Deutsches Institut für Bautechnik

DIBt

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European Technical Assessment Body for construction products

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

European Technical Assessment

ETA-24/1052 of 25 March 2025

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	Injection system SWEYTEC IMS
Product family to which the construction product belongs	Bonded fasteners and bonded expansion fasteners for use in concrete
Manufacturer	Weyland Steiner Handwerks- & Industriebedarf GmbH & Co. KG Handelszentrum 4 5101 BERGHEIM ÖSTERREICH
Manufacturing plant	Herstellwerk 1
This European Technical Assessment contains	26 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	EAD 330499-02-0601, Edition 12/2023

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Specific Part

1 Technical description of the product

The "Injection system SWEYTEC IMS Pro" is a bonded anchor consisting of a cartridge with injection mortar according to Annex A3 and a steel element according to Annex A4.

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 to tension load (static and quasi-static loading)	See Annex B3 to B5, C1 to C6
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C1 to C4
Displacements under short-term and long-term loading	See Annex C7 and C8
Characteristic resistance and displacements for seismic performance categories C1 and C2	No performance assessed

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	No performance assessed

3.3 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Content, emission and/or release of dangerous substances	No performance assessed

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

In accordance with the European Assessment Document EAD 330499-02-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 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 25 March 2025 by Deutsches Institut für Bautechnik

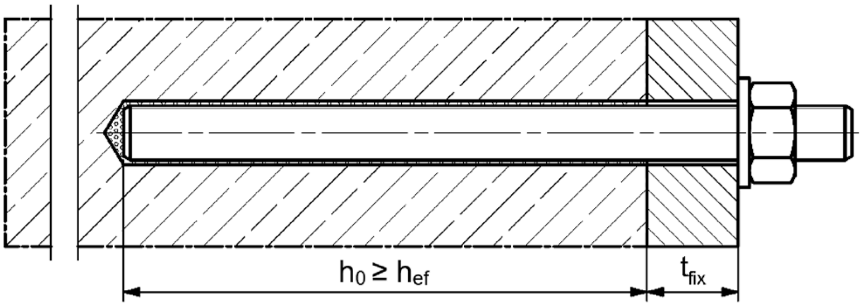
Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Baderschneider

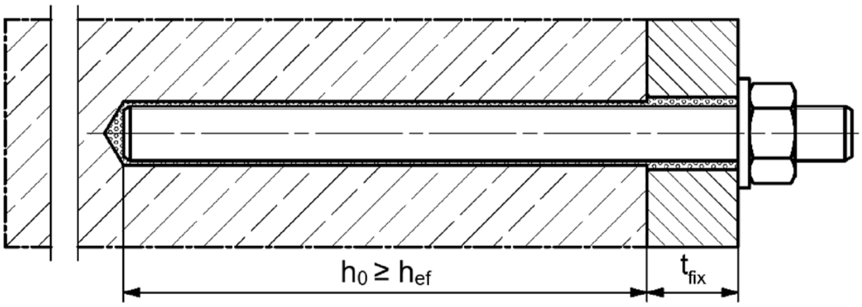
Installation conditions part 1

Anchor rod SWEYTEC A / SWEYTEC RG M (Anchor rod) and standard threaded rod (threaded rod)

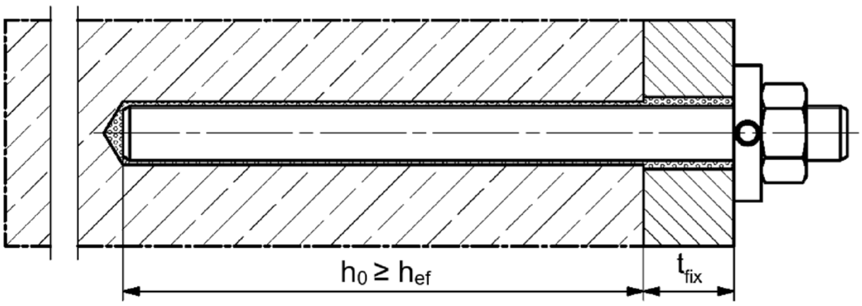
Pre-positioned installation



Push through installation (annular gap filled with mortar)



Pre-positioned or push through installation with subsequently injected SWEYTEC filling disc (annular gap filled with mortar)



Figures not to scale

h_0 = drill hole depth

h_{ef} = effective embedment depth

t_{fix} = thickness of fixture

Injection system SWEYTEC IMS

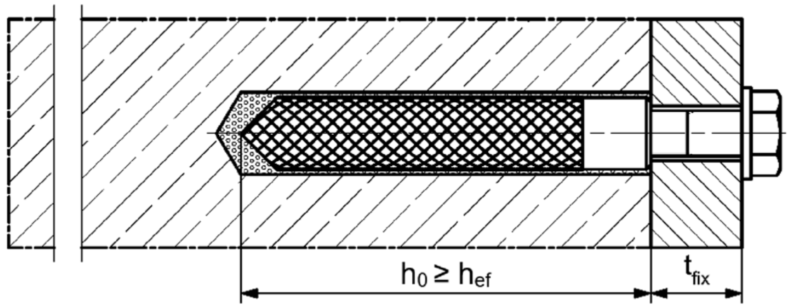
Product description
Installation conditions part 1

Annex A1

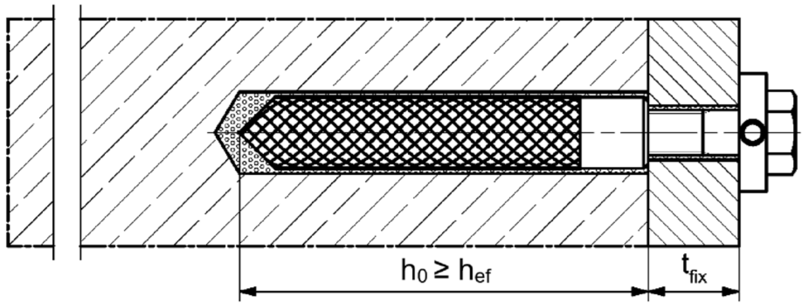
Installation conditions part 2

internal threaded anchor SWEYTEC RG M I (SWEYTEC RG M I)

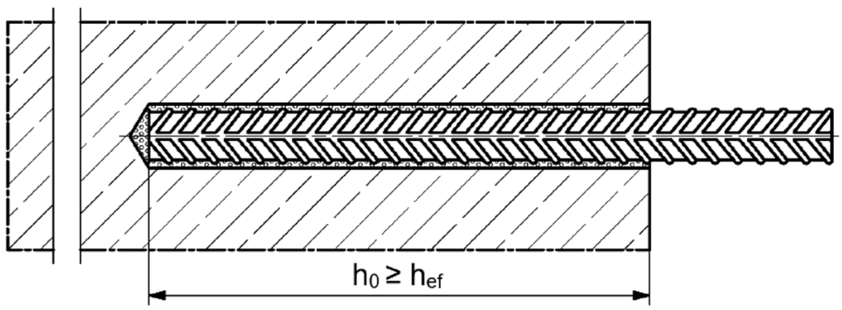
Pre-positioned installation



Pre-positioned installation with subsequently injected SWEYTEC filling disc (annular gap filled with mortar)



Reinforcing bar



Figures not to scale

h_0 = drill hole depth

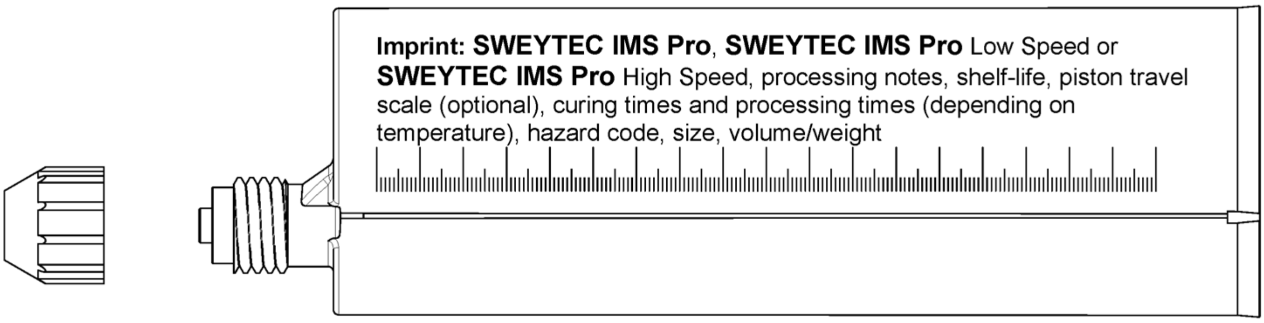
h_{ef} = effective embedment depth

t_{fix} = thickness of fixture

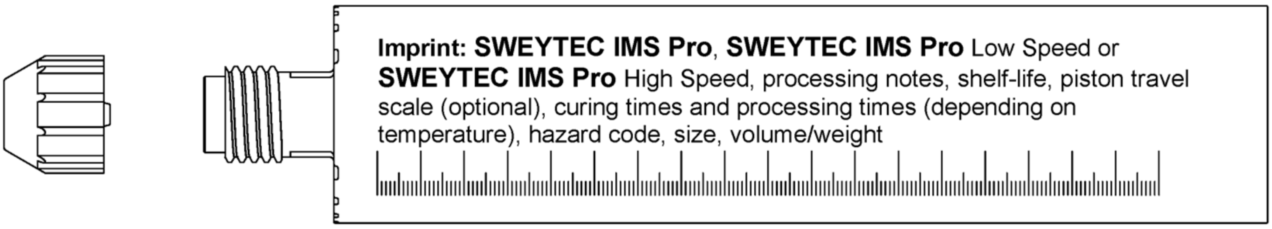
Injection system SWEYTEC IMS	Annex A2
Product description Installation conditions part 2	

Overview system components part 1

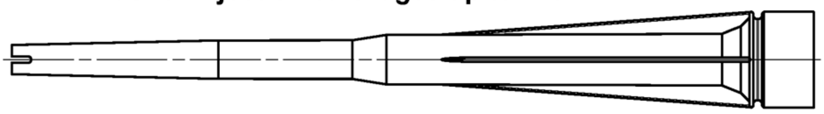
Injection cartridge (shuttle cartridge) with sealing cap; Sizes: 360 ml, 825 ml



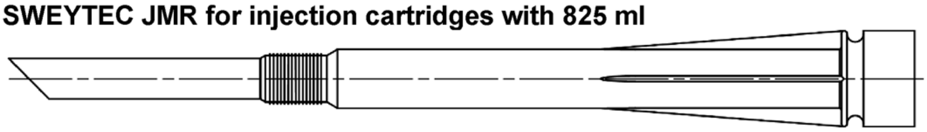
Injection cartridge (coaxial cartridge) with sealing cap; Sizes: 100 ml, 150 ml, 300 ml, 380 ml, 400 ml, 410 ml



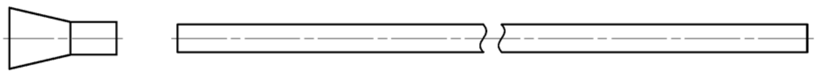
Static mixer SWEYTEC MR Plus for injection cartridges up to 410 ml



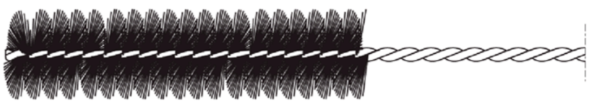
Static mixer SWEYTEC JMR for injection cartridges with 825 ml



Injection adapter and extension tube Ø 9 for static mixer SWEYTEC MR Plus;
Injection adapter and extension tube Ø 9 or Ø 15 for static mixer SWEYTEC JMR



Cleaning brush SWEYTEC BS



Blow-out pump SWEYTEC

Compressed-air cleaning tool SWEYTEC

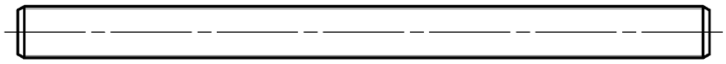
Figures not to scale

Injection system SWEYTEC IMS	**Annex A3**
Product description Overview system components part 1; cartridges / static mixer / accessories	

Overview system components part 2

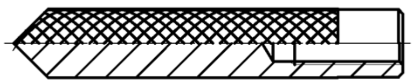
Anchor rod SWEYTEC / Threaded rod

Size: M6, M8, M10, M12, M16, M20, M24, M27, M30

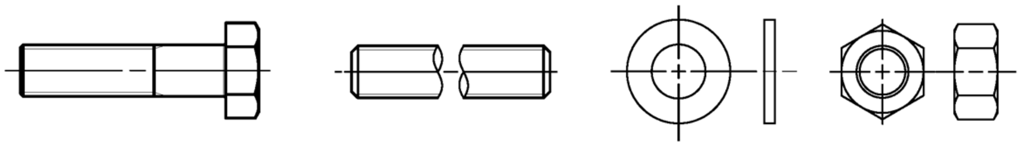


SWEYTEC RG M I

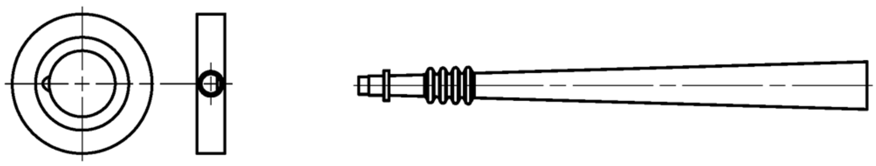
Size: M8, M10, M12, M16, M20



Screw / Threaded rod / washer / hexagon nut



SWEYTEC filling disc with injection adapter



Reinforcing bar

Nominal diameter: ϕ8, ϕ10, ϕ12, ϕ14, ϕ16, ϕ20

Figures not to scale

Injection system SWEYTEC IMS	Annex A4
Product description Overview system components part 2; metal parts, injection adapter	

Table A5.1: Materials

Part	Designation	Material		
1	Injection cartridge	Mortar, hardener, filler		
	Steel grade	Steel zinc plated (zp, hdg)	Stainless steel R acc. to EN 10088-1:2023 Corrosion resistance class CRC III acc. to EN 1993-1-4: 2006+A1:2015	High corrosion resistant steel HCR acc. to EN 10088-1:2023 Corrosion resistance class CRC V acc. to EN 1993-1-4: 2006+ A1:2015
2	Anchor rod / Threaded rod	Property class 4.8, 5.8 or 8.8; EN ISO 898-1:2013 electroplated ≥ 5 µm, EN ISO 4042:2022 or hot dip galvanised ≥ 40 µm EN ISO 10684:2004+AC:2009 f_{uk} ≤ 1000 N/mm^2 A_5 > 8% fracture elongation	Property class 50, 70 or 80 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062, 1.4662, 1.4462; EN 10088-1:2023 f_{uk} ≤ 1000 N/mm^2 A_5 > 8% fracture elongation	Property class 50, 70 or 80 EN ISO 3506-1:2020 or property class HRC 70 with f_{yk}= 560 N/mm^2; 1.4565; 1.4529; EN 10088-1:2023 f_{uk} ≤ 1000 N/mm^2 A_5 > 8% fracture elongation
3	Washer ISO 7089:2000	electroplated ≥ 5 µm, EN ISO 4042:2022 or hot dip galvanised ≥ 40 µm EN ISO 10684:2004+AC:2009	1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	1.4565; 1.4529; EN 10088-1:2023
4	Hexagon nut	Property class 5 or 8 acc. EN ISO 898-2:2022 electroplated ≥ 5 µm, EN ISO 4042:2022 or hot dip galvanised ≥ 40 µm EN ISO 10684:2004+AC:2009	Property class 50, 70 or 80 acc. EN ISO 3506-2:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	Property class 50, 70 or 80 acc. EN ISO 3506-2:2020 1.4565; 1.4529 EN 10088-1:2023
5	SWEYTEC RG M I	Property class 5.8 ISO 898-1:2013 electroplated ≥ 5 µm, EN ISO 4042:2022	Property class 70 EN ISO 3506-1:2020; 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529; EN 10088-1:2023
6	Commercial standard screw or threaded rod SWEYTEC RG M I	Property class 5.8 or 8.8; EN ISO 898-1:2013 electroplated ≥ 5 µm, EN ISO 4042:2022 A_5 > 8 % fracture elongation	Property class 70 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023 A_5 > 8 % fracture elongation	Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529; EN 10088-1:2023 A_5 > 8 % fracture elongation
7	SWEYTEC filling disc	electroplated ≥ 5 µm, EN ISO 4042:2022 or hot dip galvanised ≥ 40 µm EN ISO 10684:2004+AC:2009	1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2023	1.4565;1.4529; EN 10088-1:2023
8	Reinforcing bar	EN 1992-1-1:2004 and AC:2010, Annex C Bars and de-coiled rods, class B or C with f_{yk} and k according to NDP or NCI according EN 1992-1-1:2004/NA; $f_{uk} = f_{tk} = k \cdot f_{yk}$ (A_5 > 8%)		

Injection system SWEYTEC IMS

Product description
Materials

Annex A5

Specifications of intended use part 1

Table B1.1: Overview use and performance categories

<table>
<tr><th colspan="3"></th><th colspan="6">Injection system SWEYTEC IMS with …</th></tr>
<tr><td colspan="3"></td><td colspan="2">Anchor rod / Threaded rod
</td><td colspan="2">SWEYTEC
RG M I
</td><td colspan="2">Reinforcing bar
</td></tr>
<tr><td colspan="3">Hammer drilling with standard drill bit </td><td colspan="6">all sizes</td></tr>
<tr><td colspan="3">Hammer drilling with hollow drill bit 
(fischer „FHD“, Heller „Duster Expert“; Bosch „Speed Clean“; Hilti „TE-CD, TE-YD“, DreBo „D-Plus“, DreBo „D-Max“</td><td colspan="6">Nominal drill bit diameter (d_0)
12 mm to 35 mm</td></tr>
<tr><td rowspan="2">Static and quasi static loading, in</td><td colspan="2">uncracked concrete</td><td>all sizes</td><td rowspan="2">Tables:
C1.1
C4.1
C5.1
C7.1</td><td>all sizes</td><td rowspan="2">Tables:
C2.1
C4.1
C6.1
C7.2</td><td>all sizes</td><td rowspan="2">Tables:
C3.1
C4.1
C6.2
C8.1</td></tr>
<tr><td colspan="2">cracked concrete</td><td>M8 to M20</td><td>-[1)]</td><td>ϕ 10 to ϕ 20</td></tr>
<tr><td rowspan="2">Seismic performance category</td><td colspan="2">C1</td><td colspan="6" rowspan="2">-[1)]</td></tr>
<tr><td colspan="2">C2</td></tr>
<tr><td rowspan="2">Use category</td><td>I1</td><td>dry or wet concrete</td><td colspan="6">all sizes</td></tr>
<tr><td>I2</td><td>water filled hole [2)]</td><td colspan="2">M 12 to M 30</td><td colspan="2">all sizes</td><td colspan="2">-[1)]</td></tr>
<tr><td colspan="3">Installation direction</td><td colspan="6">D3 (downward and horizontal and upwards (e.g. overhead) installation)</td></tr>
<tr><td colspan="3">Installation temperature</td><td colspan="6">$T_{i,min}$ = -10 °C to $T_{i,max}$ = +40 °C
for the standard variation of temperature after installation</td></tr>
<tr><td rowspan="2">Service temperature</td><td colspan="2">Temperature range I</td><td colspan="2">-40 °C to +80 °C</td><td colspan="4">(max. short term temperature +80 °C;
max. long term temperature +50 °C)</td></tr>
<tr><td colspan="2">Temperature range II</td><td colspan="2">-40 °C to +120 °C</td><td colspan="4">(max. short term temperature +120 °C;
max. long term temperature +72 °C)</td></tr>
</table>

1) Performance not assessed.
2) Valid for shuttle cartridges with 360 ml, 825 ml and coaxial cartridges with 380 ml, 400 ml, 410 ml.

Injection system SWEYTEC IMS	**Annex B1**
Intended use Specifications part 1	

Specifications of intended use part 2

Base materials:

- Compacted reinforced or unreinforced normal weight concrete without fibres of strength classes C20/25 to C50/60 according to EN 206:2013+A2:2021.

Use conditions (Environmental conditions):

- Fastener intended for use in structures subject to dry internal conditions (all materials).
- For all other conditions according to EN1993-1-4:2006+A1:2015 corresponding to corrosion resistance classes to Annex A 5 Table 5.1.

Design:

- Fastenings are designed under the responsibility of an engineer experienced in fastenings and concrete work.
- Verifiable calculation notes and drawings are to be prepared taking account of the loads to be anchored. The position of the fastener is indicated on the design drawings (e. g. position of the fastener relative to reinforcement or to supports, etc.).
- Fastenings are designed in accordance with:
  EN 1992-4:2018 and EOTA TR 082, Edition June 2023.

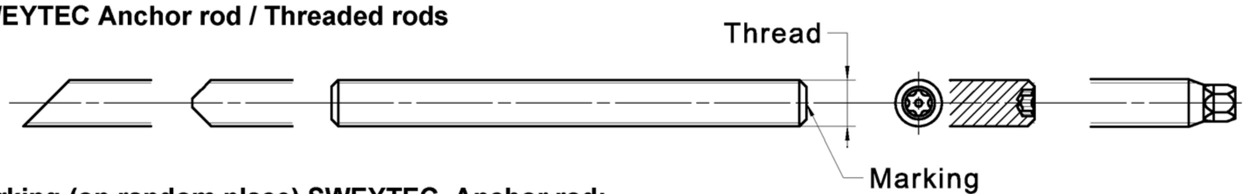
Installation:

- Fastener installation is to be carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Fastening depth should be marked and adhered to installation.
- Overhead installation is allowed (necessary equipment see installation instruction).

Table B3.1: Installation parameters for **Anchor rods / Threaded rods**

Anchor rods / Threaded rods		**Thread**	**M6**	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Nominal drill hole diameter	d_0	[mm]	8	10	12	14	18	24	28	30	35
Drill hole depth	h_0	[mm]	$h_0 \geq h_{ef}$								
Effective embedment depth	$h_{ef,\ min}$	[mm]	50	60	60	70	80	90	96	108	120
Effective embedment depth	$h_{ef,\ max}$	[mm]	72	160	200	240	320	400	480	540	600
Minimum spacing and minimum edge distance	$s_{min} = c_{min}$	[mm]	40	40	45	55	65	85	105	125	140
Diameter of the clearance hole of the fixture – pre-positioned installation	d_f	[mm]	7	9	12	14	18	22	26	30	33
Diameter of the clearance hole of the fixture – push through installation	d_f	[mm]	9	12	14	16	20	26	30	33	40
Minimum thickness of concrete member	h_{min}	[mm]	h_{ef} + 30 (≥100)				$h_{ef} + 2d_0$				
Maximum installation torque	max T_{inst}	[Nm]	5	10	20	40	60	120	150	200	300

SWEYTEC Anchor rod / Threaded rods

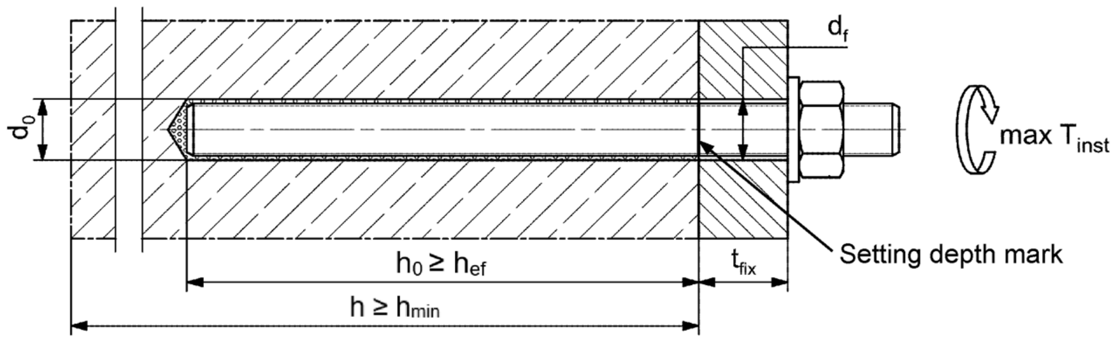


Marking (on random place) SWEYTEC Anchor rod:

Steel zinc plated PC[1] 8.8	● or +	Steel hot-dip PC[1] 8.8	●
High corrosion resistant steel HCR PC[1] 50	●	High corrosion resistant steel HCR PC[1] 70	-
High corrosion resistant steel HCR PC[1] 80	(	Stainless steel R property class 50[1]	~
Stainless steel R property class 80[1]	*		
Alternatively: Colour coding according to DIN 976-1: 2016			

[1] PC = property class

Installation conditions:



Commercial standard threaded rods, washers and hexagon nuts may also be used if the following requirements are fulfilled:

- Materials, dimensions and mechanical properties according to **Annex A5, Table A5.1**.
- Inspection certificate 3.1 according to EN 10204:2004, the documents have to be stored.
- Setting depth is marked.

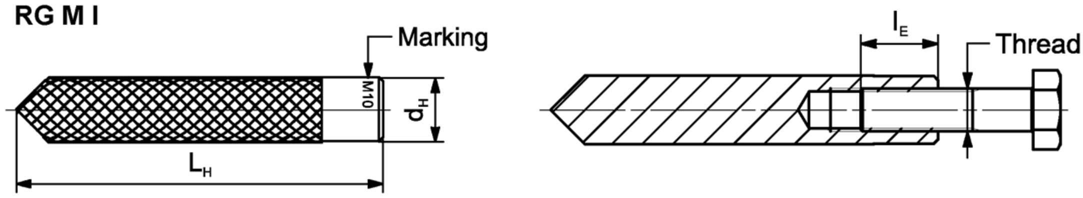
Figures not to scale

Injection system SWEYTEC IMS	**Annex B3**
Intended use Installation parameters Anchor rods / Threaded rods	

Table B4.1: Installation parameters for **SWEYTEC RG M I**

SWEYTEC RG M I		**Thread**	**M8**	**M10**	**M12**	**M16**	**M20**
Diameter of anchor	$d_{nom} = d_H$	[mm]	12	16	18	22	28
Nominal drill hole diameter	d_0	[mm]	14	18	20	24	32
Drill hole depth	h_0	[mm]	$h_0 \geq h_{ef} = L_H$				
Effective embedment depth ($h_{ef} = L_H$)	h_{ef}	[mm]	90	90	125	160	200
Minimum spacing and minimum edge distance	$s_{min} = c_{min}$	[mm]	55	65	75	95	125
Diameter of clearance hole in the fixture	d_f	[mm]	9	12	14	18	22
Minimum thickness of concrete member	h_{min}	[mm]	120	125	165	205	260
Maximum screw-in depth	$l_{E,max}$	[mm]	18	23	26	35	45
Minimum screw-in depth	$l_{E,min}$	[mm]	8	10	12	16	20
Maximum installation torque	max T_{inst}	[Nm]	10	20	40	80	120

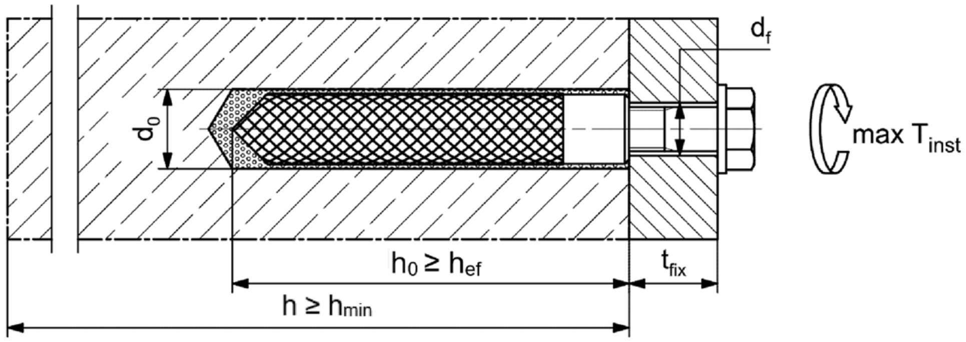
SWEYTEC RG M I



Marking: Anchor size e. g.: **M10**
Stainless steel → additional **R**; e.g.: **M10 R**
High corrosion resistant steel → additional **HCR**; e.g.: **M10 HCR**

Retaining bolt or threaded rods (including nut and washer) must comply with the appropriate material and strength class of Annex A5, Table A5.1

Installation conditions:



Figures not to scale

Injection system SWEYTEC IMS	**Annex B4**
Intended use Installation parameters SWEYTEC RG M I	

Table B5.1: Installation parameters for **reinforcing bars**

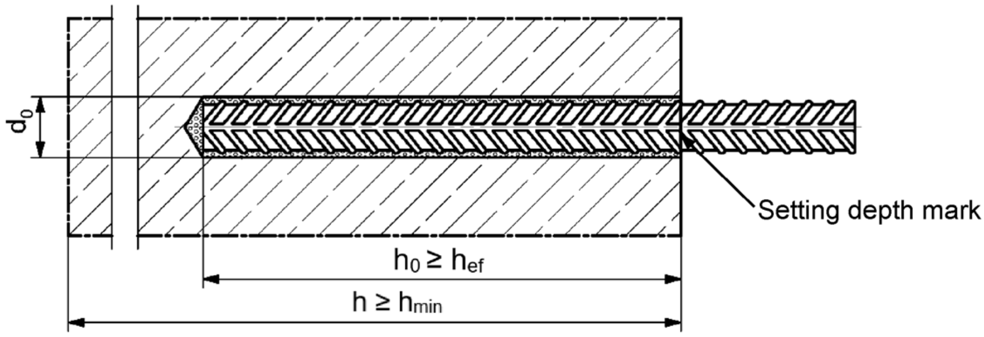
Nominal diameter of the bar		**ϕ**	**8[1)]**		**10[1)]**		**12[1)]**		**14**	**16**	**20**
Nominal drill hole diameter	d_0	[mm]	10	12	12	14	14	16	18	20	25
Drill hole depth	h_0	[mm]	$h_0 \geq h_{ef}$								
Effective embedment depth	$h_{ef,min}$	[mm]	60		60		70		75	80	90
	$h_{ef,max}$	[mm]	160		200		240		280	320	400
Minimum spacing and minimum edge distance	$s_{min} = c_{min}$	[mm]	40		45		55		60	65	85
Minimum thickness of concrete member	h_{min}	[mm]	$h_{ef} + 30$ (≥ 100)					$h_{ef} + 2d_0$			

[1)] Both drill hole diameters can be used

Reinforcing bar

- The minimum value of related rib area $f_{R,min}$ must fulfill the requirements of EN 1992-1-1:2004+AC:2010
- The rib height must be within the range: $0{,}05 \cdot \phi \leq h_{rib} \leq 0{,}07 \cdot \phi$
  (ϕ = Nominal diameter of the bar, h_{rib} = rib height).

Installation conditions:



Figures not to scale

Injection system SWEYTEC IMS

Intended use
Installation parameters reinforcing bars

Annex B5

Table B6.1: Parameters of the **SWEYTEC cleaning brush** BS (steel brush with steel bristles)

The size of the cleaning brush refers to the drill hole diameter

Nominal drill hole diameter	d_0	[mm]	8	10	12	14	16	18	20	24	25	28	30	35
Steel brush diameter BS	d_b	[mm]	9	11	14	16	20		25	26	27	30	40	

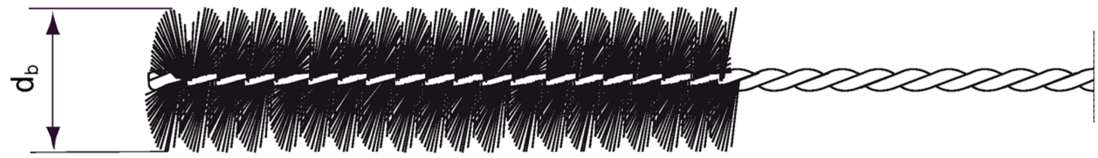


Table B6.2 **Maximum processing** time of the mortar and **minimum curing** time (During the curing time of the mortar the concrete temperature may not fall below the listed minimum temperature)

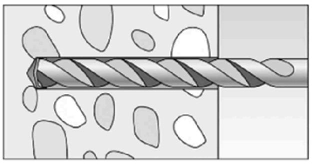
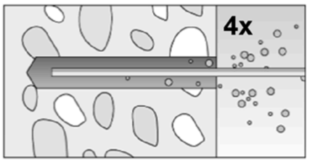
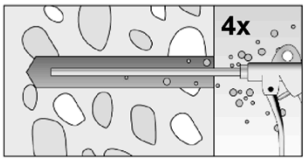
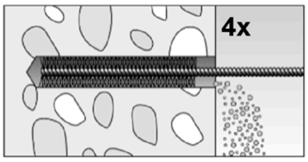
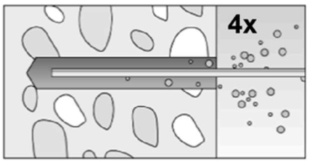
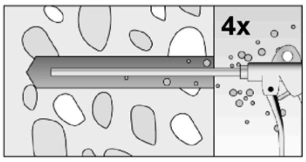
Temperature at anchoring base [°C]	Maximum processing time t_{work}			Minimum curing time [1] t_{cure}		
	SWEYTEC IMS Pro High Speed	SWEYTEC IMS Pro	SWEYTEC IMS Pro Low Speed	SWEYTEC IMS Pro High Speed	SWEYTEC IMS Pro	SWEYTEC IMS Pro Low Speed
-10 to -5 [2]	> 5 min	-	-	12 h	-	-
> -5 to 0 [2]	5 min	> 13 min	-	3 h	24 h	-
> 0 to 5 [2]	5 min	13 min	> 20 min	3 h	3 h	6 h
> 5 to 10	3 min	9 min	20 min	50 min	90 min	3 h
> 10 to 20	1 min	5 min	10 min	30 min	60 min	2 h
> 20 to 30	-	4 min	6 min	-	45 min	60 min
> 30 to 40	-	2 min	4 min	-	35 min	30 min

[1] In wet concrete or water filled holes the curing times must be doubled.
[2] Minimal cartridge temperature +5°C.

Injection system SWEYTEC IMS	**Annex B6**
Intended use Cleaning brush (steel brush) Processing time and curing time	

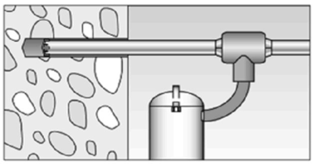
Installation instructions part 1

Drilling and cleaning the hole (hammer drilling with standard drill bit)

1		Drill the hole. Nominal drill hole diameter $\mathbf{d_0}$ and drill hole depth $\mathbf{h_0}$ see **Tables B3.1, B4.1, B5.1**.		
2		Clean the drill hole: For $h_{ef} \leq 12d$ and $d_0 < 18$ mm blow out the hole four times by hand.		For $h_{ef} > 12d$ and / or $d_0 \geq 18$ mm blow out the hole four times with oil-free compressed air ($p \geq 6$ bar).
3		Brush the drill hole four times. For drill hole diameter ≥ 30 mm use a power drill. For deep holes use an extension. Corresponding brushes see **Table B6.1**		
4		Clean the drill hole: For $h_{ef} \leq 12d$ and $d_0 < 18$ mm blow out the hole four times by hand.		For $h_{ef} > 12d$ and / or $d_0 \geq 18$ mm blow out the hole four times with oil-free compressed air ($p \geq 6$ bar).

Go to step 5

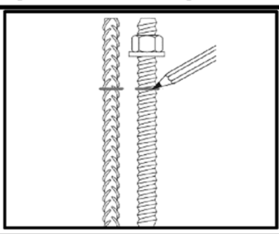
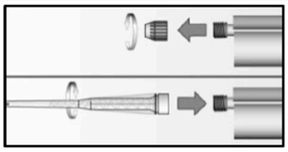
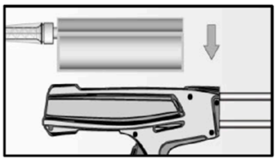
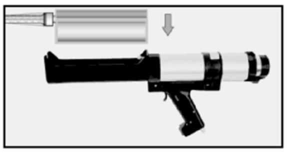
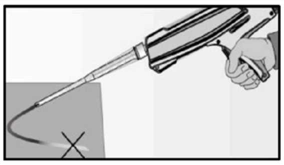
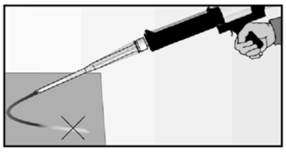
Drilling and cleaning the hole (hammer drilling with hollow drill bit)

1		Check a suitable hollow drill (see **Table B1.1**) for correct operation of the dust extraction.
2		Use a suitable dust extraction system, e.g. fischer FVC 35 M or a comparable dust extraction system with equivalent performance data. Drill the hole with hollow drill bit. The dust extraction system has to extract the drill dust nonstop during the drilling process and must be adjusted to maximum power. Nominal drill hole diameter $\mathbf{d_0}$ and drill hole depth $\mathbf{h_0}$ see **Tables B3.1, B4.1, B5.1**.

Go to step 5

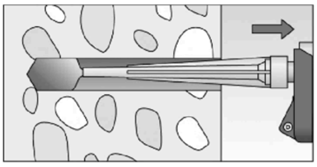
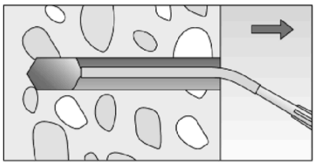
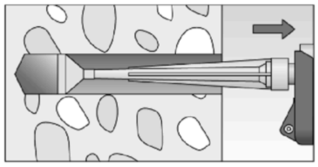
Installation instructions part 2

Preparing the cartridge

5		Mark the setting depth.
6		Remove the sealing cap. Screw on the static mixer (the spiral in the static mixer must be clearly visible).
7	 	Place the cartridge into the dispenser.
8	 	Extrude approximately 10 cm of material out until the resin is evenly grey in colour. Do not use mortar that is not uniformly grey.

Go to step 9

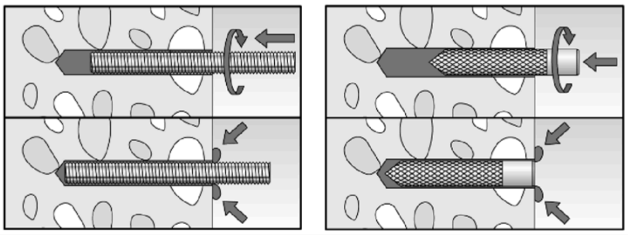
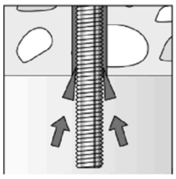
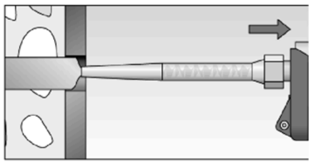
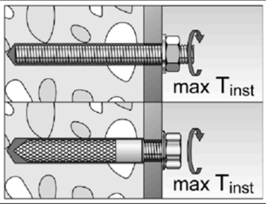
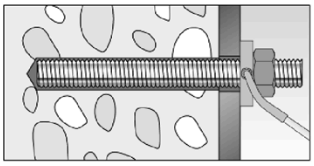
Injection of the mortar

9	 For $h_0 = h_{ef}$ fill approximately 2/3 of the drill hole with mortar. For $h_0 > h_{ef}$ more mortar is needed. Always begin from the bottom of the hole and avoid bubbles.	 For drill hole depth ≥ 150 mm use an extension tube.	 For overhead installation, deep holes ($h_0 > 250$ mm) use an injection adapter.

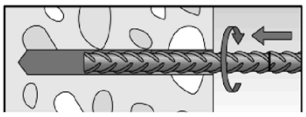
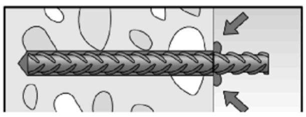
Go to step 10

Installation instructions part 3

Installation of anchor rods or SWEYTEC RG M I

10		Only use clean and oil-free metal parts. Push the anchor rod or SWEYTEC RG M I anchor down to the bottom of the hole, turning it slightly while doing so. After inserting the metal parts, excess mortar must be emerged around the anchor element. If not, pull out the metal part immediately and reinject mortar.
		For overhead installations support the metal part with wedges (e.g. centering wedges).
		For push through installation fill the annular gap with mortar
11		Wait for the specified curing time t_{cure} see **Table B6.2**.
12		Mounting the fixture max T_{inst} see **Tables B3.1 and B4.1**.
Option		After the minimum curing time is reached, the gap between metal part and fixture (annular clearance) may be filled with mortar via the filling disc. Compressive strength ≥ 50 N/mm² (e.g. SWEYTEC IMS Pro). ATTENTION: By using filling disc reduces t_{fix} (usable length of the anchor).

Installation reinforcing bars

10		Only use clean and oil-free reinforcing bars. Push the reinforcement bar with the setting depth mark into the filled hole up to the setting depth mark. Recommendation: Rotation back and forth of the reinforcement bar makes pushing easy.
		When the setting depth mark is reached, excess mortar must be emerged from the mouth of the drill hole. If not, pull out the metal part immediately and reinject mortar.
11		Wait for the specified curing time t_{cure} see **Table B6.2**.

Injection system SWEYTEC IMS	**Annex B9**
Intended use Installation instructions part 3	

Table C1.1: Characteristic resistance to **steel failure** under **tension / shear loading** of **Anchor rods** and **Threaded rods**

Anchor rod / Threaded rod				**M6**	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Characteristic resistance to steel failure under tension loading 1)												
Characteristic resistance $N_{Rk,s}$	Steel zinc plated	Property class 4.8	[kN]	8,0	14,6(13,2)	23,2(21,4)	33,7	62,8	98,0	141,2	183,6	224,4
		5.8	[kN]	10,1	18,3(16,6)	29,0(26,8)	42,1	78,5	122,5	176,5	229,5	280,5
		8.8	[kN]	16,1	29,2(26,5)	46,4(42,8)	67,4	125,6	196,0	282,4	367,2	448,8
	Stainless steel R and high corrosion resistant steel HCR	50	[kN]	10,1	18,3	29,0	42,1	78,5	122,5	176,5	229,5	280,5
		70	[kN]	14,1	25,6	40,6	59,0	109,9	171,5	247,1	321,3	392,7
		80	[kN]	16,1	29,2	46,4	67,4	125,6	196,0	282,4	367,2	448,8
Partial factors 2)												
Partial factor $\gamma_{Ms,N}$	Steel zinc plated	Property class 4.8	[-]	1,50								
		5.8	[-]	1,50								
		8.8	[-]	1,50								
	Stainless steel R and high corrosion resistant steel HCR	50	[-]	2,86								
		70	[-]	1,87 / SWEYTEC HCR: 1,50								
		80	[-]	1,60								
Characteristic resistance to steel failure under shear loading 1)												
without lever arm												
Characteristic resistance $V^0_{Rk,s}$	Steel zinc plated	Property class 4.8	[kN]	4,8	8,7(7,9)	13,9(12,8)	20,2	37,6	58,8	84,7	110,1	134,6
		5.8	[kN]	6,0	10,9(9,9)	17,4(16,0)	25,2	47,1	73,5	105,9	137,7	168,3
		8.8	[kN]	8,0	14,6(13,2)	23,2(21,4)	33,7	62,8	98,0	141,2	183,6	224,4
	Stainless steel R and high corrosion resistant steel HCR	50	[kN]	5,0	9,1	14,5	21,0	39,2	61,2	88,2	114,7	140,2
		70	[kN]	7,0	12,8	20,3	29,5	54,9	85,7	123,5	160,6	196,3
		80	[kN]	8,0	14,6	23,2	33,7	62,8	98,0	141,2	183,6	224,4
Ductility factor		k_7	[-]	1,0								
with lever arm												
Charact. resistance $M^0_{Rk,s}$	Steel zinc plated	Property class 4.8	[Nm]	6,1	14,9(12,9)	29,9(26,5)	52,3	132,9	259,6	448,8	665,7	899,5
		5.8	[Nm]	7,6	18,7(16,1)	37,3(33,2)	65,4	166,2	324,6	561,0	832,2	1124,4
		8.8	[Nm]	12,2	29,9(25,9)	59,8(53,1)	104,6	265,9	519,3	897,6	1331,5	1799,0
	Stainless steel R and high corrosion resistant steel HCR	50	[Nm]	7,6	18,7	37,3	65,4	166,2	324,6	561,0	832,2	1124,4
		70	[Nm]	10,7	26,2	52,3	91,5	232,6	454,4	785,4	1165,0	1574,1
		80	[Nm]	12,2	29,9	59,8	104,6	265,9	519,3	897,6	1331,5	1799,0
Partial factors 2)												
Charact. resistance $M^0_{Rk,s}$	Steel zinc plated	Property class 4.8	[-]	1,25								
		5.8	[-]	1,25								
		8.8	[-]	1,25								
	Stainless steel R and high corrosion resistant steel HCR	50	[-]	2,38								
		70	[-]	1,56 / SWEYTEC HCR: 1,25 3)								
		80	[-]	1,33								

1) Values in brackets are valid for undersized threaded rods with smaller stress area A_s for hot dip galvanised Threaded rods according to EN ISO 10684:2004+AC:2009.
2) In absence of other national regulations.
3) Only admissible for high corrosion resist. steel HCR, with $f_{yk} / f_{uk} \geq 0,8$ and $A_5 > 12$ % (e.g. Anchor rods).

Injection system SWEYTEC IMS	**Annex C1**
Performances Characteristic resistance to steel failure under tension / shear loading of Anchor rods and Threaded rods	

Table C2.1: Characteristic resistance to **steel failure** under tension / shear loading of **SWEYTEC RG M I**

SWEYTEC **RG M I**			**RG M I**	**Screw**		**M8**	**M10**	**M12**	**M16**	**M20**
Characteristic resistance to steel failure under tension loading										
Characteristic resistance with screw	$N_{Rk,s}$	Property class	5.8	5.8	[kN]	18,3	29,0	42,1	78,3	122,4
				8.8		29,2	46,4	67,4	106,7	180,2
		Property class	R-70 / HCR-70	R-70 / commercial standard		25,6	40,6	59,0	109,6	171,3
				HCR-70		25,6	40,6	59,0	109,6	171,3
Partial factors [1)]										
Partial factors	$\gamma_{Ms,N}$	Property class	5.8	5.8	[-]	1,50				
				8.8		1,50				
		Property class	R-70 / HCR-70	R-70 / commercial standard		1,87				
				HCR-70		1,50				
Characteristic resistance to steel failure under shear loading										
Without lever arm										
Characteristic resistance with screw	$V^0_{Rk,s}$	Property class	5.8	5.8	[kN]	10,9	17,4	25,2	47,1	73,5
				8.8		14,6	23,2	33,7	62,8	98,0
		Property class	R-70 / HCR-70	R-70 / commercial standard		12,8	20,3	29,5	54,9	85,7
				HCR-70		12,8	20,3	29,5	54,9	85,7
Ductility factor			k_7		[-]	1,0				
With lever arm										
Characteristic resistance with screw	$M^0_{Rk,s}$	Property class	5.8	5.8	[Nm]	18,7	37,3	65,4	166,2	324,6
				8.8		29,9	59,8	104,6	265,9	519,3
		Property class	R-70/ HCR-70	R-70 / commercial standard		26,2	52,3	91,5	232,6	454,4
				HCR-70		26,2	52,3	91,5	232,6	454,4
Partial factors [1)]										
Partial factors	$\gamma_{Ms,V}$	Property class	5.8	5.8	[-]	1,25				
				8.8		1,25				
		Property class	R-70 / HCR-70	R-70 / commercial standard		1,56				
				HCR-70		1,25				

[1)] In absence of other national regulations.

Injection system SWEYTEC IMS	Annex C2
Performances Characteristic resistance to steel failure under shear loading of SWEYTEC RG M I	

Table C3.1: Characteristic restistance to **steel failure** under tension / shear loading of **reinforcing bars**

Nominal diameter of the bar		**ϕ**	**8**	**10**	**12**	**14**	**16**	**20**
Characteristic resistance to steel failure under tension loading								
Characteristic resistance	$N_{Rk,s}$	[kN]	$A_s \cdot f_{uk}$[1)]					
Characteristic resistance to steel failure under shear loading								
Without lever arm								
Characteristic resistance	$V^0_{Rk,s}$	[kN]	k_6[2)] $\cdot A_s \cdot f_{uk}$[1)]					
Ductility factor	k_7	[-]	1,0					
With lever arm								
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	$1{,}2 \cdot W_{el} \cdot f_{uk}$[1)]					

1) f_{uk} respectively must be taken from the specifications of the reinforcing bar.
2) In accordance with EN 1992-4:2018 section 7.2.2.3.1.
k_6 = 0,6 for fasteners made of carbon steel with $f_{uk} \leq 500$ N/mm².
= 0,5 for fasteners made of carbon steel with $500 < f_{uk} \leq 1000$ N/mm².
= 0,5 for fasteners made of stainless steel.

Injection system SWEYTEC IMS

Performances
Characteristic resistance to steel failure under tension / shear loading of reinforcing bars

Annex C3

Table C4.1: Characteristic resistance to **concrete failure** under **tension / shear loading**

Size			All sizes	
Characteristic resistance to concrete failure under tension loading				
Installation factor	γ_{inst}	[-]	See annex C5 to C6	
Factors for the compressive strength of concrete > C20/25				
Increasing factor ψ_c for cracked or uncracked concrete $\tau_{Rk\,(X,Y)} = \psi_c \cdot \tau_{Rk\,(C20/25)}$	C25/30	[-]	1,05	
	C30/37		1,10	
	C35/45		1,15	
	C40/50		1,19	
	C45/55		1,22	
	C50/60		1,26	
Splitting failure				
Edge distance $h / h_{ef} \geq 2{,}0$	$c_{cr,sp}$	[mm]	1,0 h_{ef}	
Edge distance $2{,}0 > h / h_{ef} > 1{,}3$	$c_{cr,sp}$		4,6 h_{ef} - 1,8 h	
Edge distance $h / h_{ef} \leq 1{,}3$	$c_{cr,sp}$		2,26 h_{ef}	
Spacing	$s_{cr,sp}$		2 $c_{cr,sp}$	
Concrete failure				
Uncracked concrete	$k_{ucr,N}$	[-]	11,0	
Cracked concrete	$k_{cr,N}$		7,7	
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}	
Spacing	$s_{cr,N}$		2 $c_{cr,N}$	
Factors for sustained tension loading				
Temperature range			50 °C / 80 °C	72 °C / 120 °C
Factor	ψ^0_{sus}	[-]	0,74	0,87
Characteristic resistance to concrete failure under shear loading				
Installation factor	γ_{inst}	[-]	1,0	
Concrete pry-out failure				
Factor for pry-out failure	k_8	[-]	2,0	
Concrete edge failure				
Effective length of fastener in shear loading	l_f	[mm]	for $d_{nom} \leq 24$ mm: min (h_{ef}; 12 d_{nom}) for $d_{nom} > 24$ mm: min (h_{ef}; 8 d_{nom}; 300 mm)	

Calculation diameters

Size			M6	M8	M10	M12	M16	M20	M24	M27	M30
Anchor rods and Threaded rods	d_{nom}	[mm]	6	8	10	12	16	20	24	27	30
SWEYTEC RG M I	d_{nom}	[mm]	-[1)]	12	16	18	22	28	-[1)]	-[1)]	-[1)]

Size (nominal diameter of the bar)	ϕ	[mm]	8	10	12	14	16	20
Reinforcing bar	d_{nom}	[mm]	8	10	12	14	16	20

[1)] Anchor type not part of this assessment.

Injection system SWEYTEC IMS

Performances
Characteristic resistance to concrete failure under tension / shear loading

Annex C4

Table C5.1: Characteristic resistance to **combined pull-out** and **concrete failure** for **Anchor rods** and **Threaded rods** in hammer drilled holes; **uncracked or cracked concrete**

Anchor rod / Threaded rod				**M6**	**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Combined pull-out and concrete cone failure												
Calculation diameter		d	[mm]	6	8	10	12	16	20	24	27	30
Uncracked concrete												
Characteristic bond resistance in uncracked concrete C20/25												
Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete)												
Temperature range	I: 50 °C / 80 °C	$\tau_{Rk,ucr}$	[N/mm²]	9,0	11,0	11,0	11,0	10,0	9,5	9,0	8,5	8,5
Temperature range	II: 72 °C / 120 °C	$\tau_{Rk,ucr}$	[N/mm²]	6,5	9,5	9,5	9,0	8,5	8,0	7,5	7,0	7,0
Hammer-drilling with standard drill bit or hollow drill bit (water filled hole)												
Temperature range	I: 50 °C / 80 °C	$\tau_{Rk,ucr}$	[N/mm²]	-[2]	-[2]	-[2]	9,5	8,5	8,0	7,5	7,0	7,0
Temperature range	II: 72 °C / 120 °C	$\tau_{Rk,ucr}$	[N/mm²]	-[2]	-[2]	-[2]	7,5	7,0	6,5	6,0	6,0	6,0
Installation factors												
Dry or wet concrete		γ_{inst}	[-]	1,0								
Water filled hole		γ_{inst}	[-]	-[2]	-[2]	-[2]	1,2 [1]					
Cracked concrete												
Characteristic bond resistance in cracked concrete C20/25												
Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete)												
Temperature range	I: 50 °C / 80 °C	$\tau_{Rk,cr}$	[N/mm²]	-[2]	5,5	6,0	6,0	6,0	5,5	-[2]	-[2]	-[2]
Temperature range	II: 72 °C / 120 °C	$\tau_{Rk,cr}$	[N/mm²]	-[2]	4,5	5,0	6,0	6,0	5,0	-[2]	-[2]	-[2]
Hammer-drilling with standard drill bit or hollow drill bit (water filled hole)												
Temperature range	I: 50 °C / 80 °C	$\tau_{Rk,cr}$	[N/mm²]	-[2]	-[2]	-[2]	5,0	5,0	4,5	-[2]	-[2]	-[2]
Temperature range	II: 72 °C / 120 °C	$\tau_{Rk,cr}$	[N/mm²]	-[2]	-[2]	-[2]	4,0	4,0	4,0	-[2]	-[2]	-[2]
Installation factors												
Dry or wet concrete		γ_{inst}	[-]	-[2]	1,0					-[2]	-[2]	-[2]
Water filled hole		γ_{inst}	[-]	-[2]	-[2]	-[2]	1,2 [1]			-[2]	-[2]	-[2]

[1] Valid for shuttle cartridges with 360 ml, 825 ml and coaxial cartridges with 380 ml, 400 ml, 410 ml.
[2] Performance not assessed.

Injection system SWEYTEC IMS	**Annex C5**
Performances Characteristic resistance to combined pull-out and concrete failure for Anchor rod and Threaded rods	

Table C6.1: Characteristic resistance to **combined pull-out** and **concrete failure** for **SWEYTEC RG M I** in hammer drilled holes; **uncracked concrete**

SWEYTEC RG M I					**M8**	**M10**	**M12**	**M16**	**M20**
Combined pull-out and concrete cone failure									
Calculation diameter			d	[mm]	12	16	18	22	28
Uncracked concrete									
Characteristic bond resistance in uncracked concrete C20/25									
Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete)									
Temperature range	I:	50 °C / 80 °C	$\tau_{Rk,ucr}$	[N/mm²]	10,5	10,0	9,5	9,0	8,5
	II:	72 °C / 120 °C			9,0	8,0	8,0	7,5	7,0
Hammer-drilling with standard drill bit or hollow drill bit (water filled hole)									
Temperature range	I:	50 °C / 80 °C	$\tau_{Rk,ucr}$	[N/mm²]	10,0	9,0	9,0	8,5	8,0
	II:	72 °C / 120 °C			7,5	6,5	6,5	6,0	6,0
Installation factors									
Dry or wet concrete			γ_{inst}	[-]	1,0				
Water filled hole					1,2 [1)]				

[1)] Valid for shuttle cartridges with 360 ml, 825 ml and coaxial cartridges with 380 ml, 400 ml, 410 ml

Table C6.2: Characteristic resistance to **combined pull-out** and **concrete failure** for **reinforcing bars** in hammer drilled holes; **uncracked or cracked concrete**

Nominal diameter of the bar			**ϕ**		**8**	**10**	**12**	**14**	**16**	**20**
Combined pull-out and concrete cone failure										
Calculation diameter			d	[mm]	8	10	12	14	16	20
Uncracked concrete										
Characteristic bond resistance in uncracked concrete C20/25										
Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete)										
Temperature range	I:	50 °C / 80 °C	$\tau_{Rk,ucr}$	[N/mm²]	11,0	11,0	11,0	10,0	10,0	9,5
	II:	72 °C / 120 °C			9,5	9,5	9,0	8,5	8,5	8,0
Installation factor										
Dry or wet concrete			γ_{inst}	[-]	1,0					
Cracked concrete										
Characteristic bond resistance in cracked concrete C20/25										
Hammer-drilling with standard drill bit or hollow drill bit (dry or wet concrete)										
Temperature range	I:	50 °C / 80 °C	$\tau_{Rk,cr}$	[N/mm²]	-[1)]	3,0	5,0	5,0	5,0	4,5
	II:	72 °C / 120 °C			-[1)]	3,0	4,5	4,5	4,5	4,0
Installation factor										
Dry or wet concrete			γ_{inst}	[-]	-[1)]	1,0				

[1)] Performance not assessed

Injection system SWEYTEC IMS	**Annex C6**
Performances Characteristic resistance to combined pull-out and concrete failure for SWEYTEC Threaded RG M I and reinforcing bars	

Table C7.1: Displacements for Anchor rods / Threaded rods

Anchor rods / Threaded rods		M6	M8	M10	M12	M16	M20	M24	M27	M30
Displacement-Factors for tension loading[1]										
Uncracked concrete; Temperature range I, II										
$\delta_{N0\text{-Factor}}$	[mm/(N/mm²)]	0,09	0,09	0,09	0,10	0,10	0,10	0,10	0,11	0,12
$\delta_{N\infty\text{-Factor}}$		0,10	0,10	0,10	0,12	0,12	0,12	0,13	0,13	0,14
Cracked concrete; Temperature range I, II										
$\delta_{N0\text{-Factor}}$	[mm/(N/mm²)]	-[3]	0,12	0,12	0,12	0,13	0,13	-[3]	-[3]	-[3]
$\delta_{N0\text{-Factor}}$		-[3]	0,25	0,27	0,30	0,30	0,30	-[3]	-[3]	-[3]
Displacement-Factors for shear loading[2]										
Uncracked or cracked concrete; Temperature range I, II										
$\delta_{V0\text{-Factor}}$	[mm/kN]	0,11	0,11	0,11	0,10	0,10	0,09	0,09	0,08	0,07
$\delta_{V\infty\text{-Factor}}$		0,12	0,12	0,12	0,11	0,11	0,10	0,10	0,09	0,09

[1] Calculation of effective displacement:

$\delta_{N0} = \delta_{N0\text{-Factor}} \cdot \tau$

$\delta_{N\infty} = \delta_{N\infty\text{-Factor}} \cdot \tau$

τ = acting bond strength under tension loading

[2] Calculation of effective displacement:

$\delta_{V0} = \delta_{V0\text{-Factor}} \cdot V$

$\delta_{V\infty} = \delta_{V\infty\text{-Factor}} \cdot V$

V = acting shear loading

[3] Performance not assessed

Table C7.2: Displacements for SWEYTEC RG M I

SWEYTEC **RG M I**		**M8**	**M10**	**M12**	**M16**	**M20**
Displacement-Factors for tension loading[1]						
Uncracked concrete; Temperature range I, II						
$\delta_{N0\text{-Factor}}$	[mm/(N/mm²)]	0,10	0,11	0,12	0,13	0,14
$\delta_{N\infty\text{-Factor}}$		0,13	0,14	0,15	0,16	0,18
Displacement-Factors for shear loading[2]						
Uncracked concrete; Temperature range I, II						
$\delta_{V0\text{-Factor}}$	[mm/kN]	0,12	0,12	0,12	0,12	0,12
$\delta_{V\infty\text{-Factor}}$		0,14	0,14	0,14	0,14	0,14

[1] Calculation of effective displacement:

$\delta_{N0} = \delta_{N0\text{-Factor}} \cdot \tau$

$\delta_{N\infty} = \delta_{N\infty\text{-Factor}} \cdot \tau$

τ = acting bond strength under tension loading

[2] Calculation of effective displacement:

$\delta_{V0} = \delta_{V0\text{-Factor}} \cdot V$

$\delta_{V\infty} = \delta_{V\infty\text{-Factor}} \cdot V$

V = acting shear loading

Injection system SWEYTEC IMS	**Annex C7**
Performances Displacements for Anchor rods / Threaded rods and SWEYTEC RG M I	

Table C8.1: Displacements for reinforcing bars								
Nominal diameter of the bar		**ϕ**	**8**	**10**	**12**	**14**	**16**	**20**
Displacement-Factors for tension loading[1]								
Uncracked concrete; Temperature range I, II								
$\delta_{N0\text{-Factor}}$	[mm/(N/mm²)]		0,09	0,09	0,10	0,10	0,10	0,10
$\delta_{N\infty\text{-Factor}}$			0,10	0,10	0,12	0,12	0,12	0,12
Cracked concrete; Temperature range I, II								
$\delta_{N0\text{-Factor}}$	[mm/(N/mm²)]		-[3]	0,12	0,13	0,13	0,13	0,13
$\delta_{N\infty\text{-Factor}}$			-[3]	0,27	0,30	0,30	0,30	0,30
Displacement-Factors for shear loading[2]								
Uncracked or cracked concrete; Temperature range I, II								
$\delta_{V0\text{-Factor}}$	[mm/kN]		0,11	0,11	0,10	0,10	0,10	0,09
$\delta_{V\infty\text{-Factor}}$			0,12	0,12	0,11	0,11	0,11	0,10

[1] Calculation of effective displacement:

$\delta_{N0} = \delta_{N0\text{-Factor}} \cdot \tau$

$\delta_{N\infty} = \delta_{N\infty\text{-Factor}} \cdot \tau$

τ = acting bond strength under tension loading

[2] Calculation of effective displacement:

$\delta_{V0} = \delta_{V0\text{-Factor}} \cdot V$

$\delta_{V\infty} = \delta_{V\infty\text{-Factor}} \cdot V$

V = acting shear loading

[3] Performance not assessed.