

# SEL V400+ HYBRID RESIN

## Declaration of Performance

DoP-17/0594-SEL V400+

### 1. Unique identification code of the product-type:

SEL V400+



The photo depicts an example of a product of the given type of goods

### 2. Intended use/es:

general type

to be applied in

option / category

Loading

material

Bonded anchors

Bonded anchors with threaded rods, rods with internal thread and reinforcing bars for making fixings in concrete.

static, quasi-static and seismic

The SELV 400+, SEL V400+ S, and SEL V400+ W, are bonded anchors (injection type) consisting of an injection mortar cartridge using an applicator gun equipped with a special mixing nozzle and steel element. The steel element consists of: threaded anchor rod sizes M8 to M30, anchor rod with inner thread sizes M6/Ø10 to M16/Ø24, rebar sizes Ø8 to Ø32.

### 3. Manufacturer:

**Rawlplug S.A.**

ul. Kwidzyńska 6, 51-416 Wrocław, PL

[www.rawlplug.com](http://www.rawlplug.com)

### 4. System/s of AVCP:

System 1

### 5. European Assessment Document:

EAD 330499-00-0601 Bonded fasteners for use in concrete

Utilization category: 1, 2

### 6. European Technical Assessment:

ETA 17/0594 edition of 2018-03-29

### 7. Technical Assessment Body:

Instytut Techniki Budowlanej

### 8. Notified body/ies:

**Instytut Techniki Budowlanej** on the basis of:

- an assessment of the performance of the construction product carried out on the basis of testing (including sampling), calculation, tabulated values or descriptive documentation of the product
- initial inspection of the manufacturing plant and of factory production control
- continuing surveillance, assessment and evaluation of factory production control

issued a certificate **1488-CPR-0666/W**

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### 9. Declared performance/s:

Essential Characteristics:

Technical Specification	Basic requirements according to CPR		Remarks:
ETA 17/0594	[1]	Mechanical resistance and stability	Declared values on the page 2
	[4]	Operational safety	Such criteria as those significant for [1]

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Table 1. Characteristic values for tension load for threaded rod in non cracked concrete

Size			M8	M10	M12	M16	M20	M24	M30
<b>Steel failure</b>									
<b>Steel failure with threaded rod grade 5.8</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	18	29	42	78	122	176	280
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50						
<b>Steel failure with threaded rod grade 8.8</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	29	46	67	125	196	282	448
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50						
<b>Steel failure with threaded rod grade 10.9</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	36	58	84	157	245	353	561
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,40						
<b>Steel failure with threaded rod grade 12.9</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	43	69	101	188	294	423	673
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,40						
<b>Steel failure with stainless steel threaded rod A4-70</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	25	40	59	109	171	247	392
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,87						
<b>Steel failure with stainless steel threaded rod A4-80</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	29	46	67	125	196	282	448
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,60						
<b>Steel failure with high corrosion resistant steel grade 70</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	25	40	59	109	171	247	392
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,87						
<b>Steel failure with ultra-high strength steel threaded rod grade 14.8</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	51	81	118	219	343	494	785
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,5						
<b>Steel failure with ultra-high strength steel threaded rod grade 15.8</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	54	87	126	235	367	529	841
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,5						
<b>Steel failure with ultra-high strength steel threaded rod grade 16.8</b>									
Characteristic resistance	$N_{Rk,s}$	[kN]	58	92	134,9	251	392	564	897
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,5						
<b>Combined pull-out and concrete cone failure in non cracked concrete C20/25</b>									
Characteristic bond resistance temperature range -40°C / +40°C <sup>2)</sup>	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	16,0	15,0	15,0	13,0	10,0	10,0	8,0
Characteristic bond resistance temperature range -40°C / +80°C <sup>2)</sup>	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	15,0	15,0	15,0	13,0	10,0	10,0	8,0
Characteristic bond resistance temperature range -40°C / +120°C <sup>2)</sup>	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	8,5	8,0	8,0	7,0	5,5	5,5	4,5
Increasing factor for C30/37	$\psi_c$	[-]	1,05	1,04					
Increasing factor for C40/50			1,07						
Increasing factor for C50/60			1,09						

Note: Design method according to TR 029

1) In the absence of other national regulation.

2) See: Annex B1.

# SEL V400+ HYBRID RESIN

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Table 1-2: Characteristic values for tension load for threaded rod in non-cracked concrete

Size		M8	M10	M12	M16	M20	M24	M30	
Concrete cone failure in non-cracked concrete									
Factor for non-cracked concrete	$k_{ucr}^{(1)}$	[-]		10,1					
	$k_{ucr,N}$	[-]		11,0					
Edge distance	$c_{cr,N}$	[mm]		$1,5 \cdot h_{ef}$					
Spacing	$s_{cr,N}$	[mm]		$3,0 \cdot h_{ef}$					
Splitting failure									
Edge distance	$c_{cr,sp}$ for $h_{min}$	[mm]	$2,0 \cdot h_{ef}$				$1,5 \cdot h_{ef}$		
	$c_{cr,sp}$ for $h_{min} < h^{(1)} < 2 \cdot h_{ef}$ ( $c_{cr,sp}$ from linear interpolation)								
	$c_{cr,sp}$ for $h^{(1)} \geq 2 \cdot h_{ef}$		$c_{cr,Np}$						
Spacing	$s_{cr,sp}$	[mm]		$2,0 \cdot c_{cr,sp}$					
Partial safety factor for combined pull-out, concrete cone and splitting failure									
Partial safety factors for in use category 1	standard cleaning	$\gamma_{inst}$	[-]	1,0					
	special cleaning			1,2	1,0			1,2	
Partial safety factors for in use category 2	standard cleaning			1,0					
	special cleaning			1,2	1,0			1,2	

Note: Design method according to TR 029

- 1) Parameter for design acc. to CEN/TS 1992-4-4:2009
- 2)  $h$  – concrete member thickness
- 3) in the absence of other national regulations

# SEL V400+ HYBRID RESIN

## Declaration of Performance

Table 2: Characteristic values for tension loads for threaded rod in cracked concrete

Size			M8	M10	M12	M16	M20	M24	M30
Steel failure with threaded rod grade 5.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	18	29	42	78	122	176	280
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50						
Steel failure with threaded rod grade 8.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	29	46	67	125	196	282	448
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50						
Steel failure with threaded rod grade 10.9									
Characteristic resistance	$N_{Rk,s}$	[kN]	36	58	84	157	245	353	561
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,40						
Steel failure with threaded rod grade 12.9									
Characteristic resistance	$N_{Rk,s}$	[kN]	43	69	101	188	294	423	673
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,40						
Steel failure with stainless steel threaded rod A4-70									
Characteristic resistance	$N_{Rk,s}$	[kN]	25	40	59	109	171	247	392
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,87						
Steel failure with stainless steel threaded rod A4-80									
Characteristic resistance	$N_{Rk,s}$	[kN]	29	46	67	125	196	282	448
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,60						
Steel failure with high corrosion resistant steel grade 70									
Characteristic resistance	$N_{Rk,s}$	[kN]	25	40	59	109	171	247	392
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,87						
Steel failure with ultra-high strength steel threaded rod grade 14.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	51	81	118	219	343	494	785
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,5						
Steel failure with ultra-high strength steel threaded rod grade 15.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	54	87	126	235	367	529	841
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,5						
Steel failure with ultra-high strength steel threaded rod grade 16.8									
Characteristic resistance	$N_{Rk,s}$	[kN]	58	92	134,9	251	392	564	897
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,5						
Combined pull-out and concrete cone failure in non cracked concrete C20/25									
Characteristic bond resistance temperature range -40°C / +40°C <sup>2)</sup>	$\tau_{Rk,cr}$	[N/mm <sup>2</sup> ]	10,0	11,0	11,0	9,5	7,5	7,0	5,0
Characteristic bond resistance temperature range -40°C / +80°C <sup>2)</sup>	$\tau_{Rk,cr}$	[N/mm <sup>2</sup> ]	10,0	11,0	11,0	9,5	7,5	7,0	5,0
Characteristic bond resistance temperature range -40°C / +120°C <sup>2)</sup>	$\tau_{Rk,cr}$	[N/mm <sup>2</sup> ]	5,0	6,0	6,0	5,0	4,0	4,0	3,0
Increasing factor for C30/37	$\psi_c$	[-]	1,05	1,04					
Increasing factor for C40/50			1,07						
Increasing factor for C50/60			1,09						

Note: Design method according to TR 029

1) In the absence of other national regulation

2) See: Annex B1

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Table 2-2.: Characteristic values for tension load for threaded rod in cracked concrete

Size		M8	M10	M12	M16	M20	M24	M30	
Concrete cone failure in non-cracked concrete									
Factor for non-cracked concrete	$k_{ucr}^{1)}$	[-]		7,2					
	$k_{ucr,N}$	[-]		7,7					
Edge distance	$c_{cr,N}$	[mm]		$1,5 \cdot h_{ef}$					
Spacing	$s_{cr,N}$	[mm]		$3,0 \cdot h_{ef}$					
Splitting failure									
Edge distance	$c_{cr,sp}$ for $h_{min}$	[mm]	$2,0 \cdot h_{ef}$				$1,5 \cdot h_{ef}$		
	$c_{cr,sp}$ for $h_{min} < h^{1)} < 2 \cdot h_{ef}$ ( $c_{cr,sp}$ from linear interpolation)								
	$c_{cr,sp}$ for $h^{1)} \geq 2 \cdot h_{ef}$		$c_{cr,Np}$						
Spacing	$s_{cr,sp}$	[mm]	$2,0 \cdot c_{cr,sp}$						
Partial safety factor for combined pull-out, concrete cone and splitting failure									
Partial safety factors for in use category 1	standard cleaning	$\gamma_{inst}$	[-]	1,0					
	special cleaning			1,2	1,0			1,2	
Partial safety factors for in use category 2	standard cleaning			1,0					
	special cleaning			1,2	1,0			1,2	

Note: Design method according to TR 029

1) Parameter for design acc. to CEN/TS 1992-4-4:2009

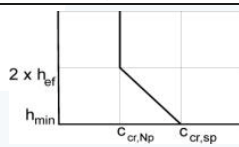
2)  $h$  – concrete member thickness

3) in the absence of other national regulations

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Table 3: Characteristic values for tension load for rod with inner thread in non cracked concrete

Size	M6 /Ø10	M8 /Ø12	M10 /Ø16	M12 /Ø16	M16 /Ø24		
<b>Steel failure</b>							
Steel failure with rod with inner thread grade 5.8							
Characteristic resistance	$N_{Rk,s}$	[kN]	10	18	29	42	78
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50				
Steel failure with rod with inner thread grade 8.8							
Characteristic resistance	$N_{Rk,s}$	[kN]	16	29	46	67	125
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50				
Steel failure with stainless steel rod with inner thread threaded rod A4-70							
Characteristic resistance	$N_{Rk,s}$	[kN]	14	25	40	59	109
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,87				
Steel failure with stainless steel rod with inner thread A4-80							
Characteristic resistance	$N_{Rk,s}$	[kN]	16	29	46	67	125
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,60				
Steel failure with high corrosion resistant steel grade 70							
Characteristic resistance	$N_{Rk,s}$	[kN]	14	25	40	59	109
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,87				
<b>Combined pull-out and concrete cone failure in non cracked concrete C20/25</b>							
Characteristic bond resistance temperature range -40°C / +40°C <sup>2)</sup>	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	11,0	14,0	11,0	11,0	8,0
Characteristic bond resistance temperature range -40°C / +80°C <sup>2)</sup>	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	11,0	14,0	11,0	11,0	8,0
Characteristic bond resistance temperature range -40°C / +120°C <sup>2)</sup>	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	6,0	7,0	6,0	6,0	4,0
Increasing factor for C30/37	$\psi_c$	[-]	1,04				1,00
Increasing factor for C40/50			1,07				1,00
Increasing factor for C50/60			1,09				1,00
<b>Concrete cone failure in non-cracked concrete</b>							
Factor for non-cracked concrete	$k_{ucr}^{3)}$	[-]	10,1				
	$k_{ucr,N}$	[-]	11,0				
Edge distance	$c_{cr,N}$	[mm]	$1,5 \cdot h_{ef}$				
Spacing	$s_{cr,N}$	[mm]	$3,0 \cdot h_{ef}$				
<b>Splitting failure</b>							
Edge distance	$c_{cr,sp}$ for $h_{min}$	[mm]	$2,0 \cdot h_{ef}$				
	$c_{cr,sp}$ for $h_{min} < h^{1)} < 2 \cdot h_{ef}$ ( $c_{cr,sp}$ from linear interpolation)						
Spacing	$s_{cr,sp}$	[mm]	$2,0 \cdot c_{cr,sp}$				
<b>Partial safety factor for combined pull-out, concrete cone and splitting failure</b>							
Installation safety factors for use category 1	standard cleaning	$\gamma_{inst}$	[-]	1,0			
	special cleaning			1,0			
Installation safety factors for use category 2	standard cleaning			1,0			
	special cleaning			1,0			

Note: Design method according to TR 029

1) In the absence of other national regulation

2) See: Annex B1

3) parameter for design acc. CEN/TS 1992-4-4:2009.

4) h – concrete member thickness

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Table 4: Characteristic values for tension loads for rod with inner thread in cracked concrete

Size			M6 /Ø10	M8/ Ø12	M10/ Ø16	M12/ Ø16	M16/ Ø24	
<b>Steel failure</b>								
Steel failure with rod with inner thread grade 5.8								
Characteristic resistance	$N_{Rk,s}$	[kN]	10	18	29	42	78	
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50					
Steel failure with rod with inner thread grade 8.8								
Characteristic resistance	$N_{Rk,s}$	[kN]	16	29	46	67	125	
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50					
Steel failure with stainless steel rod with inner thread A4-70								
Characteristic resistance	$N_{Rk,s}$	[kN]	14	25	40	59	109	
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,87					
Steel failure with stainless steel rod with inner thread rod A4-80								
Characteristic resistance	$N_{Rk,s}$	[kN]	16	29	46	67	125	
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,60					
Steel failure with high corrosion resistant steel grade 70								
Characteristic resistance	$N_{Rk,s}$	[kN]	14	25	40	59	109	
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,87					
<b>Combined pull-out and concrete cone failure in cracked concrete C20/25</b>								
Characteristic bond resistance temperature range -40°C / +40°C <sup>2)</sup>	$\tau_{Rk,cr}$	[N/mm <sup>2</sup> ]	10,0	10,0	9,5	9,0	4,0	
Characteristic bond resistance temperature range -40°C / +80°C <sup>2)</sup>	$\tau_{Rk,cr}$	[N/mm <sup>2</sup> ]	10,0	10,0	9,5	9,0	4,0	
Characteristic bond resistance temperature range -40°C / +120°C <sup>2)</sup>	$\tau_{Rk,cr}$	[N/mm <sup>2</sup> ]	5,0	6,0	5,0	5,0	2,0	
Increasing factor for C30/37	$\psi_c$	[-]	1,04					1,00
Increasing factor for C40/50			1,07					1,00
Increasing factor for C50/60			1,09					1,00
<b>Concrete cone failure in cracked concrete</b>								
Factor for non-cracked concrete	$K_{ucr}^{-1}$	[-]	7,2					
	$K_{ucr,N}$	[-]	7,7					
Edge distance	$c_{cr,N}$	[mm]	$1,5 \cdot h_{ef}$					
Spacing	$s_{cr,N}$	[mm]	$3,0 \cdot h_{ef}$					
<b>Splitting failure</b>								
Edge distance	$c_{cr,sp}$ for $h_{min}$	[mm]	$2,0 \cdot h_{ef}$					$1,5 \cdot h_{ef}$
	$c_{cr,sp}$ for $h_{min} < h^3 < 2 \cdot h_{ef}$ ( $c_{cr,sp}$ from linear interpolation)							
	$c_{cr,sp}$ for $h^3 \geq 2 \cdot h_{ef}$							$c_{cr,Np}$
Spacing	$s_{cr,sp}$	[mm]	$2,0 \cdot c_{cr,sp}$					
<b>Partial safety factor for combined pull-out, concrete cone and splitting failure</b>								
Installation safety factors for use category 1	standard cleaning	$\gamma_{inst}$	[-]	1,0				
	special cleaning			1,0				
Installation safety factors for use category 2	standard cleaning			1,0				
	special cleaning			1,0				

Note: Design method according to TR 029

<sup>1)</sup> In the absence of other national regulation

<sup>2)</sup> See: Annex B1

<sup>3)</sup> parameter for design acc. CEN/TS 1992-4-4:2009.

<sup>4)</sup> h – concrete member thickness



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Table 5: Characteristic values for tension load for rebar in non cracked concrete

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø32	
Steel failure with rebar											
Characteristic resistance	$N_{Rk,s}$	[kN]	$A_s^{5)} \cdot f_{uk}^{6)}$								
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,40								
Combined pull-out and concrete cone failure in non cracked concrete C20/25											
Characteristic bond resistance temperature range -40°C / +40°C <sup>2)3)</sup>	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	13,0	14,0	14,0	13,0	13,0	10,0	9,0	7,5	
Characteristic bond resistance temperature range -40°C / +80°C <sup>2)3)</sup>	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	13,0	14,0	14,0	13,0	13,0	10,0	9,0	7,5	
Characteristic bond resistance temperature range -40°C / +120°C <sup>2)3)</sup>	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	7,0	7,0	7,0	7,0	7,0	5,5	5,0	4,0	
Increasing factor for C30/37			1,04								
Increasing factor for C40/50	$\psi_c$	[-]	1,07								
Increasing factor for C50/60			1,09								
Concrete cone failure in cracked concrete											
Factor for non-cracked concrete	$k_{ucr}^{3)}$	[-]	10,1								
	$k_{ucr,N}$	[-]	11,0								
Edge distance	$c_{cr,N}$	[mm]	$1,5 \cdot h_{ef}$								
Spacing	$s_{cr,N}$	[mm]	$3,0 \cdot h_{ef}$								
Splitting failure											
Edge distance	$c_{cr,sp}$ for $h_{min}$	[mm]	$2,0 \cdot h_{ef}$						$1,5 \cdot h_{ef}$		
	$c_{cr,sp}$ for $h_{min} < h^4) < 2 \cdot h_{ef}$ ( $c_{cr,sp}$ from linear interpolation)										
	$c_{cr,sp}$ for $h^4) \geq 2 \cdot h_{ef}$		$c_{cr,Np}$								
Spacing	$s_{cr,sp}$	[mm]	$2,0 \cdot c_{cr,sp}$								
Partial safety factor for combined pull-out, concrete cone and splitting failure											
Installation safety factors for use category 1	standard cleaning	$\gamma_{inst}$	[-]	1,0							
	special cleaning			1,2	1,0					1,2	
Installation safety factors for use category 2	standard cleaning			1,2							
	special cleaning			1,2	1,0					1,2	

Note: Design method according to TR 029

<sup>1)</sup> In the absence of other national regulation

<sup>2)</sup> See: Annex B1

<sup>3)</sup> parameter for design acc. CEN/TS 1992-4-4:2009

<sup>4)</sup> h – concrete member thickness

<sup>5)</sup> Stressed cross section of the steel

<sup>6)</sup> acc. to EN 1992-1-1.

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Table 6: Characteristic values for tension loads for rebar in cracked concrete

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø32	
Steel failure with rebar											
Characteristic resistance	$N_{Rk,s}$	[kN]	$A_s^{5)} \cdot f_{uk}^{6)}$								
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,40								
Combined pull-out and concrete cone failure in cracked concrete C20/25											
Characteristic bond resistance temperature range -40°C / +40°C <sup>2)</sup>	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	8	9	10	10	8,5	7,5	6	3,5	
Characteristic bond resistance temperature range -40°C / +80°C <sup>2)</sup>	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	8	9	10	10	8,5	7,5	6	3,5	
Characteristic bond resistance temperature range -40°C / +120°C <sup>2)</sup>	$\tau_{Rk,ucr}$	[N/mm <sup>2</sup> ]	4,5	5	5	5	4,5	4	3	2	
Increasing factor for C30/37	$\psi_c$	[-]	1,04								
Increasing factor for C40/50			1,07								
Increasing factor for C50/60			1,09								
Concrete cone failure in cracked concrete											
Factor for cracked concrete	$k_{ucr}^{2)}$	[-]	7,2								
	$k_{ucr,N}$	[-]	7,7								
Edge distance	$c_{cr,N}$	[mm]	$1,5 \cdot h_{ef}$								
Spacing	$s_{cr,N}$	[mm]	$3,0 \cdot h_{ef}$								
Splitting failure											
Edge distance	$c_{cr,sp}$ for $h_{min}$	[mm]	$2,0 \cdot h_{ef}$							$1,5 \cdot h_{ef}$	
	$c_{cr,sp}$ for $h_{min} < h^4) < 2 \cdot h_{ef}$ ( $c_{cr,sp}$ from linear interpolation)										
	$c_{cr,sp}$ for $h^4) \geq 2 \cdot h_{ef}$		$c_{cr,Np}$								
Spacing	$s_{cr,sp}$	[mm]	$2,0 \cdot c_{cr,sp}$								
Partial safety factor for combined pull-out, concrete cone and splitting failure											
Installation safety factors for use category I <sup>1)</sup>	standard cleaning	$\gamma_{inst}$	[-]	1,0							
	special cleaning			1,2	1,0					1,2	
Installation safety factors for use category II <sup>1)</sup>	standard cleaning			1,2							
	special cleaning			1,2	1,0					1,2	

Note: Design method according to TR 029

<sup>1)</sup> In the absence of other national regulation

<sup>2)</sup> See: Annex B1

<sup>3)</sup> parameter for design acc. CEN/TS 1992-4-4:2009

<sup>4)</sup> h – concrete member thickness

<sup>5)</sup> Stressed cross section of the steel

<sup>6)</sup> acc. to EN 1992-1-1.

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Table 7: Characteristic values for shear loads for threaded rod - steel failure without lever arm

Size			M8	M10	M12	M16	M20	M24	M30
<b>Steel failure with threaded rod grade 5.8</b>									
Characteristic resistance	$V_{Rk,s}$	[kN]	9	14	21	39	61	88	140
Factor considering ductility	$k_7$	[-]	0,8						
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,25						
<b>Steel failure with threaded rod grade 8.8</b>									
Characteristic resistance	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	224
Factor considering ductility	$k_7$	[-]	0,8						
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,25						
<b>Steel failure with threaded rod grade 10.9</b>									
Characteristic resistance	$V_{Rk,s}$	[kN]	18	29	42	78	122	176	280
Factor considering ductility	$k_7$	[-]	0,8						
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50						
<b>Steel failure with threaded rod grade 12.9</b>									
Characteristic resistance	$V_{Rk,s}$	[kN]	22	35	51	94	147	212	336
Factor considering ductility	$k_7$	[-]	0,8						
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50						
<b>Steel failure with stainless steel threaded rod A4-70</b>									
Characteristic resistance	$V_{Rk,s}$	[kN]	13	20	29	55	86	124	196
Factor considering ductility	$k_7$	[-]	0,8						
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,56						
<b>Steel failure with stainless steel threaded rod A4-80</b>									
Characteristic resistance	$V_{Rk,s}$	[kN]	15	23	34	63	98	141	224
Factor considering ductility	$k_7$	[-]	0,8						
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,33						
<b>Steel failure with high corrosion stainless steel grade 70</b>									
Characteristic resistance	$V_{Rk,s}$	[kN]	13	20	29	55	86	124	196
Factor considering ductility	$k_7$	[-]	0,8						
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,56						
<b>Steel failure with ultra-high strength steel threaded rod grade 14.8</b>									
Characteristic resistance	$V_{Rk,s}$	[kN]	25	40	59	109	171	247	392
Factor considering ductility	$k_7$	[-]	0,8						
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50						
<b>Steel failure with ultra-high strength steel threaded rod grade 15.8</b>									
Characteristic resistance	$V_{Rk,s}$	[kN]	27	43	63	117	183	264	420
Factor considering ductility	$k_7$	[-]	0,8						
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50						
<b>Steel failure with ultra-high strength steel threaded rod grade 16.8</b>									
Characteristic resistance	$V_{Rk,s}$	[kN]	29	46	67	125	196	282	448
Factor considering ductility	$k_7$	[-]	0,8						
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50						

<sup>1)</sup> In the absence of other national regulation

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Table 8: Characteristic values for shear loads for threaded rod - steel failure with lever arm

Size			M8	M10	M12	M16	M20	M24	M30
<b>Steel failure with threaded rod grade 5.8</b>									
Characteristic resistance	$M_{Rk,s}^0$	[Nm]	19	37	65	166	324	561	1124
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,25						
<b>Steel failure with threaded rod grade 8.8</b>									
Characteristic resistance	$M_{Rk,s}^0$	[Nm]	30	60	105	266	519	898	1799
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,25						
<b>Steel failure with threaded rod grade 10.9</b>									
Characteristic resistance	$M_{Rk,s}^0$	[Nm]	37	75	131	333	649	1123	2249
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50						
<b>Steel failure with threaded rod grade 12.9</b>									
Characteristic resistance	$M_{Rk,s}^0$	[Nm]	45	90	157	400	779	1347	2698
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50						
<b>Steel failure with stainless steel threaded rod A4-70</b>									
Characteristic resistance	$M_{Rk,s}^0$	[Nm]	26	52	92	233	454	786	1574
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,56						
<b>Steel failure with stainless steel threaded rod A4-80</b>									
Characteristic resistance	$M_{Rk,s}^0$	[Nm]	30	60	105	266	519	898	1799
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,33						
<b>Steel failure with high corrosion resistant steel grade 70</b>									
Characteristic resistance	$M_{Rk,s}^0$	[Nm]	26	52	92	233	454	786	1574
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,56						
<b>Steel failure with ultra-high strength steel threaded rod grade 14.8</b>									
Characteristic resistance	$M_{Rk,s}^0$	[Nm]	52	104	183	466	908	1571	3148
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50						
<b>Steel failure with ultra-high strength steel threaded rod grade 15.8</b>									
Characteristic resistance	$M_{Rk,s}^0$	[Nm]	56	112	196	499	973	1683	3373
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50						
<b>Steel failure with ultra-high strength steel threaded rod grade 16.8</b>									
Characteristic resistance	$M_{Rk,s}^0$	[Nm]	59	119	209	532	1038	1796	3598
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,50						

1) In the absence of other national regulation

Table 9: Characteristic values for shear loads – pry out and concrete edge failure for threaded rod

Size			M8	M10	M12	M16	M20	M24	M30
<b>Pry out failure</b>									
Factor	$k_8$	[-]	2						
<b>Concrete edge failure</b>									
Outside diameter of anchor	$d_{nom}$	[mm]	8	10	12	16	20	24	30
Effective length of anchor under shear loading	$l_f$	[mm]	min ( $h_{ef}$ ; $8d_{nom}$ )						

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Table 10: Characteristic values for shear loads for rod with inner thread – steel failure without lever arm

Size			M6 /Ø10	M8/ Ø12	M10/ Ø16	M12/ Ø16	M16/ Ø24
<b>Steel failure with for rod with inner thread grade 5.8</b>							
Characteristic resistance	$V_{Rk,s}$	[kN]	5,0	9,2	14,5	21,1	39,3
Factor considering ductility	$k_7$	[-]	0,8				
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,25				
<b>Steel failure with for rod with inner thread grade 8.8</b>							
Characteristic resistance	$V_{Rk,s}$	[kN]	8,0	14,6	23,2	33,7	62,8
Factor considering ductility	$k_7$	[-]	0,8				
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,25				
<b>Steel failure with stainless steel for rod with inner thread A4-70</b>							
Characteristic resistance	$V_{Rk,s}$	[kN]	7,0	12,8	20,3	29,5	55,0
Factor considering ductility	$k_7$	[-]	0,8				
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,56				
<b>Steel failure with stainless steel for rod with inner thread A4-80</b>							
Characteristic resistance	$V_{Rk,s}$	[kN]	8,0	14,6	23,2	33,7	62,8
Factor considering ductility	$k_7$	[-]	0,8				
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,33				
<b>Steel failure with high corrosion stainless steel grade 70</b>							
Characteristic resistance	$V_{Rk,s}$	[kN]	7,0	12,8	20,3	29,5	55,0
Factor considering ductility	$k_7$	[-]	0,8				
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,56				

<sup>1)</sup> In the absence of other national regulation.

Table 11: Characteristic values for shear loads for rod with inner thread - steel failure with lever arm

Size			M6 /Ø10	M8/ Ø12	M10/ Ø16	M12/ Ø16	M16/ Ø24
<b>Steel failure with for rod with inner thread grade 5.8</b>							
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	7,6	18,7	37,4	65,5	166,5
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,25				
<b>Steel failure with for rod with inner thread grade 8.8</b>							
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	12,2	30,0	59,8	104,8	266,4
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,25				
<b>Steel failure with stainless steel for rod with inner thread A4-70</b>							
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	10,7	26,2	52,3	91,7	233,1
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,56				
<b>Steel failure with stainless steel for rod with inner thread A4-80</b>							
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	12,2	30,0	59,8	104,8	266,4
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,33				
<b>Steel failure with high corrosion resistant steel grade 70</b>							
Characteristic resistance	$M^0_{Rk,s}$	[Nm]	10,7	26,2	52,3	91,7	233,1
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,56				

1) In the absence of other national regulation.

Table 12: Characteristic values for shear loads – pry out and concrete edge failure for rod with inner thread

Size			M6 /Ø10	M8/ Ø12	M10/ Ø16	M12/ Ø16	M16/ Ø24
<b>Pry out failure</b>							
Factor	$k_8$	[-]	2				
<b>Concrete edge failure</b>							
Outside diameter of anchor	$d_{nom}$	[mm]	10	12	16	16	24
Effective length of anchor under shear loading	$l_f$	[mm]	min ( $h_{ef}$ ; $8d_{nom}$ )				

Table 13: Characteristic values for shear loads for rebar – steel failure without lever arm

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø32
<b>Steel failure with rebar</b>										
Characteristic resistance	$V_{Rk,s}$	[kN]	$0,5 \cdot A_s^2 \cdot f_{uk}^3$							
Factor considering ductility	$k_7$	[-]	0,8							
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,5							

<sup>1)</sup> In the absence of other national regulation.

<sup>2)</sup> Stressed cross section of the steel element.

<sup>3)</sup> Acc. to EN 1992-1-1.

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Table 14: Characteristic values for shear loads for rebar – steel failure with lever arm

Size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø32
Steel failure with rebar								
Characteristic resistance	$M_{Rk,s}^0$	[Nm]	$1,2 \cdot W_{el}^{(2)} \cdot f_{uk}^{(3)}$					
Partial safety factor <sup>1)</sup>	$\gamma_{Ms}$	[-]	1,5					

<sup>1)</sup> In the absence of other national regulation.

<sup>2)</sup> Elastic section modulus calculated from the stressed cross section of steel element.

<sup>3)</sup> Acc. to EN 1992-1-1.

Table 15: Characteristic values for shear loads – pry out and concrete edge failure for rebar

Size	Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø32		
Pry out failure										
Factor	$k_8$	[-]	2							
Concrete edge failure										
Outside diameter of anchor	$d_{nom}$	[mm]	8	10	12	14	16	20	25	32
Effective length of anchor under shear loading	$l_f$	[mm]	min ( $h_{ef}$ ; $8d_{nom}$ )							

Table 16: Displacement under tension loads – threaded rod

Size	M8	M10	M12	M16	M20	M24	M30		
Characteristic displacement in non-cracked concrete C20/25 to C50/60 under tension loads									
Admissible service load*	N	[kN]	11,9	14,3	14,3	19,0	23,8	35,7	45,2
Displacement	$\delta_{N0}$	[mm]	0,3	0,4	0,4	0,5	0,5	0,6	0,7
	$\delta_{N_{sc}}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Characteristic displacement in cracked concrete C20/25 to C50/60 under tension loads									
Admissible service load*	N	[kN]	7,6	9,5	11,9	14,3	19,0	23,8	28,6
Displacement	$\delta_{N0}$	[mm]	0,3	0,4	0,4	0,5	0,5	0,6	0,6
	$\delta_{N_{sc}}$	[mm]	2	2	2	2	2	2	2

\* These values are suitable for each temperature range and categories specified in Annex B1.

Table 17: Displacement under shear loads – threaded rod

Size	M8	M10	M12	M16	M20	M24	M30		
Characteristic displacement in cracked and non-cracked concrete C20/25 to C50/60 under shear loads									
Admissible service load*	V	[kN]	3,7	5,8	8,4	15,7	24,5	35,3	55,6
Displacement	$\delta_{V0}$	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5
	$\delta_{V_{sc}}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7

\* These values are suitable for each temperature range and categories specified in Annex B1.

Table 18: Displacement under tension loads – rod with inner thread

Size	M6/Ø10	M8/Ø12	M10/Ø16	M12/Ø16	M16/Ø24		
Characteristic displacement in non-cracked concrete C20/25 to C50/60 under tension loads							
Admissible service load*	N	[kN]	11,9	19,0	19,0	28,6	35,7
Displacement	$\delta_{N0}$	[mm]	0,2	0,3	0,3	0,4	0,4
	$\delta_{N_{sc}}$	[mm]	0,6	0,6	0,6	0,6	0,6
Characteristic displacement in cracked concrete C20/25 to C50/60 under tension loads							
Admissible service load*	N	[kN]	11,9	14,2	16,6	23,8	19,0
Displacement	$\delta_{N0}$	[mm]	0,3	0,4	0,4	0,5	0,3
	$\delta_{N_{sc}}$	[mm]	2	2	2	2	2

\* These values are suitable for each temperature range and categories specified in Annex B1.

Table 19: Displacement under shear loads – rod with inner thread

Size	M6/Ø10	M8/Ø12	M10/Ø16	M12/Ø16	M16/Ø24		
Characteristic displacement in cracked and non-cracked concrete C20/25 to C50/60 under shear loads							
Admissible service load*	V	[kN]	2,0	3,7	5,8	8,4	15,7
Displacement	$\delta_{V0}$	[mm]	2,5	2,5	2,5	2,5	2,5
	$\delta_{V_{sc}}$	[mm]	3,7	3,7	3,7	3,7	3,7

\* These values are suitable for each temperature range and categories specified in Annex B1.

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Table 20: Displacement under tension loads – rebar

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø32
Characteristic displacement in non-cracked concrete C20/25 to C50/60 under tension loads										
Admissible service load*	N	[kN]	7,9	9,9	11,9	13,9	15,9	19,8	23,8	29,8
Displacement	$\delta_{N0}$	[mm]	0,3	0,3	0,4	0,4	0,5	0,6	0,6	0,8
	$\delta_{N_{cr}}$	[mm]	0,6	0,6	0,6	0,6	0,6	0,6	0,6	0,6
Characteristic displacement in cracked concrete C20/25 to C50/60 under tension loads										
Admissible service load*	N	[kN]	4,8	6,3	7,9	7,9	9,9	13,9	15,9	19,8
Displacement	$\delta_{N0}$	[mm]	0,3	0,3	0,3	0,4	0,5	0,6	0,6	0,7
	$\delta_{N_{cr}}$	[mm]	2	2	2	2	2	2	2	2

\* These values are suitable for each temperature range and categories specified in Annex B1.

Table 21: Displacement under shear loads – rebar

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø32
Characteristic displacement in cracked and non-cracked concrete C20/25 to C50/60 under shear loads										
Admissible service load*	V	[kN]	5,5	8,6	12,3	16,8	21,9	34,3	53,6	87,8
Displacement	$\delta_{V0}$	[mm]	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
	$\delta_{V_{cr}}$	[mm]	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7

\* These values are suitable for each temperature range and categories specified in Annex B1.

Table 22: Characteristic values for tension load for threaded rod for seismic performance category C1

Size			M8	M10	M12	M16	M20	M24	M30	
Steel failure										
Steel failure with threaded rod grade 5.8										
Characteristic resistance	$N_{Rk,s,seis}$	[kN]	18	29	42	78	122	176	280	
Partial safety factor <sup>1)</sup>	$\gamma_{Ms,seis}$	[-]	1,50							
Steel failure with threaded rod grade 8.8										
Characteristic resistance	$N_{Rk,s,seis}$	[kN]	29	46	67	125	196	282	448	
Partial safety factor <sup>1)</sup>	$\gamma_{Ms,seis}$	[-]	1,50							
Steel failure with stainless steel threaded rod A4-70										
Characteristic resistance	$N_{Rk,s,seis}$	[kN]	25	40	59	109	171	247	392	
Partial safety factor <sup>1)</sup>	$\gamma_{Ms,seis}$	[-]	1,87							
Steel failure with stainless steel threaded rod A4-80										
Characteristic resistance	$N_{Rk,s,seis}$	[kN]	29	46	67	125	196	282	448	
Partial safety factor <sup>1)</sup>	$\gamma_{Ms,seis}$	[-]	1,60							
Steel failure with high corrosion resistant steel grade 70										
Characteristic resistance	$N_{Rk,s,seis}$	[kN]	25	40	59	109	171	247	392	
Partial safety factor <sup>1)</sup>	$\gamma_{Ms,seis}$	[-]	1,87							
Combined pull-out and concrete cone failure										
Characteristic bond resistance temperature range -40°C / +40°C <sup>2)</sup>	$\tau_{Rk,seis}$	[N/mm <sup>2</sup> ]	8,0	10,0	10,0	9,5	7,5	7,0	4,0	
Characteristic bond resistance temperature range -40°C / +80°C <sup>2)</sup>	$\tau_{Rk,seis}$	[N/mm <sup>2</sup> ]	8,0	10,0	10,0	9,5	7,5	7,0	4,0	
Characteristic bond resistance temperature range -40°C / +120°C <sup>2)</sup>	$\tau_{Rk,seis}$	[N/mm <sup>2</sup> ]	4,5	5,0	6,0	5,0	4,0	4,0	2,0	

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Table 23: Characteristic values for tension load for rebar for seismic performance category C1

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø32
Steel failure with rebar										
Characteristic resistance	$N_{Rk,s,seis}$	[kN]	$A_s^{3)} \cdot f_{uk}^{4)}$							
Partial safety factor <sup>1)</sup>	$\gamma_{Ms,seis}$	[-]	1,40							
Combined pull-out and concrete cone failure										
Characteristic bond resistance temperature range -40°C / +40°C <sup>2)</sup>	$\tau_{Rk,seis}$	[N/mm <sup>2</sup> ]	7,0	8,5	10,0	10,0	8,5	7,5	6,0	3,5
Characteristic bond resistance temperature range -40°C / +80°C <sup>2)</sup>	$\tau_{Rk,seis}$	[N/mm <sup>2</sup> ]	7,0	8,5	10,0	10,0	8,5	7,5	6,0	3,5
Characteristic bond resistance temperature range -40°C / +120°C <sup>2)</sup>	$\tau_{Rk,seis}$	[N/mm <sup>2</sup> ]	4,0	4,5	5,0	5,0	4,5	4,0	3,0	1,5

Note: Design method according to TR 045.

<sup>1)</sup>In the absence of other national regulation.

<sup>2)</sup> See: Annex B1.

<sup>3)</sup> Stressed cross section of the steel element.

<sup>4)</sup> Acc. to EN 1992-1-1.

Table 24: Characteristic values for shear loads for threaded rod for seismic performance category C1 - steel failure without lever arm

Size			M8	M10	M12	M16	M20	M24	M30
Steel failure with threaded rod grade 5.8									
Characteristic resistance	$V_{Rk,s,seis}$	[kN]	6,3	10,1	14,7	27,3	42,7	61,6	98,0
Partial safety factor <sup>1)</sup>	$\gamma_{Ms,seis}$	[-]	1,25						
Steel failure with threaded rod grade 8.8									
Characteristic resistance	$V_{Rk,s,seis}$	[kN]	10,2	16,1	23,5	44,1	68,6	98,7	156,8
Partial safety factor <sup>1)</sup>	$\gamma_{Ms,seis}$	[-]	1,25						
Steel failure with stainless steel threaded rod A4-70									
Characteristic resistance	$V_{Rk,s,seis}$	[kN]	9,1	14,4	20,7	38,5	59,9	86,5	137,4
Partial safety factor <sup>1)</sup>	$\gamma_{Ms,seis}$	[-]	1,56						
Steel failure with stainless steel threaded rod A4-80									
Characteristic resistance	$V_{Rk,s,seis}$	[kN]	10,2	16,1	23,5	44,1	68,6	98,7	157,2
Partial safety factor <sup>1)</sup>	$\gamma_{Ms,seis}$	[-]	1,33						
Steel failure with high corrosion stainless steel grade 70									
Characteristic resistance	$V_{Rk,s,seis}$	[kN]	9,1	14,4	20,7	38,5	59,9	86,5	137,4
Partial safety factor <sup>1)</sup>	$\gamma_{Ms,seis}$	[-]	1,56						

<sup>1)</sup>In the absence of other national regulation.

Table 25: Characteristic values for shear loads for rebar for seismic performance category C1 - steel failure without lever arm

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø32
Steel failure with rebar										
Characteristic resistance	$V_{Rk,s,seis}$	[kN]	$0,35 \cdot A_s^{2)} \cdot f_{uk}^{3)}$							
Partial safety factor <sup>1)</sup>	$\gamma_{Ms,seis}$	[-]	1,5							

<sup>1)</sup>In the absence of other national regulation.

<sup>2)</sup> Stressed cross section of the steel element.

<sup>3)</sup> Acc. to EN 1992-1-1.

Table 26: Displacement under tension loads – threaded rod for seismic performance category C1

Size			M8	M10	M12	M16	M20	M24	M30
Displacement	$\delta_{N,seis}$	[mm]	3,0	3,1	3,5	4,0	5,0	6,0	6,6

Table 27: Displacement under shear loads – threaded rod for seismic performance category C1

Size			M8	M10	M12	M16	M20	M24	M30
Displacement	$\delta_{V,seis}$	[mm]	3,5	4,0	4,6	5,0	5,8	6,5	7,0



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Table 28: Displacement under tension loads – rebar for seismic performance category C1

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø32
Displacement	$\delta_{N,seis}$	[mm]	3,0	3,1	3,5	4,0	4,0	5,0	6,0	6,4

Table 29: Displacement under shear loads – rebar for seismic performance category C1

Size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø32
Displacement	$\delta_{V,seis}$	[mm]	3,5	4,0	4,6	5,0	5,0	5,8	6,5	7,2

# SEL V400+ HYBRID RESIN

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of manufacturer:

Stawomir Jagła  
Proxy of the Quality Management System  
Wrocław, 04.07.2018.

PEŁNOMOCNIK SYSTEMU  
ZARZĄDZANIA JAKOŚCIĄ  
*Jagła*  
mgr Stawomir Jagła