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European Technical Assessment

ETA 21/0819 of 01/06/2022

Technical Assessment Body issuing the ETA: Technical and Test Institute for Construction Prague	
Trade name of the construction product	PSR PSR-H PSR-X
Product family to which the construction product belongs	Product area code: 33 Torque controlled expansion anchor for use in uncracked concrete
Manufacturer	Marcopol Sp. z o.o. Producent Śrub ul. Oliwska 100 80-209 Chwaszczyno Poland
Manufacturing plant	Plant 1 Plant 2
This European Technical Assessment contains	14 pages including 12 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 330232-01-0601 Mechanical fasteners for use in concrete

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

1. Technical description of the product

The wedge anchor type PSR in the range of M6, M8, M10, M12, M16 and M20 is an anchor made of galvanised steel with clips made of pre-galvanized steel sheet.

The wedge anchor type PSR-H in the range of M8, M10, M12, M16 and M20 is an anchor made of sherardized coating steel with clips made of stainless steel.

The wedge anchor type PSR-X in the range of M8, M10, M12 and M16 is an anchor made of stainless steel with clips made of stainless steel.

The anchor is installed into a predrilled cylindrical hole and anchored by torque-controlled expansion. The anchorage is characterized by friction between expansion clip and concrete.

The installed anchor is shown in Annex 1.

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

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

The provisions made in this European Technical Assessment are based on an assumed working life of the anchor of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the products in relation to the expected economically reasonable working life of the works.

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

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance (static and quasi-static loading)	See Annex C 1, C 2, C 3, C 4. C 5, C 6
Displacement	See Annex C 1, C 2, C 3, C 4. C 5, C 6

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1 according to EN 13501-1
Resistance to fire	No performance assessed

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

According to the Decision 97/463/EC of the European Commission[1], the system 1 of assessment verification of constancy of performance (see Annex V to the Regulation (EU) No 305/2011) apply.

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Technical and Test Institute for Construction Prague.

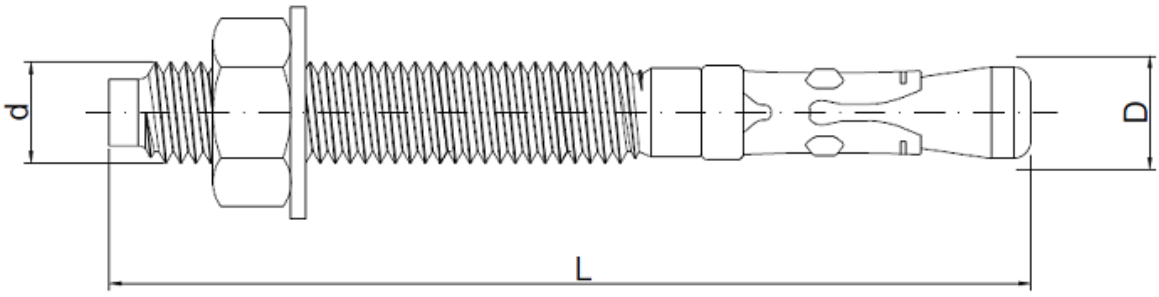
Issued in Prague on 01.06.2022

By

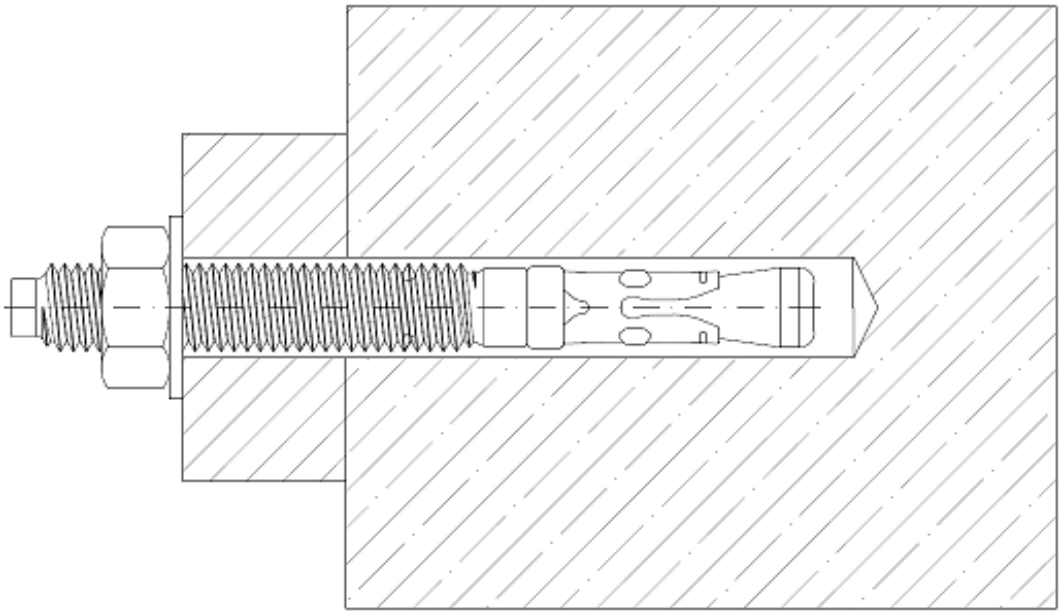
Ing. Jiří Studnička, Ph.D.
Head of the Technical Assessment Body

[1] Official Journal of the European Communities L 198/31 25.7.1997

PSR, PSR-H, PSR-X



PSR, PSR-H, PSR-X - Installed anchor



PSR, PSR-H, PSR-X	**Annex A 1**
Product description Installed conditions	

Table A1 – Materials PSR

Component	Material
Anchor body	Q195 according GB-T/701:2008[1)] processed to properties $R_m \geq 368$ MPa, $R_e \geq 240$ MPa
Clip	DC01 according Q/BB 305:2019
Hexagonal nut	Q195 according GB-T/701:2008[1)]
Washer	Q195 according GB-T/701:2008[1)]

[1)] or equivalent material

Table A2 – Materials PSR-H

Component	Material
Anchor body	Q195 according GB-T/701:2008[1)] processed to properties $R_m \geq 368$ MPa, $R_e \geq 240$ MPa
Clip	AISI316
Hexagonal nut	Q195 according GB-T/701:2008[1)]
Washer	Q195 according GB-T/701:2008[1)]

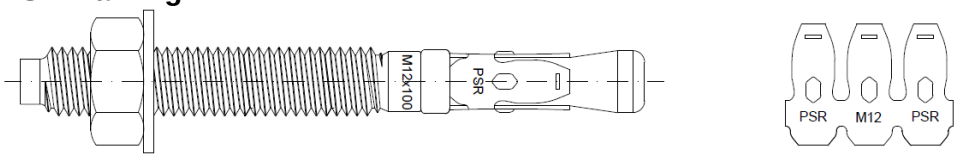
[1)] or equivalent material

Table A3 – Materials PSR-X

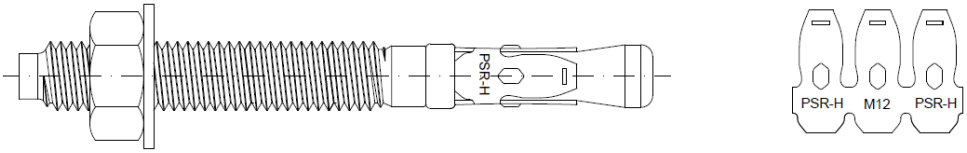
Component	Material
Anchor body	AISI316/SAE316 316[1)] $R_m \geq 586$ MPa, $R_e \geq 470$ MPa
Clip	AISI316
Hexagonal nut	AISI316/SAE316 316[1)]
Washer	AISI316/SAE316 316[1)]

[1)] or equivalent material

PSR Marking



PSR-H Marking



PSR-X Marking

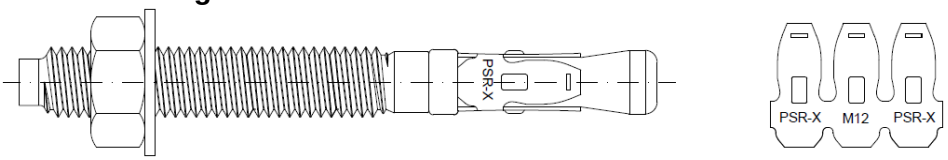


Table A4 – Marking PSR

Marking M6	M6x85								
Anchor length [mm]	85								
Marking M8	M8x65	M8x75	M8x80	M8x90	M8x115				
Anchor length [mm]	65	75	80	90	115				
Marking M10	M10x65	M10x75	M10x80	M10x90	M10x105	M10x120			
Anchor length [mm]	65	75	80	90	105	120			
Marking M12	M12x80	M12x100	M12x120	M12x140	M12x150	M12x160	M12x180	M12x200	M12x220
Anchor length [mm]	80	100	120	140	150	160	180	200	220
Marking M16	M16x105	M16x125	M16x140	M16x145	M16x150	M16x175	M16x180	M16x240	
Anchor length [mm]	105	125	140	145	150	175	180	240	
Marking M20	M20x160	M20x220	M20x250						
Anchor length [mm]	160	220	250						

Table A5 – Marking PSR-H

Marking M8	M8x65	M8x75	M8x80	M8x90	M8x115				
Anchor length [mm]	65	75	80	90	115				
Marking M10	M10x65	M10x75	M10x80	M10x90	M10x105	M10x120			
Anchor length [mm]	65	75	80	90	105	120			
Marking M12	M12x80	M12x100	M12x120	M12x140	M12x150	M12x160	M12x180	M12x200	M12x220
Anchor length [mm]	80	100	120	140	150	160	180	200	220
Marking M16	M16x105	M16x125	M16x140	M16x145	M16x150	M16x175	M16x180	M16x240	
Anchor length [mm]	105	125	140	145	150	175	180	240	
Marking M20	M20x160	M20x220	M20x250						
Anchor length [mm]	160	220	250						

Table A5 – Marking PSR-X

Marking M8	M8x65	M8x75	M8x80	M8x90	M8x115				
Anchor length [mm]	65	75	80	90	115				
Marking M10	M10x65	M10x75	M10x80	M10x90	M10x105	M10x120			
Anchor length [mm]	65	75	80	90	105	120			
Marking M12	M12x80	M12x100	M12x120	M12x140	M12x150	M12x160	M12x180	M12x200	M12x220
Anchor length [mm]	80	100	120	140	150	160	180	200	220
Marking M16	M16x105	M16x125	M16x140	M16x145	M16x150	M16x175	M16x180	M16x240	
Anchor length [mm]	105	125	140	145	150	175	180	240	

PSR, PSR-H, PSR-X

Product description
Marking

Annex A 3

Specifications of intended use

Anchorages subject to:

- Static and quasi-static load.

Base materials

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

Use conditions (Environmental conditions)

PSR, PSR-H

- Structures subject to dry internal conditions.

PSR-X

- Structures subject to dry internal conditions.
- For all other conditions according to EN 1993-1-4; Table A.1 corresponding to corrosion resistance class:
  - Stainless steel class A4: CRC III

Design:

- The anchorages are designed in accordance with the EN 1992-4 under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings.

Installation:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Use of the anchor only as supplied by the manufacturer without exchanging any components of the anchor.
- Anchor installation in accordance with the manufacturer's specifications and drawings using the appropriate tools.
- Effective anchoring depth, edge distance and spacing not less than the specified values without minus tolerance.
- In case of aborted drill hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not in the direction of load application.

PSR, PSR-H, PSR-X	**Annex B 1**
Intended use Specifications	

Table B1 - Installation parameters PSR

			M6	M8		M10		M12		M16		M20	
				red	std	red	str	red	std	red	std	red	std
d_o	Nominal diameter of drill bit	[mm]	6	8		10		12		16		20	
d_f	Diameter of clearance hole in fixture	[mm]	M6	M8		M10		M12		M16		M20	
S		[mm]	10	13		17		19		24		30	
L	Total length of the anchor	[mm]	50÷115	65÷135		65÷205		95÷225		115÷245		135÷255	
t_{fix}	Thickness of fixture	[mm]	L-(h_{nom}+9,6)	L-(h_{nom}+11,1)		L-(h_{nom}+14,5)		L-(h_{nom}+17,75)		L-(h_{nom}+22)		L-(h_{nom}+26,5)	
h_{ef}	Effective anchorage depth	[mm]	35	35	45	40	50	50	70	65	85	80	100
h_{nom}	Overall anchor embedment depth in the concrete	[mm]	38	43	53	48	58	60	80	79	99	90	110
h_1	Depth of drilled hole	[mm]	43	50	60	55	65	70	90	90	110	100	120
T_{inst}	Installation torque	[Nm]	5	15		30		50		100		200	
h_{min}	Minimum concrete thickness	[mm]	100	100		100		100		130		160	
s_{min}	Minimum spacing	[mm]	45	45		50		60		75		90	
c_{min}	Minimum edge distance	[mm]	45	45		50		60		75		90	
$c_{cr,sp}$	Edge distance for splitting failure	[mm]	65	65	75	70	85	85	115	105	140	130	160

Table B2 - Installation parameters PSR-H

			M8		M10		M12		M16		M20	
			red	std	red	str	red	std	red	std	red	std
d_o	Nominal diameter of drill bit	[mm]	8		10		12		16		20	
d_f	Diameter of clearance hole in fixture	[mm]	M8		M10		M12		M16		M20	
S		[mm]	13		17		19		24		30	
L	Total length of the anchor	[mm]	65÷135		65÷205		95÷225		115÷245		135÷255	
t_{fix}	Thickness of fixture	[mm]	L-(h_{nom}+11,1)		L-(h_{nom}+14,5)		L-(h_{nom}+17,75)		L-(h_{nom}+22)		L-(h_{nom}+26,5)	
h_{ef}	Effective anchorage depth	[mm]	35	45	40	50	50	70	65	85	80	100
h_{nom}	Overall anchor embedment depth in the concrete	[mm]	43	53	48	58	60	80	79	99	90	110
h_1	Depth of drilled hole	[mm]	50	60	55	65	70	90	90	110	100	120
T_{inst}	Installation torque	[Nm]	15		30		50		100		200	
h_{min}	Minimum concrete thickness	[mm]	100		100		100		130		160	
s_{min}	Minimum spacing	[mm]	45		50		60		75		90	
c_{min}	Minimum edge distance	[mm]	45		50		60		75		90	
$c_{cr,sp}$	Edge distance for splitting failure	[mm]	65	75	70	85	85	115	105	140	130	160

Table B3 - Installation parameters PSR-X

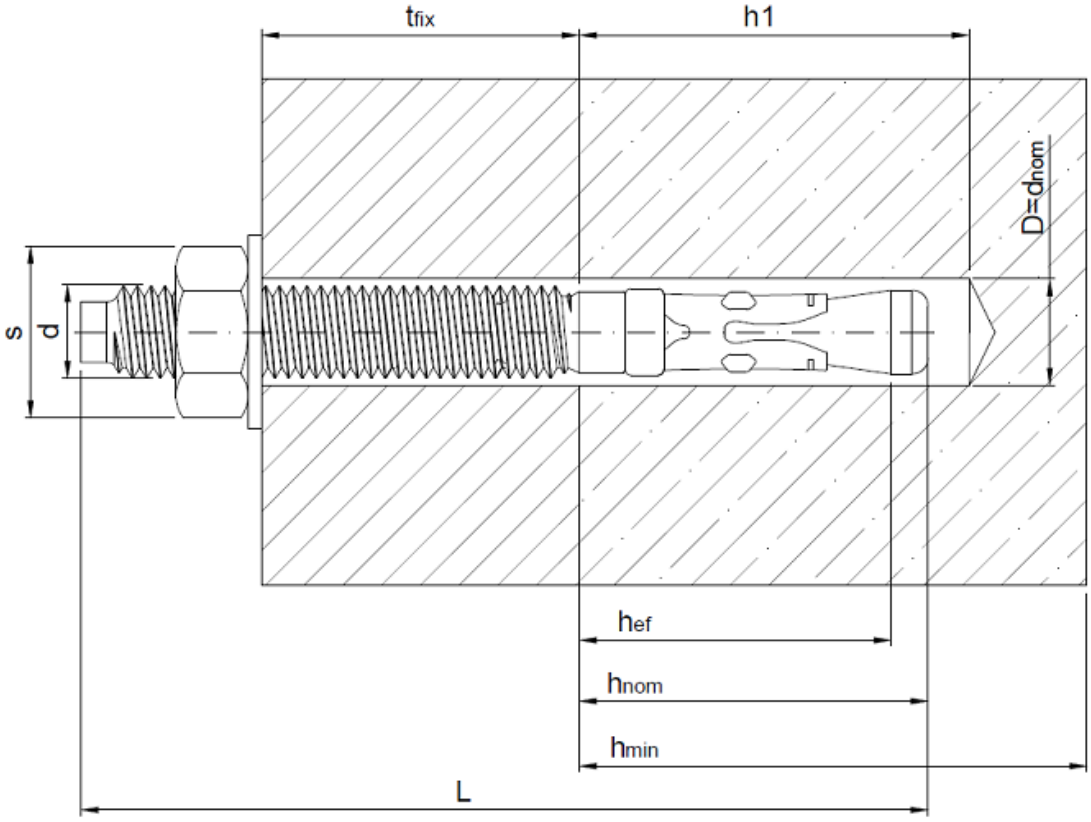
			M8		M10		M12		M16	
			red	std	red	str	red	std	red	std
d_o	Nominal diameter of drill bit	[mm]	8		10		12		16	
d_f	Diameter of clearance hole in fixture	[mm]	M8		M10		M12		M16	
S		[mm]	13		17		19		24	
L	Total length of the anchor	[mm]	65÷135		65÷205		95÷225		115÷245	
t_{fix}	Thickness of fixture	[mm]	L-(h_{nom}+11,1)		L-(h_{nom}+14,5)		L-(h_{nom}+17,75)		L-(h_{nom}+22)	
h_{ef}	Effective anchorage depth	[mm]	35	45	40	50	50	70	65	85
h_{nom}	Overall anchor embedment depth in the concrete	[mm]	43	53	48	58	60	80	79	99
h_1	Depth of drilled hole	[mm]	50	60	55	65	70	90	90	110
T_{inst}	Installation torque	[Nm]	15		30		50		100	
h_{min}	Minimum concrete thickness	[mm]	100		100		100		130	
s_{min}	Minimum spacing	[mm]	45		50		60		75	
c_{min}	Minimum edge distance	[mm]	45		50		60		75	
$c_{cr,sp}$	Edge distance for splitting failure	[mm]	65	75	70	85	85	115	105	140

PSR, PSR-H, PSR-X

Intended use
Installation parameters

Annex B 2

Installation parameters



Installation instructions

1. Hole drilling should be made by rotary hammer-drilling tools.

2. Anchor installation carried out by appropriately qualified personal and under the supervision of the person responsible for technical matters of the site.

3. Installation should be carried out based on installation parameters putted into ETA. Effective anchoring depth, edge distance and spacing not less than specified values without minus tolerance.

4. In case of aborted hole: new drilling should be carried out at a minimum distance away of twice the depth of aborted hole or smaller distance if the aborted hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of the load application.

5. Anchor have to be installed by proper tightened torque.

PSR, PSR-H, PSR-X	**Annex B 3**
Intended use Installation instructions	

Table C1 – Characteristic resistance under tension load PSR

Size				M6[1]	M8		M10		M12		M16		M20	
					red[1]	std	red	std	red	std	red	std	red	std
Steel failure														
Characteristic resistance		$N_{Rk,s}$	[kN]	6,0	10,9		18,8		23,7		43,0		68,6	
Partial safety factor		γ_{Ms}[2]	[-]	1,84										
Pull-out failure														
Characteristic resistance in uncracked concrete C20/25		$N_{Rk,p}$	[kN]	-[3]	-[3]	-[3]	9	-[3]	16	20	22	28	36	36
Installation safety factor		γ_{inst}	[-]	1	1	1	1	1	1	1	1,4	1	1,4	1
Increasing factor for uncracked concrete	C30/37	ψ_c	[-]	1	1		1,12		1,12		1,12		1,08	
	C40/50			1	1		1,23		1,23		1,23		1,15	
	C50/60			1	1		1,30		1,30		1,30		1,19	
Concrete cone and splitting failure														
Factor for concrete cone failure for uncracked concrete		$k_{ucr,N}$	[-]	11,0										
Installation safety factor		γ_{inst}	[-]	1	1	1	1	1	1	1	1,4	1	1,4	1
Effective embedment depth		h_{ef}	[mm]	35	35	45	40	50	50	70	65	85	80	100
Concrete cone failure	Edge distance	$c_{cr,N}$	[mm]	$1,5 \cdot h_{ef}$										
	Spacing	$s_{cr,N}$	[mm]	$3 \cdot h_{ef}$										
Splitting failure	Edge distance	$c_{cr,sp}$	[mm]	65	65	75	70	85	85	115	105	140	130	160
	Spacing	$s_{cr,sp}$	[mm]	115	115	140	130	160	160	220	205	265	250	310

[1] only for statically indeterminate structural components, when in case of failure the load can be distributed to other fasteners
[2] in absence of other national regulations
[3] steel failure is decisive

Table C2 – Displacement under tension load PSR

Size			M6	M8		M10		M12		M16		M20	
				red[1]	std	red	std	red	std	red	std	red	std
Tension load in uncracked concrete	N	[kN]	2,3	4,2	4,2	4,3	7,3	7,6	9,5	7,5	13,3	12,2	17,1
Displacement	δ_{N0}	[mm]	0,2	0,4	0,4	0,1	0,5	0,9	0,4	0,5	0,7	0,3	0,4
	$\delta_{N\infty}$	[mm]	0,6	0,8	0,8	0,5	0,9	1,3	0,8	0,9	1,1	0,7	0,8

[1] only for statically indeterminate structural components, when in case of failure the load can be distributed to other fasteners

PSR, PSR-H, PSR-X

Performances
Characteristic resistance under tension load
Displacement under tension load

Annex C 1

Table C3 – Characteristic resistance under shear load PSR

Size			M6[1]	M8		M10		M12		M16		M20	
				red[1]	std	red	std	red	std	red	std	red	std
Steel failure without lever arm													
Characteristic resistance	$V^0_{Rk,s}$	[kN]	3,7	6,7		10,6		10,1		14,2		21,3	
Ductility factor	k_7	[-]	0,8										
Partial safety factor	γ_{Ms}[2]	[-]	1,53										
Steel failure with lever arm													
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	6	14		28		48		123		239	
Partial safety factor	γ_{Ms}[2]	[-]	1,53										
Concrete pry-out failure													
Factor	k_8	[-]	1,0	1,0	1,0	1,0	1,0	1,0	2,0	2,0	2,0	2,0	2,0
Concrete edge failure													
Effective length of anchor	l_f	[mm]	35	35	45	40	50	50	70	65	85	80	100
Anchor diameter	d_{nom}	[mm]	6	8		10		12		16		20	

[1] only for statically indeterminate structural components, when in case of failure the load can be distributed to other fasteners
[2] in absence of other national regulations

Table C4 – Displacement under shear load PSR

Size			M6	M8	M10	M12	M16	M20
Shear load in uncracked concrete	V	[kN]	3,7	6,7	10,6	10,1	14,2	21,3
Displacement	δ_{V0}	[mm]	0,8	1,1	0,5	0,3	0,7	0,8
	$\delta_{V\infty}$	[mm]	1,2	1,7	0,8	0,5	1,1	1,2

PSR, PSR-H, PSR-X

Performances
Characteristic resistance under shear load
Displacement under shear load

Annex C 2

Table C5 – Characteristic resistance under tension load PSR-H

Size				M8		M10		M12		M16		M20	
				red[1]	std	red	std	red	std	red	std	red	std
Steel failure													
Characteristic resistance		$N_{Rk,s}$	[kN]	8,1		19,6		24,5		43,0		68,6	
Partial safety factor		γ_{Ms}[2]	[-]	1,84									
Pull-out failure													
Characteristic resistance in uncracked concrete C20/25		$N_{Rk,p}$	[kN]	-[3]	-[3]	9	-[3]	15	-[3]	28	28	34	40
Installation safety factor		γ_{inst}	[-]	1	1	1	1	1	1	1,4	1	1,4	1
Increasing factor for uncracked concrete	C30/37	ψ_c	[-]	1		1,17		1,17		1		1,08	
	C40/50			1		1,32		1,32		1		1,15	
	C50/60			1		1,42		1,42		1		1,19	
Concrete cone and splitting failure													
Factor for concrete cone failure for uncracked concrete		$k_{ucr,N}$	[-]	11,0									
Installation safety factor		γ_{inst}	[-]	1	1	1	1	1	1	1,4	1	1,4	1
Effective embedment depth		h_{ef}	[mm]	35	45	40	50	50	70	65	85	80	100
Concrete cone failure	Edge distance	$c_{cr,N}$	[mm]	$1,5 \cdot h_{ef}$									
	Spacing	$s_{cr,N}$	[mm]	$3 \cdot h_{ef}$									
Splitting failure	Edge distance	$c_{cr,sp}$	[mm]	65	75	70	85	85	115	105	140	130	160
	Spacing	$s_{cr,sp}$	[mm]	115	140	130	160	160	220	205	265	250	310

[1] only for statically indeterminate structural components, when in case of failure the load can be distributed to other fasteners
[2] in absence of other national regulations
[3] steel failure is decisive

Table C6 – Displacement under tension load PSR-H

Size				M8		M10		M12		M16		M20	
				red[1]	std	red	std	red	std	red	std	red	std
Tension load in uncracked concrete		N	[kN]	3,9	3,9	4,3	9,3	7,1	11,7	9,5	13,3	11,6	19,0
Displacement		δ_{N0}	[mm]	0,9	0,9	0,5	1,2	0,9	1,1	0,8	1,1	0,8	1,0
		$\delta_{N\infty}$	[mm]	1,3	1,3	0,9	1,6	1,3	1,5	1,2	1,5	1,2	1,4

[1] only for statically indeterminate structural components, when in case of failure the load can be distributed to other fasteners

Table C7 – Characteristic resistance under shear load PSR-H

Size			M8		M10		M12		M16		M20	
			red[1)]	std	red	std	red	std	red	std	red	std
Steel failure without lever arm												
Characteristic resistance	$V^0_{Rk,s}$	[kN]	6,7		10,7		15,5		25,7		37,4	
Ductility factor	k_7	[-]	0,8									
Partial safety factor	γ_{Ms}[2)]	[-]	1,53									
Steel failure with lever arm												
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	14		28		48		123		239	
Partial safety factor	γ_{Ms}[2)]	[-]	1,53									
Concrete pry-out failure												
Factor	k_8	[-]	1,0	1,0	1,0	1,0	1,0	2,0	2,0	2,0	2,0	2,0
Concrete edge failure												
Effective length of anchor	l_f	[mm]	35	45	40	50	50	70	65	85	80	100
Anchor diameter	d_{nom}	[mm]	8		10		12		16		20	

[1)] only for statically indeterminate structural components, when in case of failure the load can be distributed to other fasteners
[2)] in absence of other national regulations

Table C8 – Displacement under shear load PSR-H

Size			M8	M10	M12	M16	M20
Shear load in uncracked concrete	V	[kN]	3,1	5,0	7,2	12,0	17,5
Displacement	δ_{V0}	[mm]	0,5	0,8	0,6	0,5	1,1
	$\delta_{V\infty}$	[mm]	0,8	1,2	0,9	0,8	1,7

Table C9 – Characteristic resistance under tension load PSR-X

Size				M8		M10		M12		M16	
				red[1)]	std	red	std	red	std	red	std
Steel failure											
Characteristic resistance		$N_{Rk,s}$	[kN]	21,4		34,0		39,0		68,5	
Partial safety factor		γ_{Ms}[2)]	[-]	1,5							
Pull-out failure											
Characteristic resistance in uncracked concrete C20/25		$N_{Rk,p}$	[kN]	9,5		13,0		11,0		19,0	
Installation safety factor		γ_{inst}	[-]	1							
Increasing factor for uncracked concrete	C30/37	ψ_c	[-]	1		1,04		1,04		1,04	
	C40/50			1		1,07		1,07		1,07	
	C50/60			1		1,09		1,09		1,09	
Concrete cone and splitting failure											
Factor for concrete cone failure for uncracked concrete		$k_{ucr,N}$	[-]	11,0							
Installation safety factor		γ_{inst}	[-]	1							
Effective embedment depth		h_{ef}	[mm]	35	45	40	50	50	70	65	85
Concrete cone failure	Edge distance	$c_{cr,N}$	[mm]	$1,5 \cdot h_{ef}$							
	Spacing	$s_{cr,N}$	[mm]	$3 \cdot h_{ef}$							
Splitting failure	Edge distance	$c_{cr,sp}$	[mm]	65	75	70	85	85	115	105	140
	Spacing	$s_{cr,sp}$	[mm]	115	140	130	160	160	220	205	265

[1)] only for statically indeterminate structural components, when in case of failure the load can be distributed to other fasteners
[2)] in absence of other national regulations
[3)] steel failure is decisive

Table C10 – Displacement under tension load PSR-X

Size			M8	M10	M12	M16
Tension load in uncracked concrete	N	[kN]	4,5	6,2	5,2	9,1
Displacement	δ_{N0}	[mm]	0,9	0,7	0,7	0,6
	$\delta_{N\infty}$	[mm]	1,3	1,1	1,1	1,0

Table C11 – Characteristic resistance under shear load PSR-X

Size			M8		M10		M12		M16	
			red[1)]	std	red	std	red	std	red	std
Steel failure without lever arm										
Characteristic resistance	$V^0_{Rk,s}$	[kN]	9,6		12,3		13,5		25,4	
Ductility factor	k_7	[-]	0,8							
Partial safety factor	γ_{Ms}[2)]	[-]	1,5							
Steel failure with lever arm										
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	22		44		77		195	
Partial safety factor	γ_{Ms}[2)]	[-]	1,5							
Concrete pry-out failure										
Factor	k_8	[-]	1,0	1,0	1,0	1,0	1,0	2,0	2,0	2,0
Concrete edge failure										
Effective length of anchor	l_f	[mm]	35	45	40	50	50	70	65	85
Anchor diameter	d_{nom}	[mm]	8		10		12		16	

[1)] only for statically indeterminate structural components, when in case of failure the load can be distributed to other fasteners
[2)] in absence of other national regulations

Table C12 – Displacement under shear load PSR-X

Size			M8	M10	M12	M16
Shear load in uncracked concrete	V	[kN]	4,6	5,9	6,4	12,1
Displacement	δ_{V0}	[mm]	1,0	0,7	1,0	0,6
	$\delta_{V\infty}$	[mm]	1,5	1,1	1,5	0,9

PSR, PSR-H, PSR-X

Performances
Characteristic resistance under shear load
Displacement under shear load

Annex C 6