

# R-HPTII-ZF Zinc Flake Throughbolt

Throughbolt anchor with corrosion-resistant coating for cracked and non-cracked concrete



## Approvals and Reports

- ETA 17/0184



## Product information

### Features and benefits

- New generation of throughbolt with unique corrosion-resistant coating
- High performance in cracked and non-cracked concrete confirmed by ETA Option 1
- Highest quality ensures maximum load capability
- For applications requiring fire resistance up to 120 minutes
- Suitable for reduced embedment to avoid contact with reinforcement
- Embedment depth markings help to ensure precise installation of the anchor
- Design of R-HPTII allows drilling and installing directly through the fixture and helps to reduce installation time
- Fire resistant

### Applications

- Cladding restraints
- Consoles
- Barriers
- Structural steel
- Curtain walling
- Hand rails
- Heavy Plant
- Balustrading
- Passenger lifts
- Facades
- Racking systems
- Platforms
- Fencing & gates manufacturing and installation

### Base materials

#### Approved for use in:

- Cracked concrete C20/25-C50/60
- Non-cracked concrete C20/25-C50/60
- Reinforced concrete
- Unreinforced concrete

#### Also suitable for use in:

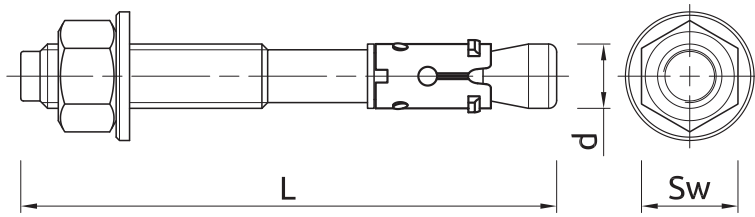
- Natural Stone

## Installation guide



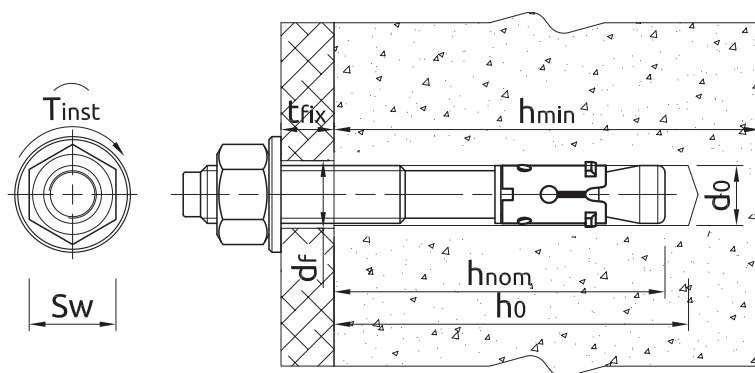
1. Drill a hole of required diameter and depth
2. Clear the hole of drilling dust and debris (using blowpump or equivalent method)
3. Lightly tap the throughbolt through the fixture into hole with a hammer, until fixing depth is reached
4. Tighten to the recommended torque

**Product information**



Size	Product Code	Anchor		Fixture		
		Diameter	Length	Max. thickness $t_{fix}$ for:		Hole diameter
		d [mm]	L [mm]	$h_{nom,red}$ [mm]	$h_{nom,std}$ [mm]	$d_f$ [mm]
M8	R-HPTIIZF-08065/15	8	65	15	-	9
	R-HPTIIZF-08080/15	8	80	30	15	9
	R-HPTIIZF-08100/35	8	100	50	35	9
	R-HPTIIZF-08115/50	8	115	65	50	9
M10	R-HPTIIZF-10065/5	10	65	5	-	11
	R-HPTIIZF-10080/20	10	80	20	-	11
	R-HPTIIZF-10095/15	10	95	35	15	11
	R-HPTIIZF-10115/35	10	115	55	35	11
	R-HPTIIZF-10130/50	10	130	70	50	11
M12	R-HPTIIZF-12080/5	12	80	5	-	13
	R-HPTIIZF-12100/5	12	100	25	5	13
	R-HPTIIZF-12120/25	12	120	45	25	13
	R-HPTIIZF-12135/40	12	135	60	40	13
	R-HPTIIZF-12150/55	12	150	75	55	13
M16	R-HPTIIZF-16105/10	16	105	10	-	18
	R-HPTIIZF-16140/20	16	140	40	20	18
	R-HPTIIZF-16180/60	16	180	80	60	18
M20	R-HPTIIZF-20125/5	20	125	5	-	22
	R-HPTIIZF-20160/20	20	160	40	20	22

**Installation data**



Size			M8	M10	M12	M16	M20
Thread diameter	d	[mm]	8	10	12	16	20
Hole diameter in substrate	$d_0$	[mm]	8	10	12	16	20
Installation torque	$T_{inst}$	[Nm]	10	20	40	100	180
Wrench size	Sw	[mm]	13	17	19	24	32

## Installation data

Size			M8	M10	M12	M16	M20
<b>STANDARD EMBEDMENT DEPTH</b>							
Min. hole depth in substrate	$h_{0,s}$	[mm]	65	79	90	110	129
Installation depth	$h_{nom,s}$	[mm]	55	69	80	100	119
Min. substrate thickness	$h_{min,s}$	[mm]	100	120	140	170	200
Min. spacing (Non-cracked concrete)	$s_{min,s}$	[mm]	50	70	90	160	180
Min. spacing (Cracked concrete)	$s_{min,s}$	[mm]	50	70	90	160	180
Min. edge distance (Non-cracked concrete)	$c_{min,s}$	[mm]	40	50	65	100	120
Min. edge distance (Cracked concrete)	$c_{min,s}$	[mm]	40	45	65	90	100
<b>REDUCED EMBEDMENT DEPTH</b>							
Min. hole depth in substrate	$h_{0,r}$	[mm]	50	59	70	90	110
Installation depth	$h_{nom,r}$	[mm]	40	49	60	80	100
Min. substrate thickness	$h_{min,r}$	[mm]	100	100	100	130	160
Min. spacing (Non-cracked concrete)	$s_{min,r}$	[mm]	55	75	150	190	300
Min. spacing (Cracked concrete)	$s_{min,r}$	[mm]	55	75	150	190	300
Min. edge distance (Non-cracked concrete)	$c_{min,r}$	[mm]	45	60	100	125	200
Min. edge distance (Cracked concrete)	$c_{min,r}$	[mm]	40	50	80	110	120

## Mechanical properties

Size			M8	M10	M12	M16	M20
Nominal ultimate tensile strength - tension	$f_{uk}$	[N/mm <sup>2</sup> ]	620	620	620	620	620
Nominal ultimate tensile strength - shear	$f_{uk}$	[N/mm <sup>2</sup> ]	520	520	520	520	520
Nominal yield strength - tension	$f_{yk}$	[N/mm <sup>2</sup> ]	531	531	531	531	531
Nominal yield strength - shear	$f_{yk}$	[N/mm <sup>2</sup> ]	416	416	416	416	416
Cross sectional area - tension	$A_s$	[mm <sup>2</sup> ]	25.5	40.7	60.1	106.6	162.9
Cross sectional area - shear	$A_s$	[mm <sup>2</sup> ]	38.9	61.7	89.6	165.2	259.1
Elastic section modulus	$W_{el}$	[mm <sup>3</sup> ]	34.3	68.3	119.6	299.5	588.3
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	19	38	67	167	328
Design bending resistance	M	[Nm]	15	31	53	134	263

## Basic performance data

Performance data for single anchor without influence of edge distance and spacing

Size		M8	M10	M12	M16	M20
<b>NON-CRACKED CONCRETE</b>						
Standard embedment depth $h_{ef}$	[mm]	47.00	59.00	68.00	85.00	99.00
Reduced embedment depth $h_{ef}$	[mm]	32.00	39.00	48.00	65.00	80.00
<b>CRACKED CONCRETE</b>						
Standard embedment depth $h_{ef}$	[mm]	47.00	59.00	68.00	85.00	99.00
Reduced embedment depth $h_{ef}$	[mm]	32.00	39.00	48.00	65.00	80.00

## Basic performance data

Size		M8	M10	M12	M16	M20
<b>MEAN ULTIMATE LOAD</b>						
<b>TENSION LOAD <math>N_{Ru,m}</math></b>						
<b>NON-CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	12.40	20.60	27.70	45.50	64.80
Reduced embedment depth	[kN]	9.60	13.60	17.60	34.50	47.10
<b>CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	7.50	12.50	19.90	27.30	41.90
Reduced embedment depth	[kN]	4.80	8.60	12.80	26.80	32.70
<b>SHEAR LOAD <math>V_{Ru,m}</math></b>						
<b>NON-CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	12.20	19.20	28.00	51.50	80.90
Reduced embedment depth	[kN]	12.20	19.20	28.00	51.50	80.90
<b>CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	12.20	19.20	28.00	51.50	80.90
Reduced embedment depth	[kN]	12.20	19.20	28.00	51.50	80.90
<b>CHARACTERISTIC LOAD</b>						
<b>TENSION LOAD <math>N_{Rk}</math></b>						
<b>NON-CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	9.00	12.00	20.00	35.00	49.74
Reduced embedment depth	[kN]	7.50	9.00	12.00	26.40	36.13
<b>CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	5.00	9.00	12.00	20.00	30.00
Reduced embedment depth	[kN]	3.00	6.00	9.00	16.00	25.76
<b>SHEAR LOAD <math>V_{Rk}</math></b>						
<b>NON-CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	8.40	13.30	19.30	35.50	55.70
Reduced embedment depth	[kN]	8.40	12.30	16.79	35.50	55.70
<b>CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	8.40	13.30	19.30	35.50	55.70
Reduced embedment depth	[kN]	6.52	8.77	11.97	35.50	51.52
<b>DESIGN LOAD</b>						
<b>TENSION LOAD <math>N_{Rd}</math></b>						
<b>NON-CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	5.00	8.00	13.30	23.30	33.16
Reduced embedment depth	[kN]	4.17	5.00	8.00	17.64	24.09
<b>CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	2.78	6.00	8.00	13.30	20.00
Reduced embedment depth	[kN]	1.67	3.33	6.00	10.70	17.17
<b>SHEAR LOAD <math>V_{Rd}</math></b>						
<b>NON-CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	6.72	10.64	15.44	28.40	44.56
Reduced embedment depth	[kN]	5.08	6.83	11.20	28.40	44.56
<b>CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	6.44	10.64	15.44	28.40	44.56
Reduced embedment depth	[kN]	3.62	4.87	7.98	25.15	34.35

## Basic performance data

Size		M8	M10	M12	M16	M20
<b>RECOMMENDED LOAD</b>						
<b>TENSION LOAD <math>N_{rec}</math></b>						
<b>NON-CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	3.57	5.71	9.52	16.70	23.69
Reduced embedment depth	[kN]	2.98	3.57	5.71	12.60	17.21
<b>CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	1.98	4.29	5.71	9.52	14.30
Reduced embedment depth	[kN]	1.19	2.38	4.29	7.62	12.27
<b>SHEAR LOAD <math>V_{rec}</math></b>						
<b>NON-CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	4.80	7.60	11.03	20.29	31.83
Reduced embedment depth	[kN]	3.62	4.88	8.00	20.29	31.83
<b>CRACKED CONCRETE</b>						
Standard embedment depth	[kN]	4.60	7.60	11.03	20.29	31.83
Reduced embedment depth	[kN]	2.58	3.48	5.70	17.97	24.53

## Design performance data

Standard embedment depth

(-) failure is not decisive

Size			M8	M10	M12	M16	M20
Effective embedment depth	$h_{ef}$	[mm]	47.00	59.00	68.00	85.00	99.00
<b>TENSION LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance	$N_{Rk,s}$	[kN]	11.00	17.50	25.80	45.80	70.00
Partial safety factor	$\gamma_{Ms}$	-	1.40	1.40	1.40	1.40	1.40
<b>PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25</b>							
Characteristic resistance	$N_{Rk,p}$	[kN]	9.00	12.00	20.00	35.00	-
<b>PULL-OUT FAILURE; CRACKED CONCRETE C20/25</b>							
Characteristic resistance	$N_{Rk,p}$	[kN]	5.00	9.00	12.00	20.00	30.00
<b>PULL-OUT FAILURE</b>							
Installation safety factor	$\gamma_2$	-	1.20	1.00	1.00	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C30/37	$\psi_c$	-	1.12	1.22	1.00	1.14	1.07
Increasing factors for $N_{Rd,p}$ - C40/50	$\psi_c$	-	1.22	1.44	1.00	1.28	1.14
Increasing factors for $N_{Rd,p}$ - C50/60	$\psi_c$	-	1.33	1.67	1.00	1.43	1.21
<b>CONCRETE CONE FAILURE</b>							
Factor for cracked concrete	$k$	-	7.20	7.20	7.20	7.20	7.20
Factor for cracked concrete	$k_{cr,N}$	-	7.70	7.70	7.70	7.70	7.70
Factor for non-cracked concrete	$k$	-	10.10	10.10	10.10	10.10	10.10
Factor for non-cracked concrete	$k_{ucr,N}$	-	11.00	11.00	11.00	11.00	11.00
Installation safety factor	$\gamma_2$	-	1.20	1.00	1.00	1.00	1.00
Spacing	$s_{cr,N}$	[mm]	141.00	177.00	204.00	255.00	297.00
Edge distance	$c_{cr,N}$	[mm]	71.00	89.00	102.00	128.00	149.00
<b>CONCRETE SPLITTING FAILURE</b>							
Spacing	$s_{cr,sp}$	[mm]	220.00	300.00	340.00	430.00	530.00
Edge distance	$c_{cr,sp}$	[mm]	110.00	150.00	170.00	215.00	265.00
Installation safety factor	$\gamma_2$	-	1.20	1.00	1.00	1.00	1.00

## Design performance data

Size			M8	M10	M12	M16	M20
<b>SHEAR LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	8.40	13.30	19.30	35.50	55.70
Ductility factor	$k_{\gamma}$	-	0.80	0.80	0.80	0.80	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	18.00	35.00	62.00	155.00	304.00
Partial safety factor	$\gamma_{Ms}$	-	1.25	1.25	1.25	1.25	1.25
<b>CONCRETE PRY-OUT FAILURE</b>							
Factor	$k$	-	1.00	1.00	2.00	2.00	2.00
Installation safety factor	$\gamma_2$	-	1.20	1.00	1.00	1.00	1.00
<b>CONCRETE EDGE FAILURE</b>							
Effective length of anchor	$l_f$	[mm]	47.00	59.00	68.00	85.00	99.00
Anchor diameter	$d_{nom}$	[mm]	8.00	10.00	12.00	16.00	20.00
Installation safety factor	$\gamma_2$	-	1.20	1.00	1.00	1.00	1.00

## Design performance data

Resistance to tension and shear loads under fire exposure - Standard embedment depth

Size			M8	M10	M12	M16	M20
<b>TENSION LOAD</b>							
Spacing	$s_{cr}$	[mm]	188.00	236.00	272.00	340.00	369.00
Edge distance	$c_{cr}$	[mm]	94.00	118.00	136.00	170.00	198.00
<b>R (for EI) = 30 min</b>							
<b>TENSION LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance	$N_{Rk,s}$	[kN]	0.40	0.90	1.70	3.10	4.90
<b>PULL-OUT FAILURE</b>							
Characteristic resistance	$N_{Rk,p}$	[kN]	1.30	2.30	3.00	5.00	-
<b>SHEAR LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.40	0.90	1.70	3.10	4.90
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.40	1.10	2.60	6.70	13.00
<b>R (for EI) = 60 min</b>							
<b>TENSION LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance	$N_{Rk,s}$	[kN]	0.30	0.80	1.30	2.40	3.70
<b>PULL-OUT FAILURE</b>							
Characteristic resistance	$N_{Rk,p}$	[kN]	1.30	2.30	3.00	5.00	-
<b>SHEAR LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.30	0.80	1.30	2.40	3.70
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.30	1.00	2.00	5.00	9.70
<b>R (for EI) = 90 min</b>							
<b>TENSION LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance	$N_{Rk,s}$	[kN]	0.30	0.60	1.10	2.00	3.20
<b>PULL-OUT FAILURE</b>							
Characteristic resistance	$N_{Rk,p}$	[kN]	1.30	2.30	3.00	5.00	-
<b>SHEAR LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.30	0.60	1.10	2.00	3.20
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.30	0.70	1.70	4.30	8.40
<b>R (for EI) = 120 min</b>							
<b>TENSION LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance	$N_{Rk,s}$	[kN]	0.20	0.50	0.80	1.60	2.50
<b>PULL-OUT FAILURE</b>							
Characteristic resistance	$N_{Rk,p}$	[kN]	1.00	1.80	2.40	4.00	-
<b>SHEAR LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.20	0.50	0.80	1.60	2.50
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.20	0.60	1.30	3.30	6.50

## Design performance data

Reduced embedment depth

(-) failure is not decisive

Size			M8	M10	M12	M16	M20
Effective embedment depth	$h_{ef}$	[mm]	32.00	39.00	48.00	65.00	80.00
<b>TENSION LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance	$N_{Rk,s}$	[kN]	11.00	17.50	25.80	45.80	70.00
Partial safety factor	$\gamma_{Ms}$	-	1.40	1.40	1.40	1.40	1.40
<b>PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25</b>							
Characteristic resistance	$N_{Rk,p}$	[kN]	7.50	9.00	12.00	-	-
<b>PULL-OUT FAILURE; CRACKED CONCRETE C20/25</b>							
Characteristic resistance	$N_{Rk,p}$	[kN]	3.00	6.00	9.00	16.00	-
<b>PULL-OUT FAILURE</b>							
Installation safety factor	$\gamma_2$	-	1.20	1.20	1.00	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C30/37	$\psi_c$	-	1.20	1.16	1.22	1.11	1.12
Increasing factors for $N_{Rd,p}$ - C40/50	$\psi_c$	-	1.40	1.33	1.44	1.22	1.26
Increasing factors for $N_{Rd,p}$ - C50/60	$\psi_c$	-	1.60	1.50	1.67	1.33	1.39
<b>CONCRETE CONE FAILURE</b>							
Factor for cracked concrete	$k$	-	7.20	7.20	7.20	7.20	7.20
Factor for cracked concrete	$k_{cr,N}$	-	7.70	7.70	7.70	7.70	7.70
Factor for non-cracked concrete	$k$	-	10.10	10.10	10.10	10.10	10.10
Factor for non-cracked concrete	$k_{ucr,N}$	-	11.00	11.00	11.00	11.00	11.00
Installation safety factor	$\gamma_2$	-	1.20	1.20	1.00	1.00	1.00
Spacing	$s_{cr,N}$	[mm]	96.00	117.00	144.00	195.00	240.00
Edge distance	$c_{cr,N}$	[mm]	48.00	59.00	72.00	98.00	120.00
<b>CONCRETE SPLITTING FAILURE</b>							
Spacing	$s_{cr,sp}$	[mm]	170.00	200.00	250.00	320.00	410.00
Edge distance	$c_{cr,sp}$	[mm]	85.00	100.00	125.00	160.00	205.00
Installation safety factor	$\gamma_2$	-	1.20	1.20	1.00	1.00	1.00
<b>SHEAR LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	8.40	13.30	19.30	35.50	55.70
Ductility factor	$k_\gamma$	-	0.80	0.80	0.80	0.80	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	18.00	35.00	62.00	155.00	304.00
Partial safety factor	$\gamma_{Ms}$	-	1.25	1.25	1.25	1.25	1.25
<b>CONCRETE PRY-OUT FAILURE</b>							
Factor	$k$	-	1.00	1.00	1.00	2.00	2.00
Installation safety factor	$\gamma_2$	-	1.20	1.20	1.00	1.00	1.00
<b>CONCRETE EDGE FAILURE</b>							
Effective length of anchor	$\ell_f$	[mm]	32.00	39.00	48.00	65.00	80.00
Anchor diameter	$d_{nom}$	[mm]	8.00	10.00	12.00	16.00	20.00
Installation safety factor	$\gamma_2$	-	1.20	1.20	1.00	1.00	1.00

## Design performance data

Resistance to tension and shear loads under fire exposure - Reduced embedment depth

Size			M8	M10	M12	M16	M20
<b>TENSION LOAD</b>							
Spacing	$s_{cr}$	[mm]	128.00	156.00	192.00	260.00	320.00
Edge distance	$c_{cr}$	[mm]	64.00	78.00	96.00	130.00	160.00
<b>R (for EI) = 30 min</b>							
<b>TENSION LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance	$N_{Rk,s}$	[kN]	0.40	0.90	1.70	3.10	4.90
<b>PULL-OUT FAILURE</b>							
Characteristic resistance	$N_{Rk,p}$	[kN]	0.80	1.50	2.30	4.00	-
<b>SHEAR LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.40	0.90	1.70	3.10	4.90
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.40	1.10	2.60	6.70	13.00
<b>R (for EI) = 60 min</b>							
<b>TENSION LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance	$N_{Rk,s}$	[kN]	0.30	0.80	1.30	2.40	3.70
<b>PULL-OUT FAILURE</b>							
Characteristic resistance	$N_{Rk,p}$	[kN]	0.80	1.50	2.30	4.00	-
<b>SHEAR LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.30	0.80	1.30	2.40	3.70
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.30	1.00	2.00	5.00	9.70
<b>R (for EI) = 90 min</b>							
<b>TENSION LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance	$N_{Rk,s}$	[kN]	0.30	0.60	1.10	2.00	3.20
<b>PULL-OUT FAILURE</b>							
Characteristic resistance	$N_{Rk,p}$	[kN]	0.80	1.50	2.30	4.00	-
<b>SHEAR LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.30	0.60	1.10	2.00	3.20
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.30	0.70	1.70	4.30	8.40
<b>R (for EI) = 120 min</b>							
<b>TENSION LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance	$N_{Rk,s}$	[kN]	0.20	0.50	0.80	1.60	2.50
<b>PULL-OUT FAILURE</b>							
Characteristic resistance	$N_{Rk,p}$	[kN]	0.60	1.20	1.80	3.20	-
<b>SHEAR LOAD</b>							
<b>STEEL FAILURE</b>							
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.20	0.50	0.80	1.60	2.50
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.20	0.60	1.30	3.30	6.50

## Design performance data

Allowable values for resistance in case of Seismic performance category C1 - Standard embedment depth

Size			M8	M10	M12	M16	M20
Effective embedment depth	$h_{ef}$	[mm]	47.00	59.00	68.00	85.00	99.00
<b>TENSION LOAD, STEEL FAILURE</b>							
Characteristic resistance	$N_{Rk,s}$	[kN]	11.00	17.50	25.80	45.80	70.00
Partial safety factor	$V_{MsN,seisC1}$	-	1.40				
<b>TENSION LOAD, PULL-OUT FAILURE</b>							
Characteristic resistance	$N_{Rk,p}$	[kN]	5.00	9.00	12.00	20.00	30.00
Partial safety factor	$V_{Mp,seisC1}$	-	1.80	1.50			
<b>SHEAR LOAD, STEEL FAILURE</b>							
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	5.20	9.40	23.80	33.30	55.10
Partial safety factor	$V_{MsV,seisC1}$	-	1.25				

## Product commercial data

Size	Product Code	Anchor		Quantity [pcs]			Weight [kg]			Bar Codes
		Diameter [mm]	Length [mm]	Box	Outer	Pallet	Box	Outer	Pallet	
M8	R-HPTIIZF-08065/15 <sup>1)</sup>	8	65	100	100	16000	2.8	2.8	474.6	5906675022840
	R-HPTIIZF-08080/15 <sup>1)</sup>	8	80	100	100	16000	3.2	3.2	544.7	5906675022857
	R-HPTIIZF-08100/35 <sup>1)</sup>	8	100	100	100	12000	3.9	3.9	494.3	5906675034881
	R-HPTIIZF-08115/50 <sup>1)</sup>	8	115	100	100	16000	4.3	4.3	711.8	5906675022871
M10	R-HPTIIZF-10065/5 <sup>1)</sup>	10	65	50	50	8000	2.4	2.4	409.4	5906675022888
	R-HPTIIZF-10080/20 <sup>1)</sup>	10	80	50	50	8000	2.8	2.8	471.1	5906675022895
	R-HPTIIZF-10095/15 <sup>1)</sup>	10	95	50	50	8000	3.1	3.1	528.2	5906675022901
	R-HPTIIZF-10115/35 <sup>1)</sup>	10	115	50	50	6000	3.6	3.6	463.3	5906675022918
	R-HPTIIZF-10130/50 <sup>1)</sup>	10	130	50	50	6000	4.0	4.0	510.1	5906675022925
M12	R-HPTIIZF-12080/5 <sup>1)</sup>	12	80	50	50	8000	4.1	4.1	682.0	5906675022932
	R-HPTIIZF-12100/5 <sup>1)</sup>	12	100	50	50	8000	4.8	4.8	794.3	5906675022949
	R-HPTIIZF-12120/25 <sup>1)</sup>	12	120	50	50	6000	5.4	5.4	679.8	5906675022956
	R-HPTIIZF-12135/40 <sup>1)</sup>	12	135	50	50	6000	6.1	6.1	758.9	5906675022963
	R-HPTIIZF-12150/55 <sup>1)</sup>	12	150	50	50	4000	6.6	6.6	557.2	5906675022970
M16	R-HPTIIZF-16105/10 <sup>1)</sup>	16	105	25	25	4000	4.6	4.6	765.7	5906675022987
	R-HPTIIZF-16140/20 <sup>1)</sup>	16	140	25	25	4000	5.7	5.7	941.2	5906675022994
	R-HPTIIZF-16180/60 <sup>1)</sup>	16	180	25	25	3000	7.1	7.1	883.3	5906675023007
M20	R-HPTIIZF-20125/5 <sup>1)</sup>	20	125	25	25	3000	8.2	8.2	1013.3	5906675023021
	R-HPTIIZF-20160/20 <sup>1)</sup>	20	160	25	25	3000	10.1	10.1	1245.4	5906675023038

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