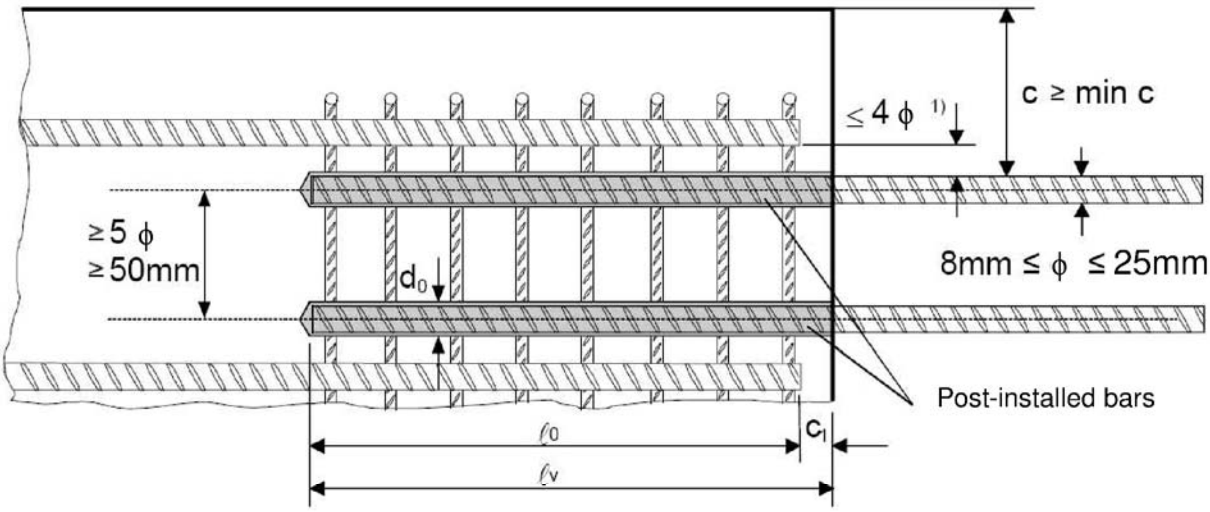
Scell-It Injection System X-MAX for rebar connection

Intended use
Specifications

Annex B 1

Figure B1: General construction rules for post-installed rebars

- Only tension forces in the axis of the rebar may be transmitted
- The transfer of shear forces between new concrete and existing structure shall be designed additionally according to EN 1992-1-1:2004+AC:2010.
- The joints for concreting must be roughened to at least such an extent that aggregate protrude.



[1] If the clear distance between lapped bars exceeds 4ϕ, then the lap length shall be increased by the difference between the clear bar distance and 4ϕ.

The following applies to Figure B1:

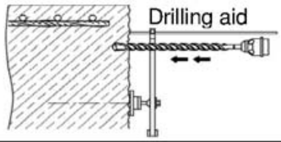
c	concrete cover of post-installed rebar
c_1	concrete cover at end-face of existing rebar
min c	minimum concrete cover according to Table B1 and to EN 1992-1-1:2004+AC:2010, Section 4.4.1.2
ϕ	diameter of post-installed rebar
ℓ_0	lap length, according to EN 1992-1-1:2004+AC:2010, Section 8.7.3
ℓ_v	effective embedment depth, ≥ $\ell_0 + c_1$
d_0	nominal drill bit diameter, see Annex B 6

Scell-It Injection System X-MAX for rebar connection

Intended use
General construction rules for post-installed rebars

Annex B 2

Table B1: Minimum concrete cover min c[1)] of post-installed rebar depending of drilling method



Drilling method	Rebar diameter	Without drilling aid	With drilling aid
Hammer drilling (HD)	< 25 mm	30 mm + 0,06 · $\ell_v \geq 2\,\phi$	30 mm + 0,02 · $\ell_v \geq 2\,\phi$
	= 25 mm	40 mm + 0,06 · $\ell_v \geq 2\,\phi$	40 mm + 0,02 · $\ell_v \geq 2\,\phi$
Compressed air drilling (CD)	< 25 mm	50 mm + 0,08 · ℓ_v	50 mm + 0,02 · ℓ_v
	= 25 mm	60 mm + 0,08 · ℓ_v	60 mm + 0,02 · ℓ_v

1) see Annexes B2, Figures B1
Comments: The minimum concrete cover acc. EN 1992-1-1:2004+AC:2010 must be observed

Table B2: maximum embedment depth $\ell_{v,max}$

Rebar Ø ϕ	$\ell_{v,max}$ [mm]
8 mm	1000
10 mm	1000
12 mm	1200
14 mm	1400
16 mm	1600
20 mm	2000
22 mm	2000
24 mm	2000
25 mm	2000

Table B3: Base material temperature, gelling time and curing time

Concrete temperature	Gelling- / working time[1)]	Minimum curing time in dry concrete[5)]
	t_{gel}	$t_{cure,dry}$
-10°C bis -6°C	90 min[2)]	24 h
-5°C bis -1°C	90 min[3)]	14 h
0°C bis +4°C	45 min[3)]	7 h
+5°C bis +9°C	25 min[3)]	2 h
+10°C bis +19°C	15 min[3)]	80 min
+20°C bis +24°C	6 min[3)]	45 min
+25°C bis +29°C	4 min[3)]	25 min
+30°C bis +40°C	2,5 min[4)]	15 min

1) t_{gel}: maximum time from starting of mortar injection to completing of rebar setting.
2) Cartridge temperature **must** be at minimum +15°C
3) Cartridge temperature **must** be between +5°C and +25°C
4) Cartridge temperature **must** be below +20°C
5) In wet concrete the curing time $t_{cure,dry}$ has to be doubled up

Scell-It Injection System X-MAX for rebar connection	Annex B 3
Intended use Minimum concrete cover Maximum embedment depth / working time and curing times	

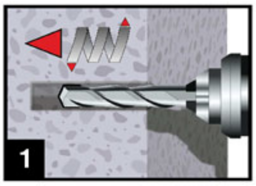
Table B4: Dispensing tools

Cartridge type/size	Hand tool		Pneumatic tool
Coaxial cartridges 150, 280, 300 up to 333 ml	 e.g. Type H 297 or H244C		 e.g. Type TS 492 X
Coaxial cartridges 380 up to 420 ml	 e.g. Type CCM 380/10	 e.g. Type H 285 or H244C	 e.g. Type TS 485 LX
Side-by-side cartridges 235, 345 ml	 e.g. Type CBM 330A	 e.g. Type H 260	 e.g. Type TS 477 LX
Side-by-side cartridge 825 ml	-	-	 e.g. Type TS 498X

All cartridges could also be extruded by a battery tool.

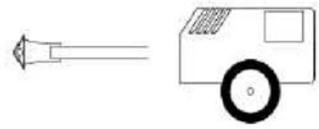
Scell-It Injection System X-MAX for rebar connection	**Annex B 4**
Intended Use Dispensing tools	

A) Bore hole drilling



1. Drill a hole into the base material to the size and embedment depth required by the selected reinforcing bar with carbide hammer drill (HD) or a compressed air drill (CD). In case of aborted drill hole: the drill hole shall be filled with mortar.

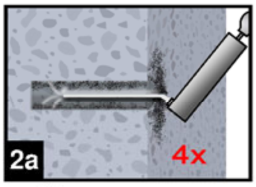
Hammer drill (HD)



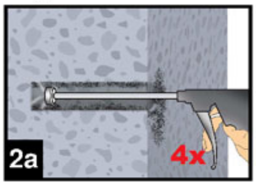
Compressed air drill (CD)

Rebar - Ø ϕ	Drill - Ø [mm]
8 mm	12
10 mm	14
12 mm	16
14 mm	18
16 mm	20
20 mm	25
22 mm	28
24 mm	32
25 mm	32

B) Bore hole cleaning

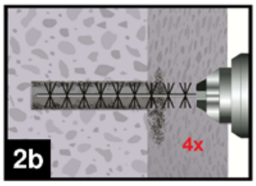


or

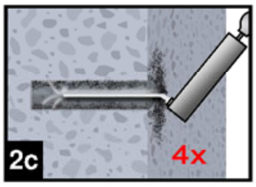


2a. Starting from the bottom or back of the bore hole, blow the hole clean with compressed air (min. 6 bar) or a hand pump a minimum of four times. If the bore hole ground is not reached an extension shall be used.

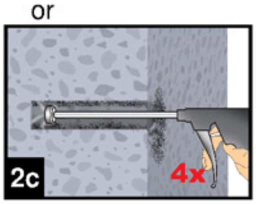
For bore holes deeper then 240 mm, compressed air (min. 6 bar) **must** be used.



2b. Check brush diameter (Table B5) and attach the brush to a drilling machine or a battery screwdriver. Brush the hole with an appropriate sized wire brush > $d_{b,min}$ (Table B5) a minimum of four times.
If the bore hole ground is not reached with the brush, a brush extension shall be used.



or



2c. Finally blow the hole clean again with compressed air (min. 6 bar) or a hand pump a minimum of four times. If the bore hole ground is not reached an extension shall be used.

For bore holes deeper than 240 mm, compressed air (min. 6 bar) **must** be used.

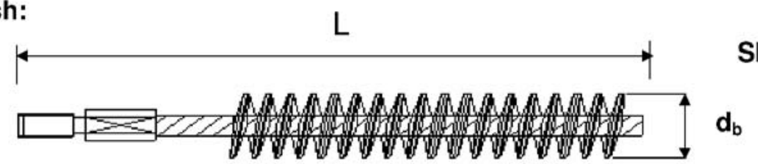
Scell-It Injection System X-MAX for rebar connection

Intended Use
Installation instruction: Bore hole drilling and Bore hole cleaning

Annex B 5

Table B5: Cleaning tools

Brush:

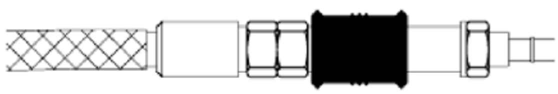


SDS Plus Adapter:

Brush extension:

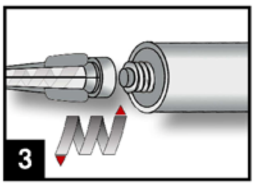
ϕ Rebar - ∅	d_0 Drill bit - ∅	d_b Brush - ∅	$d_{b,min}$ min. Brush - ∅	L Total length
(mm)	(mm)	(mm)	(mm)	(mm)
8	12	14	12,5	170
10	14	16	14,5	200
12	16	18	16,5	200
14	18	20	18,5	300
16	20	22	20,5	300
20	25	27	25,5	300
22	28	30	28,5	300
24	32	34	32,5	300
25	32	34	32,5	300

Hand pump (volume 750 ml)

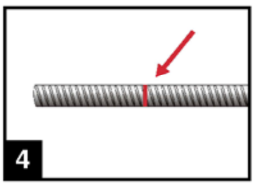


**Rec. compressed air tool
hand slide valve (min 6 bar)**

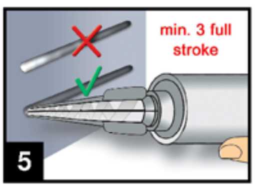
C) Preparation of bar and cartridge



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



4. Prior to inserting the reinforcing bar into the filled bore hole, the position of the embedment depth shall be marked (e.g. with tape) on the reinforcing bar and insert bar in empty hole to verify hole and depth ℓ_v.
The anchor should be free of dirt, grease, oil or other foreign material.



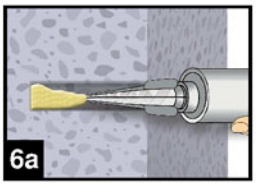
5. Prior to dispensing into the anchor hole, squeeze out separately the mortar until it shows a consistent grey colour, but a minimum of three full strokes, and discard non-uniformly mixed adhesive components.

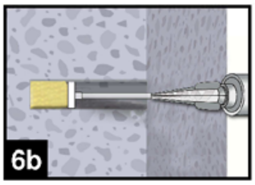
Scell-It Injection System X-MAX for rebar connection

Intended Use
Installation instruction: Cleaning tools and
Preparation of bar and cartridge

Annex B 6

D) Filling the bore hole





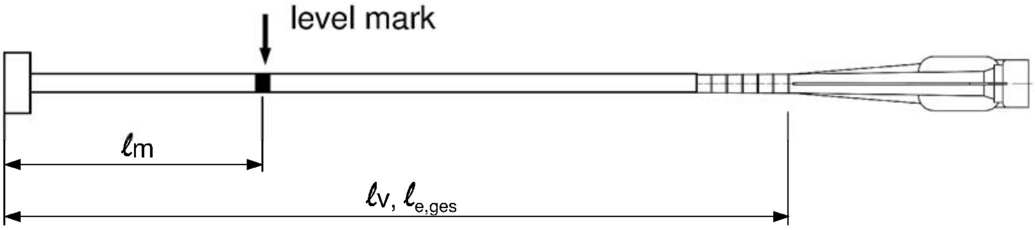
6. Starting from the bottom or back of the cleaned anchor hole fill the hole up to approximately two-thirds with adhesive. Slowly withdraw the static mixing nozzle as the hole fills to avoid creating air pockets. For embedment larger than 190 mm an extension nozzle shall be used.

For overhead and horizontal installation and bore holes deeper than 240 mm a piston plug and the appropriate mixer extension must be used.

Observe the gel-/ working times given in Table B3.

Table B6: Piston plugs, max anchorage depth and mixer extension

<table>
<tr><th rowspan="2">Bar size</th><th colspan="2">Drill bit - Ø</th><th rowspan="3">Piston plug</th><th colspan="4">Cartridge: All sizes</th><th colspan="2">Cartridge: side-by-side (825 ml)</th></tr>
<tr><th colspan="2"></th><th colspan="2">Hand or battery tool</th><th colspan="2">Pneumatic tool</th><th colspan="2">Pneumatic tool</th></tr>
<tr><th>ϕ</th><th>HD</th><th>PD</th><th>$l_{v,max}$</th><th>Mixer extension</th><th>$l_{v,max}$</th><th>Mixer extension</th><th>$l_{v,max}$</th><th>Mixer extension</th></tr>
<tr><th>(mm)</th><th colspan="2">(mm)</th><th>No.</th><th>(cm)</th><th></th><th>(cm)</th><th></th><th>(cm)</th><th></th></tr>
<tr><td>8</td><td>12</td><td>-</td><td>-</td><td rowspan="5">70</td><td rowspan="9">VL 10/0,75</td><td>80</td><td rowspan="9">VL 10/0,75</td><td>80</td><td rowspan="2">VL 10/0,75</td></tr>
<tr><td>10</td><td>14</td><td>-</td><td>#14</td><td rowspan="4">100</td><td>100</td></tr>
<tr><td>12</td><td colspan="2">16</td><td>#16</td><td>120</td><td rowspan="7">VL 16/1,8</td></tr>
<tr><td>14</td><td colspan="2">18</td><td>#18</td><td>140</td></tr>
<tr><td>16</td><td colspan="2">20</td><td>#20</td><td>160</td></tr>
<tr><td>20</td><td>25</td><td>26</td><td>#25</td><td rowspan="4">50</td><td rowspan="2">70</td><td rowspan="4">200</td></tr>
<tr><td>22</td><td colspan="2">28</td><td>#28</td></tr>
<tr><td>24</td><td colspan="2">32</td><td>#32</td><td rowspan="2">50</td></tr>
<tr><td>25</td><td colspan="2">32</td><td>#32</td></tr>
</table>



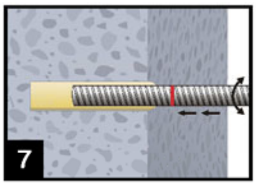
Injection tool must be marked by mortar level mark ℓ_m and anchorage depth ℓ_v resp. $\ell_{e,ges}$ with tape or marker.

Quick estimation: $\ell_m = 1/3 \cdot \ell_v$

Continue injection until the mortar level mark ℓ_m becomes visible.

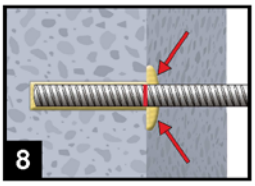
Optimum mortar volume: $\ell_m = \ell_v \text{ resp. } \ell_{e,ges} \cdot \left(1{,}2 \cdot \frac{\phi^2}{d_0^2} - 0{,}2\right)$ [mm]

E) Inserting the rebar

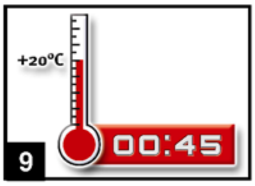


7. Push the reinforcing bar into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached.

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



8. Be sure that the bar is inserted in the bore hole until the embedment mark is at the concrete surface and that excess mortar is visible at the top of the hole. If these requirements are not maintained, the application has to be renewed. For overhead installation fix embedded part (e.g. wedges).



9. Observe gelling time t_{gel}. Attend that the gelling time can vary according to the base material temperature (see Table B3). It is not allowed to move the bar after geling time t_{gel} has elapsed.
Allow the adhesive to cure to the specified time prior to applying any load. Do not move or load the bar until it is fully cured (attend Table B3). After full curing time $\mathbf{t_{cure}}$ has elapsed, the add-on part can be installed.

Scell-It Injection System X-MAX for rebar connection	**Annex B 8**
Intended Use Installation instruction: Inserting rebar	

Minimum anchorage length and minimum lap length

The minimum anchorage length $\ell_{b,min}$ and the minimum lap length $\ell_{0,min}$ according to EN 1992-1-1:2004+AC:2010 $\ell_{b,min}$ acc. to Eq. 8.6 and Eq. 8.7 and $\ell_{0,min}$ acc. to Eq. 8.11) shall be multiply by a factor according to Table C1.

Table C1: Factor related to concrete class and drilling method

Concrete class	Drilling method	Factor
C12/15 to C50/60	Hammer drilling and compressed air drilling	1,0

Table C2: Design values of the ultimate bond resistance f_{bd} in N/mm² for all drilling methods for good conditions

according to EN 1992-1-1:2004+AC:2010 for good bond conditions
(for all other bond conditions multiply the values by 0.7)

Rebar - ∅	**Concrete class**								
ϕ	C12/15	C16/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
8 to 25 mm	1,6	2,0	2,3	2,7	3,0	3,4	3,7	4,0	4,3

Scell-It Injection System X-MAX for rebar connection

Performances
Minimum anchorage length and minimum lap length
Design values of ultimate bond resistance f_{bd}

Annex C 1

EUROPEAN TECHNICAL ASSESSMENT

XMAX

Scell-it®

Deutsches
Institut
für
Bautechnik
DIBt

Member of EOTA
www.eota.eu

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-14/0066 of 22 September 2014

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Scell-It Injection system X-MAX for masonry
Product family to which the construction product belongs	Injection system for use in masonry
Manufacturer	SCELL-IT 28 Rue Paul Dubrule 59854 LESQUIN FRANKREICH
Manufacturing plant	Scell-It Plant 1, Germany
This European Technical Assessment contains	17 pages including 3 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	Guideline for European technical approval of "Metal Injection Anchors for Use in Masonry", ETAG 029, April 2013, used as European Assessment Document (EAD) according to Article 66 Paragraph 3 of Regulation (EU) No 305/2011.

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Specific Part

1 Technical description of the product

The Scell-It Injection system X-MAX for masonry is a bonded anchor (injection type) consisting of a mortar cartridge with injection mortar X-MAX, a perforated sleeve and an anchor rod with hexagon nut and washer in the range of M8 to M12. The steel elements are made of zinc coated steel or stainless steel.

The anchor rod is placed into a drilled hole filled with injection mortar and is anchored via the bond between steel element, injection mortar and masonry and mechanical interlock.

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 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance for tension and shear loads	See Annex C 1
Characteristic resistance for bending moments	See Annex C 2
Displacements under shear and tension loads	See Annex C 2
Reduction Factor for job site tests (β-Factor)	See Annex C 2
Edge distances and spacings	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 (NPD)

3.3 Hygiene, health and the environment (BWR 3)

Regarding dangerous substances there may be requirements (e.g. transposed European legislation and national laws, regulations and administrative provisions) applicable to the products falling within the scope of this European Technical Assessment. In order to meet the provisions of 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)

The essential characteristics regarding Safety in use are included under the Basic Works Requirement Mechanical resistance and stability.

3.5 Protection against noise (BWR 5)

Not applicable.

3.6 Energy economy and heat retention (BWR 6)

Not applicable.

3.7 Sustainable use of natural resources (BWR 7)

The sustainable use of natural resources was not investigated.

3.8 General aspects

The verification of durability is part of testing the essential characteristics. Durability is only ensured if the specifications of intended use according to Annex B are taken into account.

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

According to Decision of the Commission of 17 February 1997 (97/177/EC) (OJ L 073 of 14.03.97 p. 24-25), the system of assessment and verification of constancy of performance (see Annex V and Article 65 Paragraph 2 to Regulation (EU) No 305/2011) given in the following table applies.

Product	Intended use	Level or class	System
Metal injection anchors for use in masonry	For fixing and/or supporting to masonry, 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 for in the applicable European Assessment Document

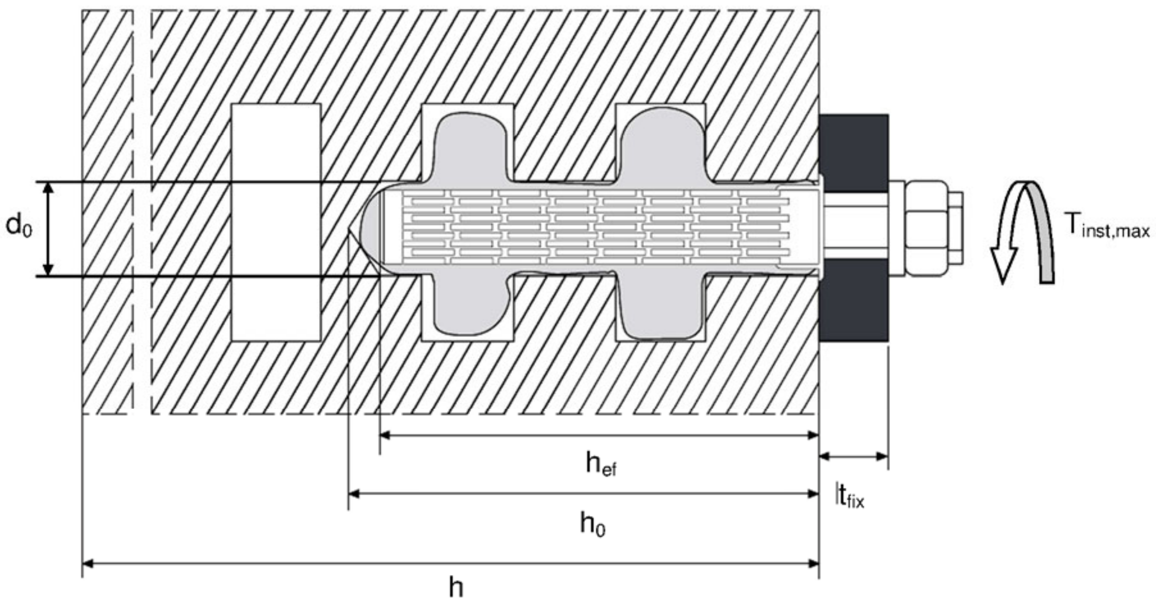
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 22 September 2014 by Deutsches Institut für Bautechnik

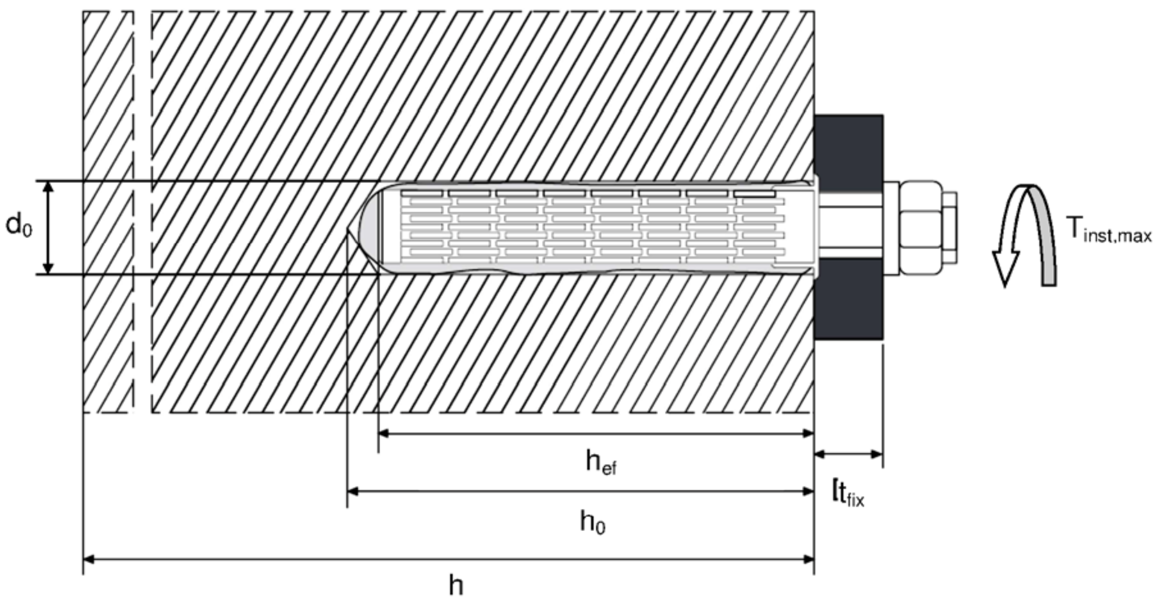
Andreas Kummerow
p.p. Head of Department

beglaubigt:
Baderschneider

Installation in hollow brick; threaded rod with sleeve



Installation in solid brick; threaded rod with or without sleeve



h_{ef} = effective setting depth

h_0 = bore hole depth

t_{fix} = thickness of fixture

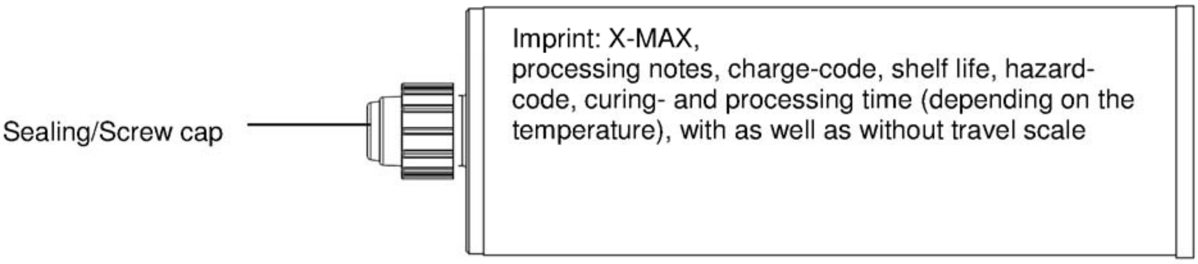
d_0 = bore hole diameter

T_{inst} = torque moment

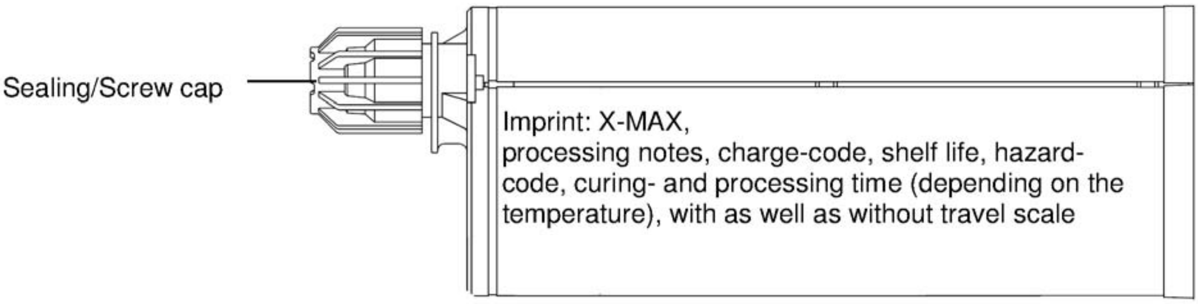
Scell-It Injection System X-MAX for masonry	**Annex A 1**
Product description Installed condition	

Cartridge: X-MAX

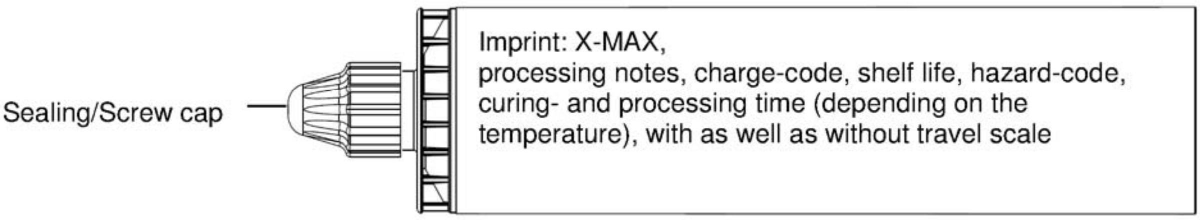
150 ml, 280 ml, 300 ml up to 333 ml and 380 ml up to 420 ml cartridge (Type: coaxial)



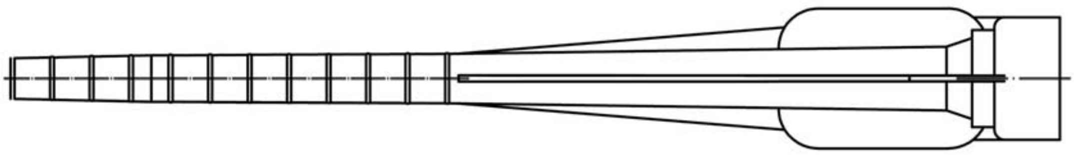
235 ml, 345 ml and 825 ml cartridge (Type: “side-by-side”)



165 ml and 300 ml cartridge (Type: “foil tube”)



Static Mixer



Scell-It Injection System X-MAX for masonry	**Annex A 2**
Product description Injection system	

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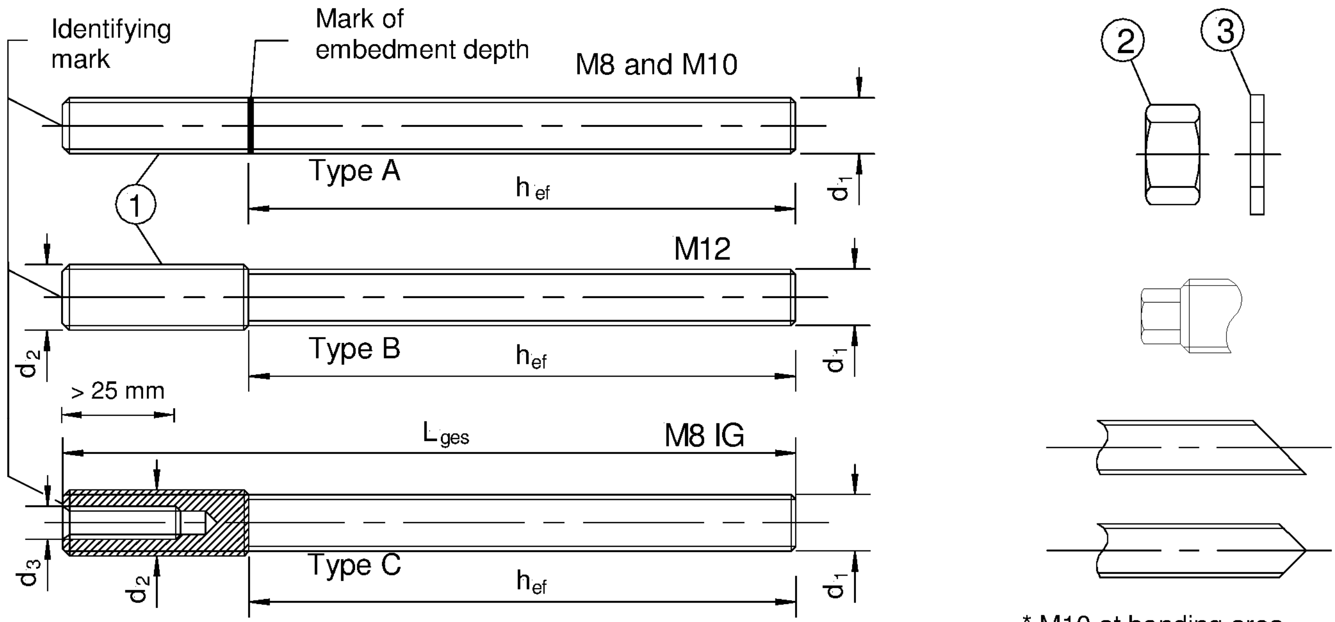
Threaded rod M8, M8 IG, M10, M12*



* M10 at bonding area

With mark (Type A, B, C):
- Identifying mark: CVM; thread size: M
- additional with stainless steel: A4
- e.g. CVM M8 A4

Commercial standard rod (<u>only</u> Type A) with:
- Materials, dimensions and mechanical properties acc. to Table A2
- Inspection certificate 3.1 acc. to EN 10204:2004
- Marking of embedment depth

Sleeve (Plastic) SH 13 / 100 and SH 15 / 100

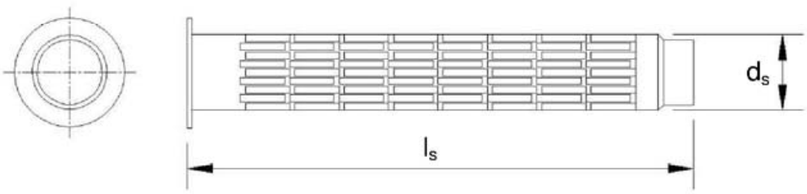


Table A1: Sizes threaded rod and sleeve (mm)

Threaded rods							Sleeves		
Size	d_1	d_2	d_3	h_{ef}	L_{min}	L_{max}	Size	d_s	l_s
[mm]								[mm]	[mm]
M8	8	8	-	80	100	500	SH13/100	13	100
M8 IG	10	12	8	90	110	500	SH15/100	15	100
M10	10	10	-	90	110	500	SH15/100	15	100
M12*	10	12	-	90	110	500	SH15/100	15	100

Scell-It Injection System X-MAX for masonry

Product description
Threaded rod and Sleeve

Annex A 3

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Table A2: Materials

Part	Designation	Material
Steel, zinc plated ≥ 5 µm acc. to EN ISO 4042:1999 or Steel, hot-dip galvanised ≥ 40 µm acc. to EN ISO 1461:2009 and EN ISO 10684:2004+AC:2009		
1	Anchor rod	Steel, EN 10087:1998 or EN 10263:2001 Strength class 5.8, 8.8 EN 1993-1-8:2005+AC:2009 $f_{uk} = f_{ub}$ $f_{yk} = f_{yb}$
2	Hexagon nut, EN ISO 4032:2012	Strength class 5 (for class 5.8 rod) EN ISO 898-2:2012 Strength class 8 (for class 8.8 rod) EN ISO 898-2:2012
3	Washer, EN ISO 887:2006, EN ISO 7089:2000, EN ISO 7093:2000, or EN ISO 7094:2000	Steel, zinc plated or hot-dip galvanised
Stainless steel		
1	Anchor rod	Material 1.4401 / 1.4404 / 1.4571, EN 10088-1:2005, Strength class 70 EN ISO 3506-1:2009 $f_{uk} = R_{m,min}$ $f_{yk} = R_{p0,2,min}$
2	Hexagon nut, EN ISO 4032:2012	Material 1.4401 / 1.4404 / 1.4571 EN 10088-1:2005, Strength class 70 (for class 70 rod) EN ISO 3506-2:2009
3	Washer, EN ISO 887:2006, EN ISO 7089:2000, EN ISO 7093:2000, or EN ISO 7094:2000	Material 1.4401, 1.4404 or 1.4571, EN 10088-1:2005

Scell-It Injection System X-MAX for masonry

Product description
Materials

Annex A 4

Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads

Base materials:

- Solid brick masonry (Use category b), according to Annex B 2.

  Note: The characteristic resistance are also valid for larger brick sizes and larger compressive strength of the masonry unit.
- Hollow brick masonry (use category c), according to Annex B 2.
- Mortar strength class of the masonry M2,5 at minimum according to EN 998-2:2010.
- For other bricks in solid masonry and in hollow or perforated masonry, the characteristic resistance of the anchor may be determined by job site tests according to ETAG 029, Annex B under consideration of the β-factor according to Annex C 2, Table C4.

Temperature Range:

- Ta: - 40°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C)
- Tb: - 40°C to +80°C (max. short term temperature +80°C and max. long term temperature +50°C)

Use conditions (Environmental conditions):

- Dry and wet structure (regarding injection mortar).
- Structures subject to dry internal conditions (zinc coated steel, stainless steel or high corrosion resistant steel).
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel or high corrosion resistant steel).
- Structures subject to external atmospheric exposure and to permanently damp internal condition, if other particular aggressive conditions exist (high corrosion resistant 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 in respect of installation and use:

- Category d/d.
- Category w/w.

Design:

- Verifiable calculation notes and drawings are prepared taking account the relevant masonry in the region of the anchorage, the loads to be transmitted and their transmission to the supports of the structure. The position of the anchor is indicated on the design drawings.
- The anchorages are designed in accordance with the ETAG 029, Annex C, Design method A under the responsibility of an engineer experienced in anchorages and masonry work.

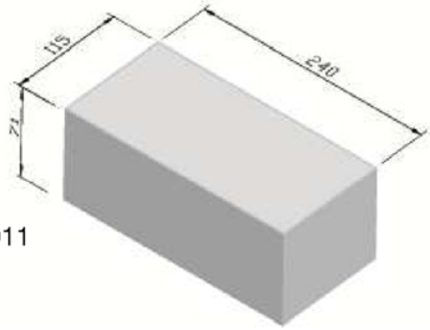
Installation:

- Dry or wet structures.
- Hole drilling by rotary drill mode.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.

Scell-It Injection System X-MAX for masonry	**Annex B 1**
Intended Use Specifications	

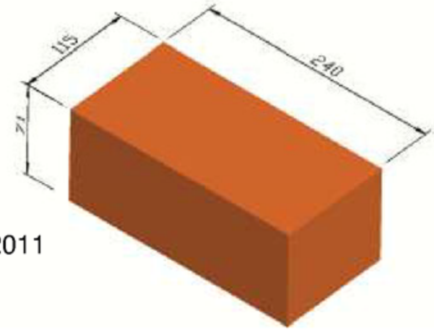
Types of brick and dimensions (Dimensions in mm)

Brick No. 1



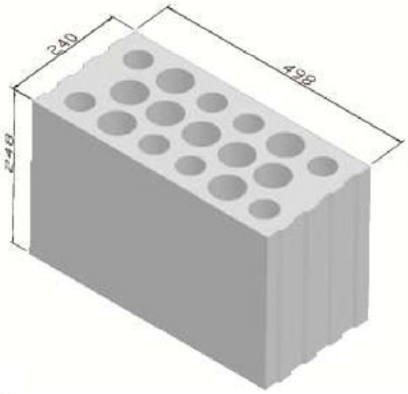
Calcium silicate masonry
KSV – NF
acc. to EN 771-1:2011
$\rho \geq 1{,}8$ [kg/dm³]
$f_b \geq 8$ [N/mm²]

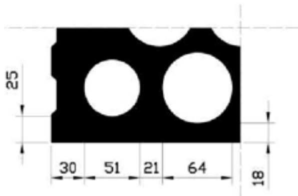
Brick No. 2



Clay masonry
Mz – NF
acc. to EN 771-1:2011
$\rho \geq 1{,}8$ [kg/dm³]
$f_b \geq 12$ [N/mm²]

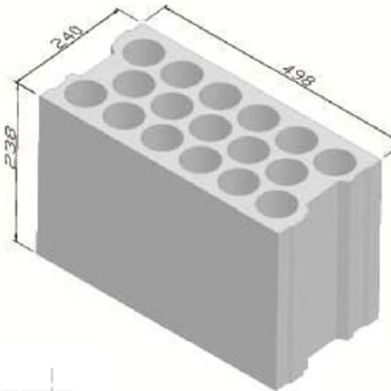
Brick No. 3

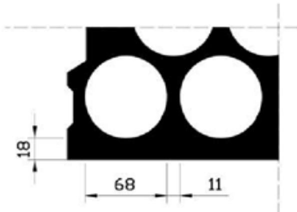




Calcium silicate masonry
KSL-R-12-1,2-16DF
acc. to EN 771-1:2011
$\rho \geq 1{,}2$ [kg/dm³]
$f_b \geq 12$ [N/mm²]

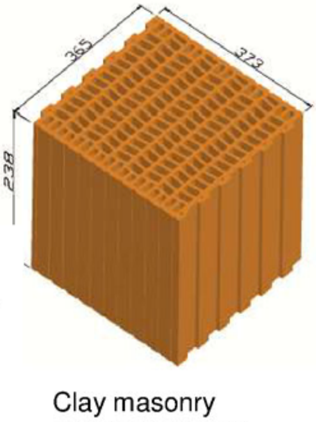
Brick No. 4

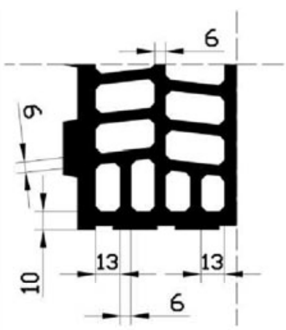




Calcium silicate masonry
KSL-12-1,2-16DF
acc. to EN 771-2:2011
$\rho \geq 1{,}2$ [kg/dm³]
$f_b \geq 12$ [N/mm²]

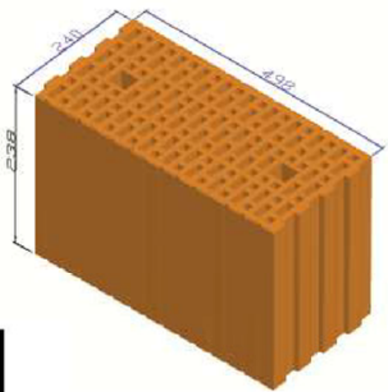
Brick No. 5

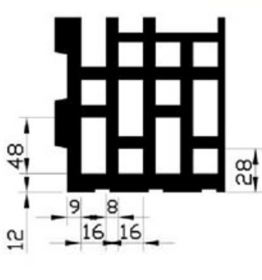




Clay masonry
Hlz-12-0,8-xxDF
acc. to Z-17.1-383
$\rho \geq 0{,}8$ [kg/dm³]
$f_b \geq 12$ [N/mm²]

Brick No. 6





Clay masonry
Hlz-12-0,9-16DF N+F
acc. to EN 771-1:2011
$\rho \geq 0{,}9$ [kg/dm³]
$f_b \geq 12$ [N/mm²]

Scell-It Injection System X-MAX for masonry

Intended Use
Types of brick and dimensions

Annex B 2

Installation

Cleaning Brush

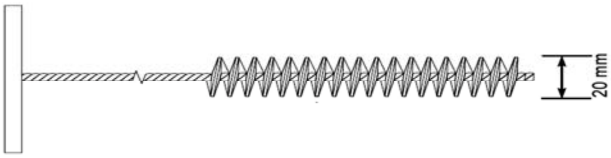


Table B1: Installation parameters in solid masonry (without sleeve)

Threaded rod			M8	M8 IG	M10	M12
Nominal drill hole diameter	d_0	[mm]	10	12	12	12
Embedment depth	h_{ef}	[mm]	80	90	90	90
Bore hole depth	h_0	[mm]	85	95	95	95
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	9	14	12	14
Diameter of nylon brush	$d_b \geq$	[mm]	20			
Torque moment	T_{inst}	[Nm]	2			

Table B2: Installation parameters in solid and hollow masonry (with sleeve)

Threaded rod			M8	M8 IG	M10	M12
Sleeve			SH 13x100	SH 15x100	SH 15x100	SH 15x100
Nominal drill hole diameter	d_0	[mm]	14	16	16	16
Embedment depth sleeve	h_{nom}	[mm]	100	100	100	100
Embedment depth rod	h_{ef}	[mm]	80	90	90	90
Bore hole depth	h_0	[mm]	105	105	105	105
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	9	14	12	14
Diameter of nylon brush	$d_b \geq$	[mm]	20			
Torque moment	T_{inst}	[Nm]	2			

Table B3: Minimum curing time

Base material temperature	Gelling- / working time	Minimum curing time in dry base material[1)]
+ 5 °C to +9 °C	25 min	2 h
+ 10 °C to +19 °C	15 min	80 min
+ 20 °C to +29 °C	6 min	45 min
+ 30 °C to +34 °C	4 min	25 min
+ 35 °C to +40 °C	2 min	20 min

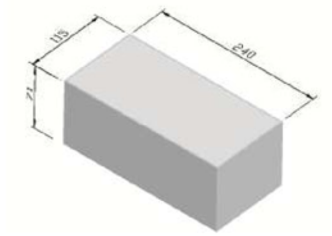
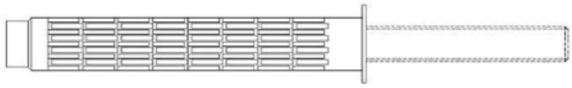
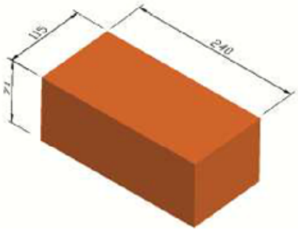
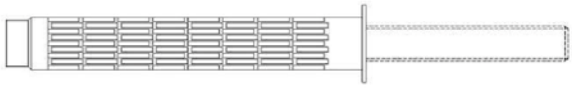
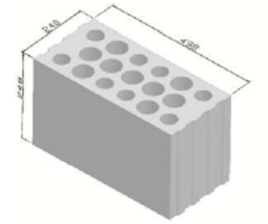
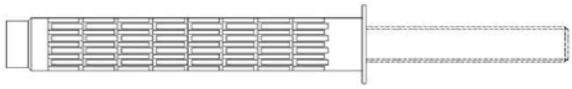
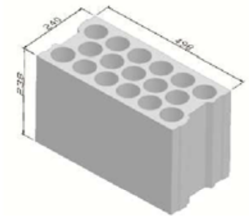
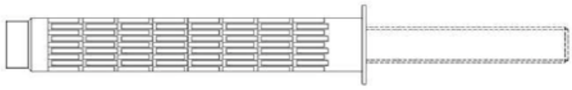
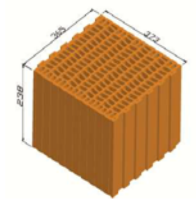
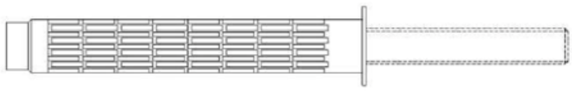
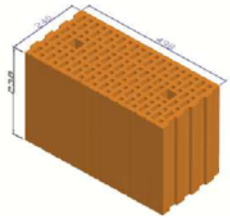
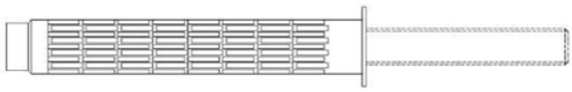
[1)] In wet base material the curing time **must** be doubled

Scell-It Injection System X-MAX for masonry

Intended Use
Installation parameters and cleaning brush
Gelling and Curing times

Annex B 3

Table B4: Allocation of anchor rods[1], sleeves[1] and bricks

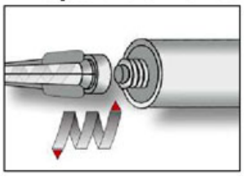
Bricks	Valid anchor rods and sleeves * M10 at bonding area
No 1 	 **M8; M8IG; M10; M12***  **SH 13x100 SH 15x100**
No 2 	 **M8; M8IG; M10; M12***  **SH 13x100 SH 15x100**
No 3 	 **SH 13x100**
No 4 	 **SH 13x100 SH 15x100**
No 5 	 **SH 13x100 SH 15x100**
No 6 	 **SH 13x100**

1) Other combination can be use after job side test acc. to ETAG 029, Annex B.
The β-factors for this job side test are given in Table C4

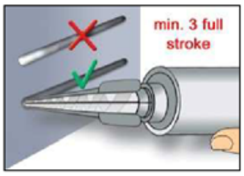
Scell-It Injection System X-MAX for masonry	**Annex B 4**
Intended Use Allocation of anchor rods, sleeves and bricks	

Installation instructions

Preparation of cartridge

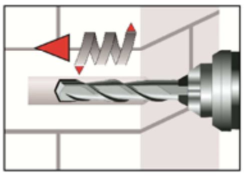


1. Remove the cap and attach the supplied static-mixing nozzle to the cartridge and load the cartridge into the correct dispensing tool. Cut off the foil tube clip before use.For every working interruption longer than the recommended working time (Table B3) as well as for new cartridges, a new static-mixer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

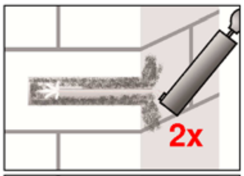


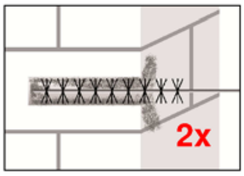
2. Place in the cartridge to an appropriate dispenser tool.
Prior to dispensing into the anchor hole, squeeze out separately a minimum of three full strokes and discard non-uniformly mixed adhesive components until the mortar shows a consistent grey colour.

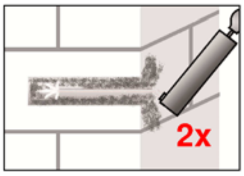
Installation in solid masonry (without sleeve)



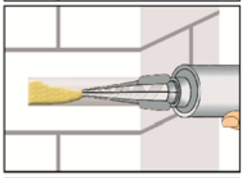
3. Holes to be drilled perpendicular to the surface of the base material by using a hard-metal tipped hammer drill bit. Drill a hole, by rotary drill mode, into the base material, with nominal drill hole diameter and bore hole depth acc. to the size and embedment depth required by the selected anchor. In case of aborted drill hole the drill hole shall be filled with mortar



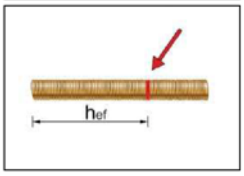


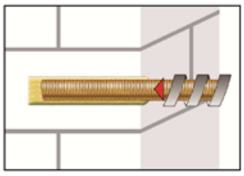


4. Blow from the bottom of the bore hole two times. Brush the hole clean two times, and finally blow out the hole again two times.

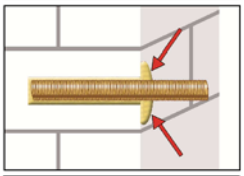


5. Starting from the bottom or back of the cleaned anchor hole fill the hole up to min two-thirds with adhesive. Slowly withdraw the static mixing nozzle as the hole fills to avoid creating air pockets.
Observe the gel-/ working times given in Table B3.

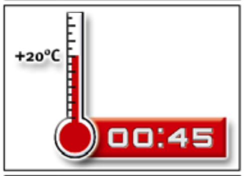




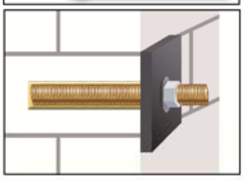
6. The position of the embedment depth shall be marked on the threaded rod. Push the threaded rod into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached. The anchor should be free of dirt, grease, oil or other foreign material.



7. Be sure that the anular gap is fully filled with mortar. If no excess mortar is visible at the top of the hole, the application has to be renewed.



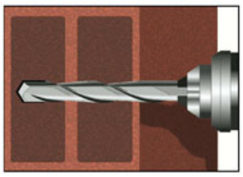
8. Allow the adhesive to cure to the specified curing time prior to applying any load or torque. Do not move or load the anchor until it is fully cured (attend Table B3).



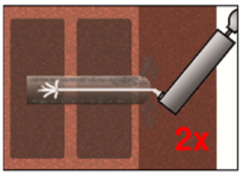
9. After full curing, the fixture can be installed with the max. torque (Table B1 or B2) by using a calibrated torque wrench.

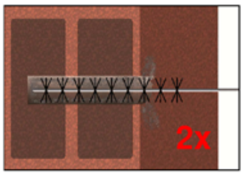
Scell-It Injection System X-MAX for masonry	**Annex B 5**
Intended Use Installation instructions (solid brick)	

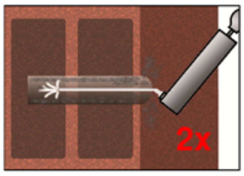
Installation in solid and hollow masonry (with sleeve)



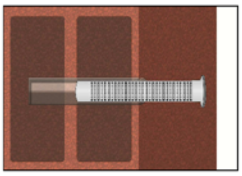
3. Holes to be drilled perpendicular to the surface of the base material by using a hard-metal tipped hammer drill bit. Drill a hole, by rotary drill mode, into the base material, with nominal drill hole diameter and bore hole depth acc. to the size and embedment depth required by the selected anchor. In case of aborted drill hole the drill hole shall be filled with mortar



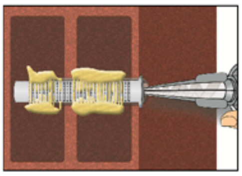




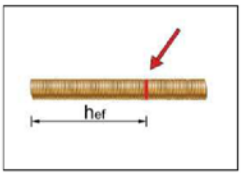
4. Blow from the bottom of the bore hole two times. Brush the hole clean two times, and finally blow out the hole again two times.

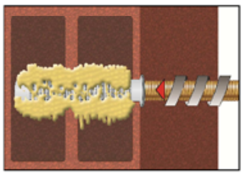


5. Insert the perforated sleeve into the bore hole. Make sure that the sleeve fits well into the hole. Never cut the sleeve! Only use sleeves that have the right length.

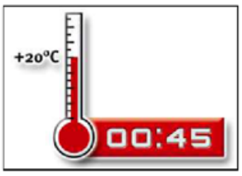


6. Starting from the bottom or back fill the sleeve completely with adhesive. For quantity of mortar attend cartridge label.
Observe the gel-/ working times given in Table B3.

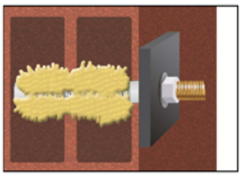




7. The position of the embedment depth shall be marked on the threaded rod. Push the threaded rod into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached. The anchor should be free of dirt, grease, oil or other foreign material.



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



9. After full curing, the fixture can be installed with the max. torque (Table B2) by using a calibrated torque wrench.

Table C1: Characteristic values of resistance for tension and shear loads

Brick No.	Desity ρ [kg/dm³] Com-pressive strength f_b [N/mm²]	Sleeve	Anchor size	Effective Embed-ment depth h_{ef} [mm]	Characteristic resistance – Use category – dry / dry (d/d) – Ta: 24°C/40°C N_{Rk} 1)	Ta: 24°C/40°C V_{Rk} 2,3)	dry / dry (d/d) – Tb: 50°C/80°C N_{Rk} 1)	Tb: 50°C/80°C V_{Rk} 2,3)	wet / wet (w/w) – Ta: 24°C/40°C N_{Rk} 1)	Ta: 24°C/40°C V_{Rk} 2,3)	wet / wet (w/w) – Tb: 50°C/80°C N_{Rk} 1)	Tb: 50°C/80°C V_{Rk} 2,3)
					[kN]		[kN]		[kN]		[kN]	
1	ρ ≥ 1,8 f_b ≥ 8	without	M8	80	4,0	4,0	3,0	3,0	3,0	3,0	2,5	2,5
		without	M8 IG; M10; M12	90	5,0	5,0	4,5	4,5	4,0	4,0	3,5	3,5
		SH 13x100	M8	80	5,0	5,0	4,5	4,5	4,5	4,5	3,5	3,5
		SH 15x100	M8 IG; M10; M12	90	7,0	7,0	6,0	6,0	5,0	5,0	4,5	4,5
2	ρ ≥ 1,8 f_b ≥ 12	without	M8	80	4,0	4,0	3,0	3,0	3,5	3,5	3,0	3,0
		without	M8 IG; M10; M12	90	5,0	5,0	4,5	4,5	5,0	5,0	4,0	4,0
		SH 13x100	M8	80	3,5	3,5	3,0	3,0	3,5	3,5	2,5	2,5
		SH 15x100	M8 IG; M10; M12	90	4,5	4,5	3,5	3,5	4,5	4,5	3,5	3,5
3	ρ ≥ 1,2 f_b ≥ 12	SH 13x100	M8	80	3,5	2,5	3,5	2,5	3,0	2,0	3,0	2,0
4	ρ ≥ 1,2 f_b ≥ 12	SH 13x100	M8	80	2,5	2,0	2,5	2,0	2,0	1,5	2,0	1,5
		SH 15x100	M8 IG; M10; M12	90	3,0	2,5	3,0	2,5	2,0	2,0	2,0	2,0
5	ρ ≥ 0,8 f_b ≥ 12	SH 13x100	M8	80	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
		SH 15x100	M8 IG; M10; M12	90	2,0	2,5	2,0	2,5	2,0	2,5	2,0	2,5
6	ρ ≥ 0,9 f_b ≥ 12	SH 13x100	M8	80	3,0	2,0	3,0	2,0	2,5	2,0	2,5	2,0

1) For design according to ETAG 029, Annex C: $N_{Rk} = N_{Rk,p} = N_{Rk,b} = N_{Rk,s}$
2) For design according to ETAG 029, Annex C: $V_{Rk} = V_{Rk,b} = V_{Rk,s}$
3) $V_{Rk,c}$ according to ETAG 029, Annex C

Scell-It Injection System X-MAX for masonry

Performances
Characteristic values of resistance for tension load and shear load values

Annex C 1

Table C2: Characteristic values of resistance for bending moments

			M8	M8 IG[1)]	M10	M12[1)]
Characteristic bending moment, Steel, property class 5.8	$M_{Rk,s}$	[Nm]	19	37	37	37
Characteristic bending moment, Steel, property class 8.8	$M_{Rk,s}$	[Nm]	30	60	60	60
Characteristic bending moment, Stainless steel A4, property class 70	$M_{Rk,s}$	[Nm]	26	52	52	52

1) M10 at bonding area

Table C3: Displacement under shear and tension load

Brick-No.	N [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	V [kN]	δ_{V0} [mm]	$\delta_{V\infty}$ [mm]
1	$\frac{N_{Rk}}{1{,}4 \times \gamma_M}$	0,1	0,2	$\frac{V_{Rk}}{1{,}4 \times \gamma_M}$	$\frac{V_{Rk}\text{ [kN]}}{2{,}0\text{ [kN/mm]}}$	1,5 δ_{V0}
2						
3					0,7	1,1
4						
5						
6						

Table C4: β-factors for job site tests according to ETAG 029, Annex B

Brick-No.	Installation & use	β-factor	
		Ta: 24°C / 40°C	Tb: 50°C / 80°C
1-2	d/d	0,66	0,53
3-6		0,92	
1	w/w (incl. w/d)	0,53	0,42
2		0,61	0,49
3		0,74	
4		0,74	
5		0,86	
6		0,86	

Scell-It Injection System X-MAX for masonry

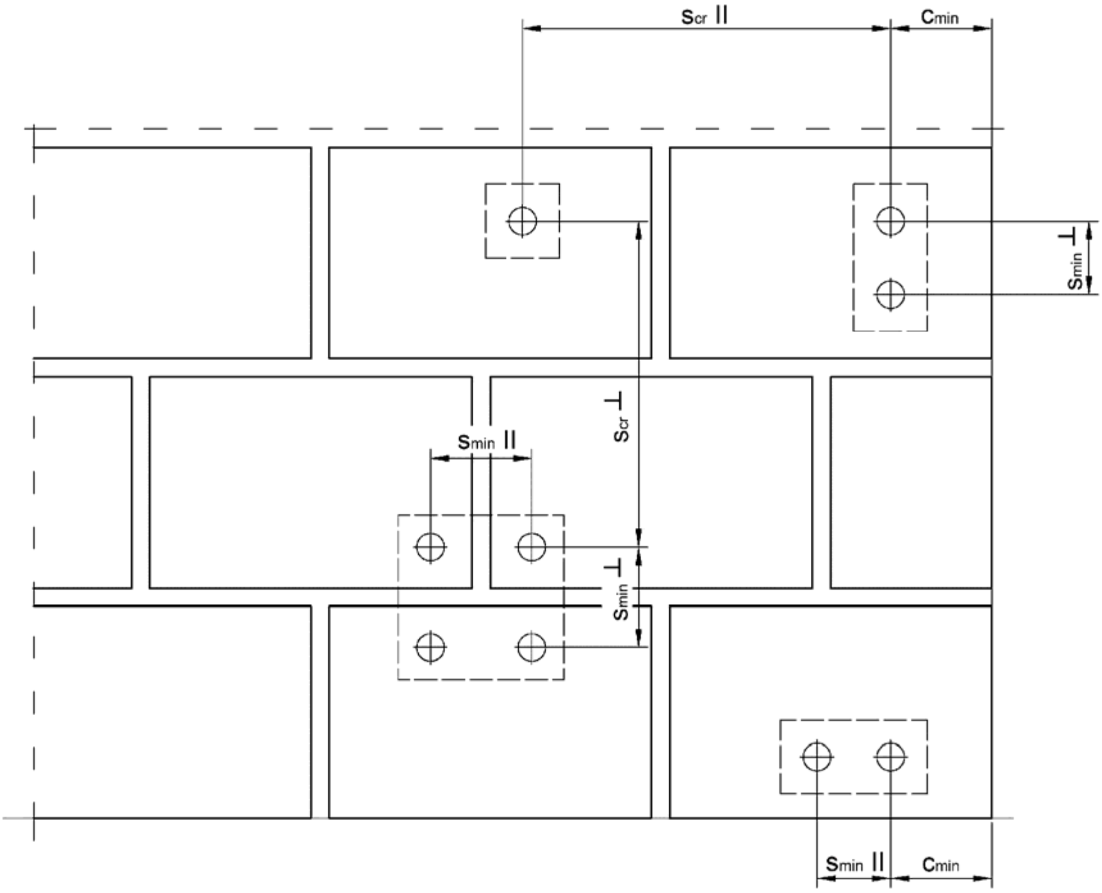
Performances
Characteristic values of resistance for bending moments,
Displacements, β-factors for job site tests

Annex C 2

Table C5: Edge distances and spacings

Brick No.	Anchor size					
	M8			M8 IG, M10, M12		
	$c_{min} = c_{cr}$ [mm]	$s_{min,II} = s_{cr,II}$ [1)] [mm]	$s_{min,\perp} = s_{cr,\perp}$ [2)] [mm]	$c_{min} = c_{cr}$ [mm]	$s_{min,II} = s_{cr,II}$ [1)] [mm]	$s_{min,\perp} = s_{cr,\perp}$ [2)] [mm]
1	120 (150)[3)]	240 (300)[3)]	240 (300)[3)]	135 (150)[3)]	270 (300)[3)]	270 (300)[3)]
2	120 (150)[3)]	240 (300)[3)]	240 (300)[3)]	135 (150)[3)]	270 (300)[3)]	270 (300)[3)]
3	100	498	248	100	498	248
4	100	498	238	100	498	238
5	100	373	238	100	373	238
6	100	498	238	100	498	238

1) s_{II} : Spacing parallel to the bearing joint
2) $s_{\perp}$: Spacing perpendicular to the bearing joint
3) with perforated sleeve



Scell-It Injection System X-MAX for masonry

Performances
Edge distances and spacings

Annex C 3