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European Technical Assessment

**ETA-11/0126
of 29/05/2017**

General Part

Technical Assessment Body issuing the European Technical Assessment

Instytut Techniki Budowlanej

Trade name of the construction product

SafetyPlus

Product family to which the construction product belongs

Torque controlled expansion anchor of sizes M8, M10, M12, M16 and M20 for use in non-cracked concrete

Manufacturer

RAWLPLUG S.A.
ul. Kwidzyńska 6
PL 51-416 Wrocław
Poland

Manufacturing plants

1. Plant 2
2. Plant 3

This European Technical Assessment contains

13 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

European Assessment Document (EAD) 330232-01-0601 "Mechanical fasteners for use in concrete"

This version replaces

ETA-11/0126 issued on 26/06/2013

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Specific Part

1 Technical description of the product

The SafetyPlus anchors types R-SPL, R-SPL-C and R-SPL-BP in the sizes M8, M10, M12, M16 and M20 (R-SPL and R-SPL-BP in the sizes M8, M10, M12, M16 and M20 and R-SPL-C in the sizes M8, M10, M12 and M16) are the anchors made of galvanized steel which are placed into a drill hole and anchored by torque-controlled expansion.

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

2 Specification of the intended use in accordance with the applicable European Assessment Document (EAD)

The performances given in Annex C 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 or Technical Assessment Body, 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 Performance of the product

3.1.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance for tension loads, displacements	Annex C1
Characteristic resistance for shear loads, displacements	Annex C2

3.1.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchors satisfy requirements for Class A1
Resistance to fire	No performance assessed

3.2 Methods used for the assessment

The assessment of fitness of anchors for the declared intended use in relation to the requirements for mechanical resistance and stability and safety in case of fire in the sense of the Basic Requirements 1 and 2 has been made in accordance with the EAD 330232-00-0601 "Mechanical fasteners for use in concrete".

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

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

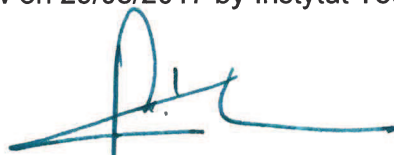
Product	Intended use	Level or class	System
Metal anchors for use in concrete	For fixing and/or supporting to concrete structural elements (which contributes to the stability of the works) or heavy units	–	1

5 Technical details necessary for the implementation of the AVCP system, as provided in the applicable European Assessment Document (EAD)

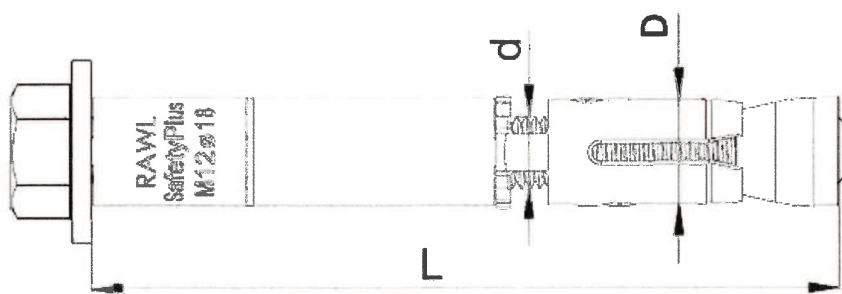
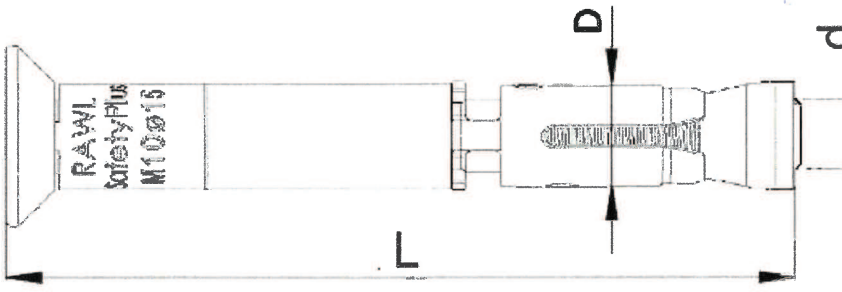
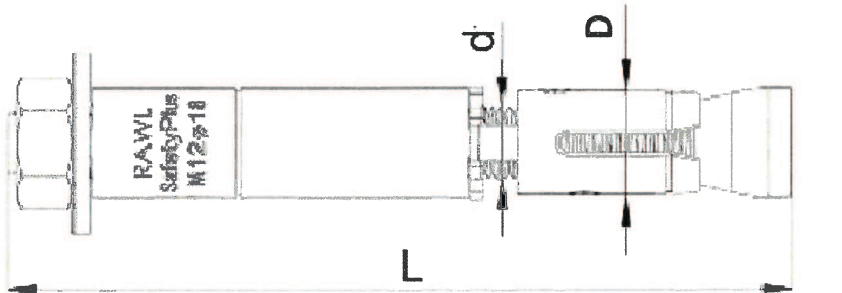
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited in Instytut Techniki Budowlanej.

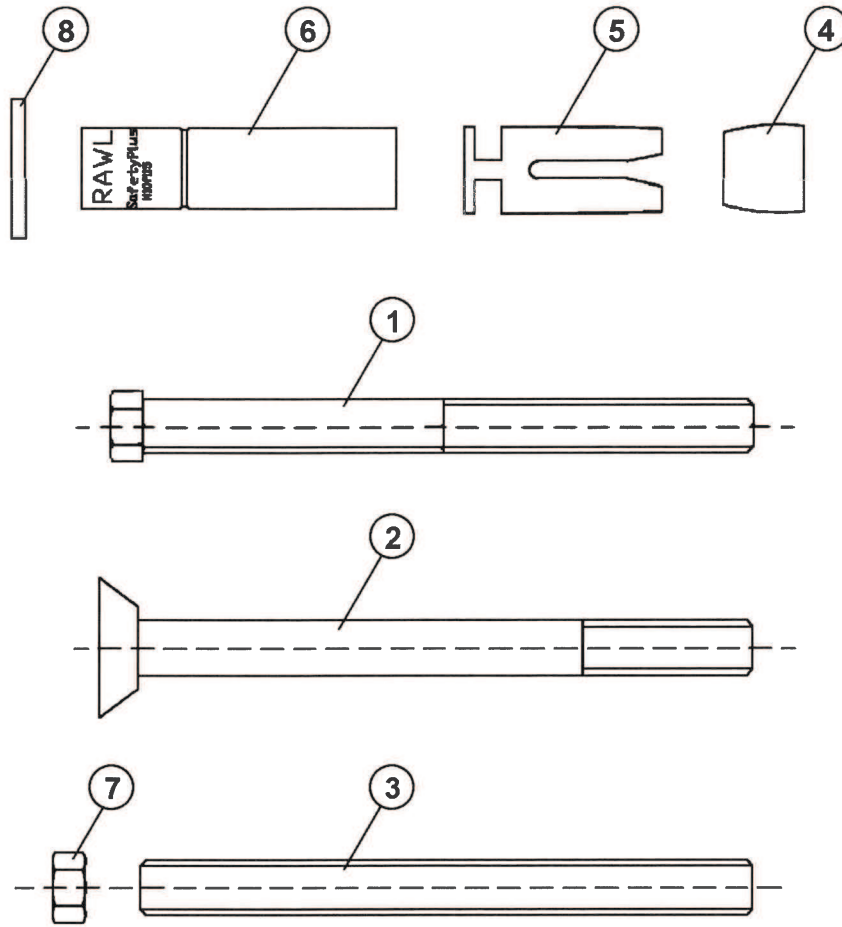
For the type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

Issued in Warsaw on 29/05/2017 by Instytut Techniki Budowlanej



Marcin M. Kruk, PhD
Director of ITB

 <p>RAWL SafetyPlus M12x18</p> <p>L</p> <p>d</p> <p>D</p>	<p>R-SPL</p>
 <p>RAWL SafetyPlus M10x16</p> <p>L</p> <p>D</p> <p>d</p>	<p>R-SPL-C</p>
 <p>RAWL SafetyPlus M12x18</p> <p>L</p> <p>d</p> <p>D</p>	<p>R-SPL-BP</p>
<p>SafetyPlus</p>	<p>Annex A1 of European Technical Assessment ETA-11/0126</p>
<p>Product description Anchor</p>	



- 1 – hexagonal screw
- 2 – countersunk screw
- 3 – threaded bolt
- 4 – conical nut
- 5 – expansion sleeve
- 6 – spacer sleeve
- 7 – hexagonal nut
- 8 – washer

SafetyPlus	Annex A2 of European Technical Assessment ETA-11/0126
Product description Different parts of the anchor	

Table A1: SafetyPlus anchor type R-SPL, dimensions

Type of anchor				d [mm]	dc [mm]	L [mm]	SW [mm]
Size	Marking	M x L	t _{fix} ⁽¹⁾ [mm]				
M8	R-SPL-08090/15	M8 x 90	15	8	12	90	13
	R-SPL-08110/40	M8 x 110	40			110	
M10	R-SPL-10105/20	M10 x 105	20	10	15	105	17
	R-SPL-10120/40	M10 x 120	40			120	
	R-SPL-10140/60	M10 x 140	60			140	
M12	R-SPL-12120/25	M12 x 120	25	12	18	120	19
	R-SPL-12150/50	M12 x 150	50			150	
M16	R-SPL-16145/25	M16 x 145	25	16	24	145	24
	R-SPL-16170/50	M16 x 170	50			170	
M20	R-SPL-20175/30	M20 x 175	30	20	28	175	30

¹⁾ – thickness of the fixed element

Table A2: SafetyPlus anchor type R-SPL-C, dimensions

Type of anchor				d [mm]	dc [mm]	L [mm]	HEX [mm]
Size	Marking	M x L	t _{fix} ⁽¹⁾ [mm]				
M8	R-SPL-C-08090/20	M8x90	20	8	12	90	6
M10	R-SPL-C-10105/25	M10 x 105	25	10	15	105	8
M12	R-SPL-C-10125/30	M12 x 125	30	12	18	125	10
M16	R-SPL-C-16145/30	M16 x 145	30	16	24	145	12

¹⁾ – thickness of the fixed element

Table A3: SafetyPlus anchor type R-SPL-BP, dimensions

Type of anchor				d [mm]	dc [mm]	L [mm]	SW [mm]
Size	Marking	M x L	t _{fix} ⁽¹⁾ [mm]				
M8	R-SPL-BP-08095/15	M8 x 95	15	8	12	95	13
M10	R-SPL-BP-10110/20	M10 x 110	20	10	15	110	17
M12	R-SPL-BP-12135/25	M12 x 135	25	12	18	135	19
	R-SPL-BP-12160/50	M12 x 160	50			160	
M16	R-SPL-BP-16160/25	M16 x 160	25	16	24	160	24
	R-SPL-BP-16185/50	M16 x 185	50			185	
M20	R-SPL-BP-20190/30	M20 x 190	30	20	28	190	30

¹⁾ – thickness of the fixed element

SafetyPlus	Annex A3 of European Technical Assessment ETA-11/0126
Product description Dimensions	

Table A4: Materials

Part	Designation	Material	Protection
1	Hexagonal screw	Carbon steel class 8.8 EN ISO 898-1	Zinc plated $\geq 5 \mu\text{m}$ EN ISO 4042
2	Countersunk screw	Carbon steel class 8.8 EN ISO 898-1	Zinc plated $\geq 5 \mu\text{m}$ EN ISO 4042
3	Threaded bolt	Carbon steel class 8.8 EN ISO 898-1	Zinc plated $\geq 5 \mu\text{m}$ EN ISO 4042
4	Conical nut	Carbon steel EN 10263-2 (M8 – M12) EN 10087 (M16 – M20)	Zinc plated $\geq 5 \mu\text{m}$ EN ISO 4042
5	Expansion sleeve	Carbon steel EN 10139	Zinc plated $\geq 5 \mu\text{m}$ EN ISO 4042
6	Spacer sleeve	Carbon steel EN 10139	Zinc plated $\geq 5 \mu\text{m}$ EN ISO 4042
7	Hexagonal nut	Carbon steel class 8 EN ISO 898-1	Zinc plated $\geq 5 \mu\text{m}$ EN ISO 4042
8	Washer	Carbon steel class 8 EN ISO 898-1	Zinc plated $\geq 5 \mu\text{m}$ EN ISO 4042

SafetyPlus**Product description**
Materials**Annex A4**
of European
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Specification of intended use

Anchorage subject to:

- Static and quasi-static loads.

Base material:

- Reinforced or unreinforced normal weight concrete of strength classes C20/25 at minimum and C50/60 at maximum according to EN 206.
- Non-cracked concrete.

Use conditions (environmental conditions):

- Structures subject to dry internal conditions.

Design:

- The anchorages under static loads and quasi-static loads are designed in accordance with methods mentioned in EOTA Technical Report TR 055.
- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- The position of the anchor is indicated on the design drawings.
- Verifiable calculation notes and drawings are taking account of the loads to be transmitted.

Installation of anchors:

- 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 component of the anchor.
- Anchor installation in accordance with the manufacturer's specification and drawings and using the appropriate tools.
- Checks before placing the anchor to ensure that the strength class of the concrete in which the anchor is to be placed is in the range given and is not lower than that of the concrete to which the characteristic loads apply.
- Check of concrete being well compacted, e.g. without significant voids.
- Effective anchorage depth, edge distances and spacings not less than the specified values without minus tolerances.
- Positioning of the drill holes without damaging the reinforcement.
- Hole drilling by hammer drill.
- Cleaning of the hole of drilling dust.
- Application of the torque moment using a calibrated torque wrench.
- In case of aborted 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 if is not in the direction of load application.

SafetyPlus	Annex B1 of European Technical Assessment ETA-11/0126
Intended use Specifications	

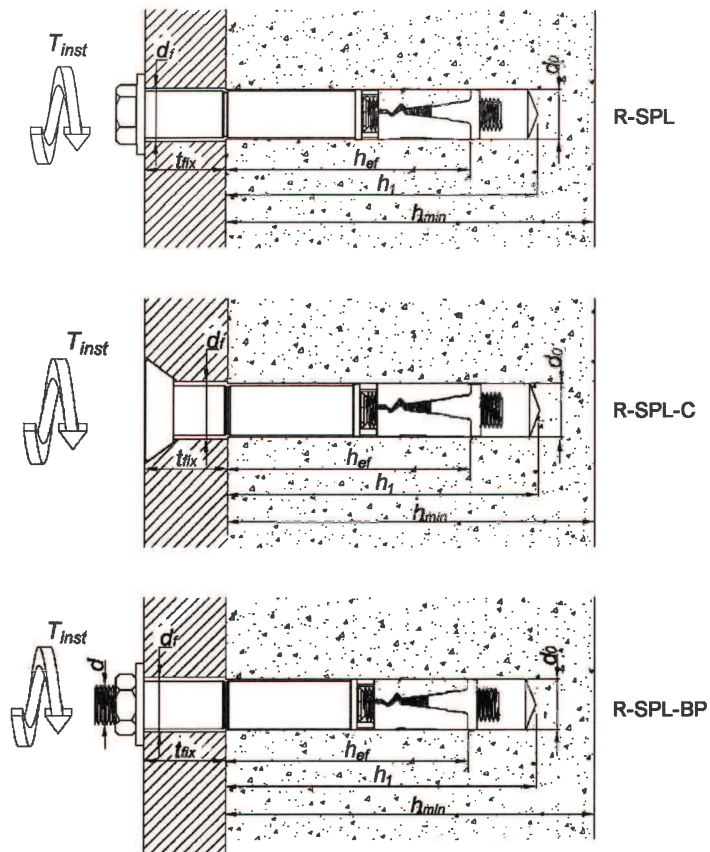
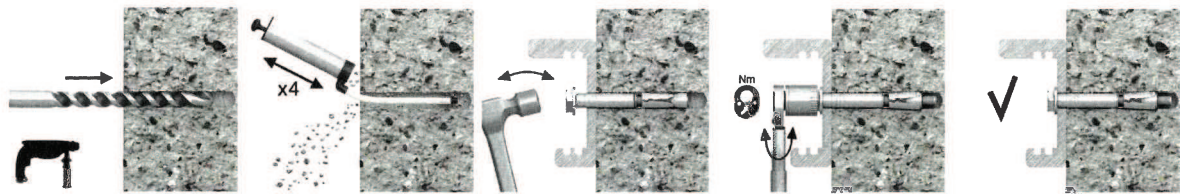


Table B1: Installation parameters

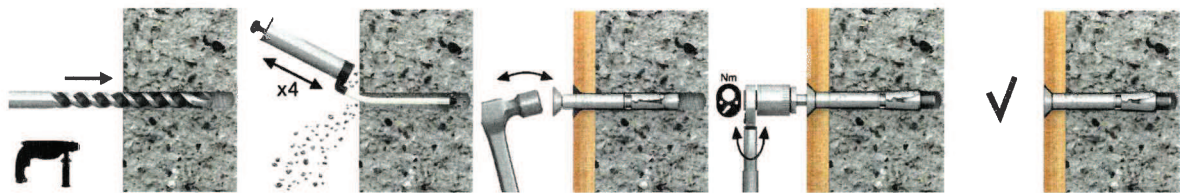
Anchor size		M8	M10	M12	M16	M20
Effective anchorage depth	h_{ef} [mm]	60	70	80	100	125
Nominal drill hole diameter	$d_o =$ [mm]	12	15	18	24	28
Depth of drill hole	$h_0 \geq$ [mm]	85	95	105	130	160
Diameter of clearance hole in the fixture	$d_f \leq$ [mm]	14	17	20	26	30
Installation torque	$T_{inst} =$ [Nm]	25	50	80	180	275
Minimum thickness of member	h_{min} [mm]	100	105	120	150	187,5
Minimum spacing	s_{min} [mm]	60	70	80	100	125
Minimum edge distance	c_{min} [mm]	90	105	120	150	185,5

SafetyPlus	Annex B2 of European Technical Assessment ETA-11/0126
Intended use Installation parameters	

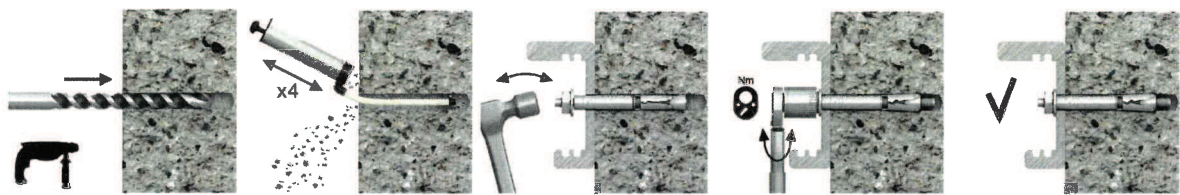
Installation instruction for R-SLP anchor



Installation instruction for R-SPL-C anchor



Installation instruction for R-SPL-C anchor



SafetyPlus

Intended use
Installation instruction

Annex B3
of European
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Table C1: Characteristic values for tension loads (static and quasi-static loading)

Anchor size		M8	M10	M12	M16	M20
Steel failure						
Characteristic resistance	$N_{Rk,s}$ [kN]	29,3	46,4	57,4	125,6	196,0
Partial safety factor	γ_{Ms} ¹⁾	1,5				
Pull-out failure						
Characteristic resistance in non-cracked concrete C20/25	$N_{Rk,p}$ [kN]	9	12	16	35	40
Installation safety factor	$\gamma_2^{2)} = \gamma_{inst}^{3)4)}$	1,2				
Increasing factor	concrete C30/37	1,22				
	concrete C40/50	1,41				
	concrete C50/60	1,55				
Concrete cone failure and splitting failure						
Effective anchorage depth	h_{ef} [mm]	60	70	80	100	125
Factor for non-cracked concrete	$k_1^{2)} = k_{ucr}^{3)}$	10,1	10,1	10,1	10,1	10,1
	$k_1^{2)} = k_{ucr,N}^{4)}$	11,0	11,0	11,0	11,0	11,0
Installation safety factor	$\gamma_2^{2)} = \gamma_{inst}^{3)4)}$	1,2				
Increasing factor	concrete C30/37	1,22				
	concrete C40/50	1,41				
	concrete C50/60	1,55				
Characteristic resistance for splitting	$N_{Rk,sp}^0$ [kN]	9	12	16	35	40
Characteristic spacing	concrete cone failure $s_{cr,N}$ [mm]	180	210	240	300	375
	splitting failure $s_{cr,sp}$ [mm]	180	210	240	300	375
Characteristic edge distance	concrete cone failure $c_{cr,N}$ [mm]	90	105	120	150	188
	splitting failure $c_{cr,sp}$ [mm]	90	105	120	150	188

¹⁾ in absence of other national regulations

²⁾ parameter for design according to ETAG-001 Annex C

³⁾ parameter for design according to CEN/TS 1992-4-4:2009

⁴⁾ parameter for design according to FprEN 1992-4:2016

Table C2: Displacements under tension loads

Anchor size		M8	M10	M12	M16	M20
Tension load	N [kN]	3,06	4,08	6,80	11,90	13,61
Displacement	δ_{N0} [mm]	0,08	0,27	0,11	0,15	0,36
	$\delta_{N\infty}$ [mm]	1,00	1,00	1,00	1,00	1,00

SafetyPlus

Performances
Characteristic values for tension loads, displacements

Annex C1
of European
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Table C3: Characteristic values for shear loads (static and quasi-static loading)

Anchor size		M8	M10	M12	M16	M20
Steel failure without lever arm						
Characteristic resistance	$V_{Rk,s}^{2)3)} = V_{Rk,s}^{0)4)}$ [kN]	19,20	30,00	43,20	77,60	73,68
Ductility factor	$k^{2)} = k_2^{3)} = k_7^{4)}$	0,8	0,8	0,8	0,8	0,8
Partial safety factor	$\gamma_{Ms}^{1)}$	1,25				
Steel failure with lever arm						
Characteristic bending resistance	$M_{Rk,s}^0$ [Nm]	45,04	87,97	152,01	365,97	728,54
Partial safety factor	$\gamma_{Ms}^{(1)}$	1,25				
Concrete pry-out failure						
Factor	$k^{2)} = k_3^{3)} = k_8^{4)}$	2,0				
Partial safety factor	$\gamma_{Ms}^{1)}$	1,25				
Concrete edge failure						
Effective length of anchor under shear loading	l_f [mm]	60	70	80	100	125
Outside diameter of anchor	d_{nom} [mm]	8	10	12	16	20
Partial safety factor	$\gamma_{Mc}^{1)}$	1,5				
¹⁾ in absence of other national regulations ²⁾ parameter for design according to ETAG-001 Annex C ³⁾ parameter for design according to CEN/TS 1992-4-4:2009 ⁴⁾ parameter for design according to FprEN 1992-4:2016						

Table C4: Displacements under shear loads

Anchor size		M8	M10	M12	M16	M20
Shear load	V [kN]	6,53	10,20	14,69	26,39	25,06
Displacement	δ_{v0} [mm]	1,91	0,99	2,07	2,44	2,81
	$\delta_{v\infty}$ [mm]	2,86	1,49	3,11	3,66	4,21

SafetyPlus**Performances**

Characteristic values for shear loads, displacements

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