R-HPTII-ZF ZINC FLAKE THROUGHBOLT

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

FEATURES AND BENEFITS

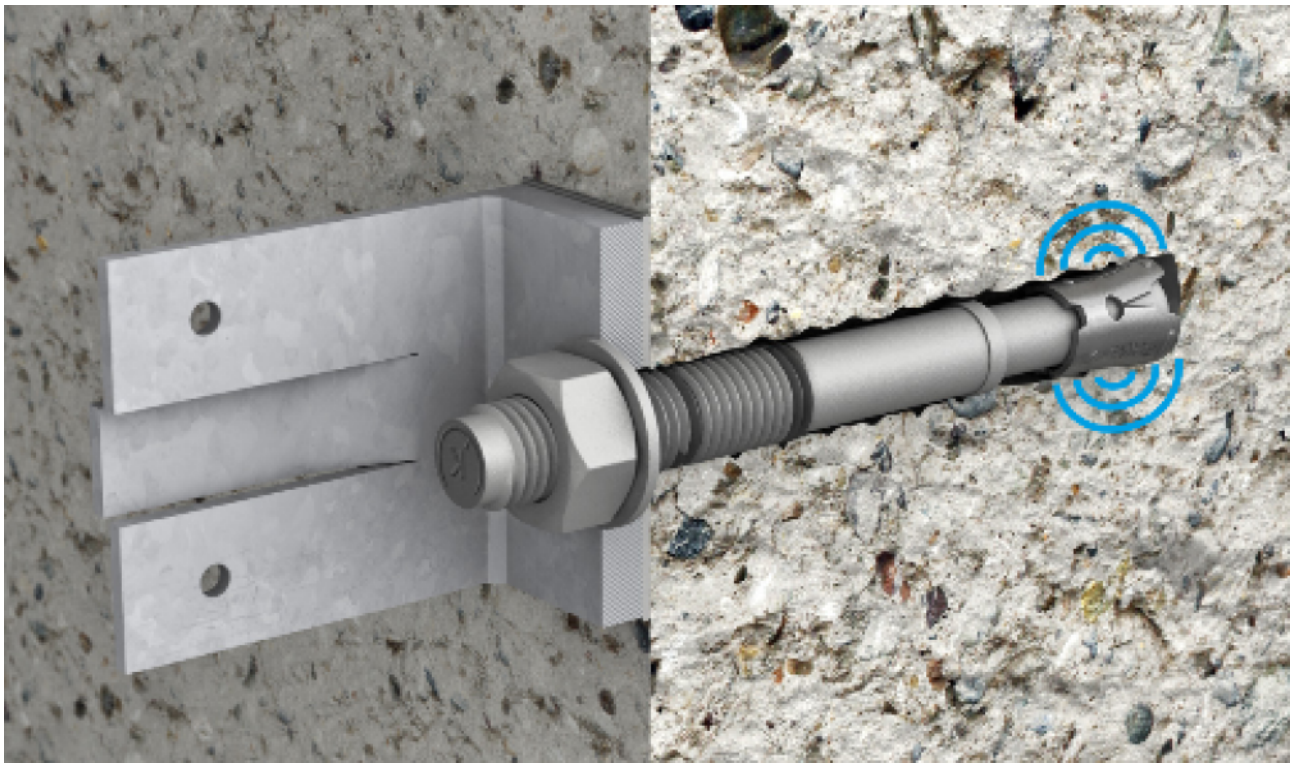
- Anchors can be used in earthquake risk zones - seismic category C1 and C2.
- Design of R-HPTII allows drilling and installing directly through the fixture and helps to reduce installation time.
- New generation of throughbolt with unique corrosion-resistant coating.
- Fire resistant.
- For applications requiring fire resistance up to 120 minutes.
- Highest quality ensures maximum load capability.
- Embedment depth markings help to ensure precise installation of the anchor.
- High performance in cracked and non-cracked concrete confirmed by ETA Option 1.

SUBSTRATES

- Cracked concrete C20/25-C50/60
- Non-cracked concrete C20/25-C50/60
- Unreinforced concrete
- Reinforced concrete
- High-density natural stone

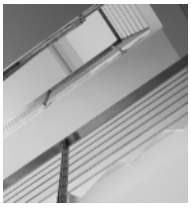


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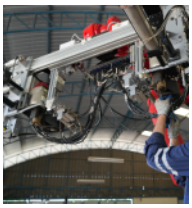
APPLICATIONS

- Balustrades
- Brackets
- Elevators and escalators
- Gates
- Steel structures
- Storage racks
- Ventilated facades





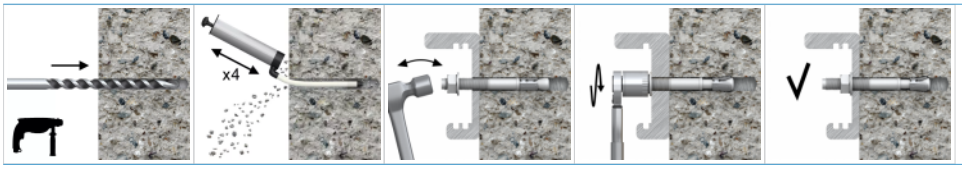




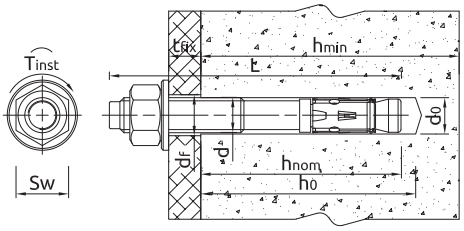
R-HPTII-ZF ZINC FLAKE THROUGHBOLT

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 anchor through the fixture into hole with hammer, until fixing depth is reached.
4. Insert bolt through fixture and tighten to the recommended torque.

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
Hole diameter in fixture	d_f	[mm]	9	11	13	18	22
Installation torque	T_{inst}	[Nm]	10	20	40	100	180
Wrench size	Sw	[mm]	13	17	19	24	30
STANDARD EMBEDMENT DEPTH							
Min. hole depth in substrate	$h_{0,s}$	[mm]	65	79	90	110	129
Min. 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 (Uncracked 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 (Uncracked concrete)	$c_{min,s}$	[mm]	40	50	65	85	100
Min. edge distance (Cracked concrete)	$c_{min,s}$	[mm]	40	45	65	90	100
REDUCED EMBEDMENT DEPTH							
Min. hole depth in substrate	$h_{0,r}$	[mm]	50	59	70	90	110
Min. installation depth	$h_{nom,r}$	[mm]	40[1)]	49[1)]	60	80	100
Min. substrate thickness	$h_{min,r}$	[mm]	100	100	100	130	160
Min. spacing (Uncracked 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 (Uncracked concrete)	$c_{min,r}$	[mm]	45	60	70	100	160
Min. edge distance (Cracked concrete)	$c_{min,r}$	[mm]	40	50	80	110	120

[1)] Use restricted to anchoring statically indeterminate structural components

MECHANICAL PROPERTIES

Size			M8	M10	M12	M16	M20
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	620	620	620	620	620
Nominal yield strength	f_{yk}	[N/mm²]	531	531	531	531	531
Cross sectional area	A_s	[mm²]	25,5	40,7	60,1	106,6	162,9
Elastic section modulus	W_{el}	[mm³]	34,3	68,3	119,6	229,5	588,3
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	22,0	45,0	79,0	200,0	389,0
Design bending resistance	M	[Nm]	17,6	36,0	63,2	160,0	311,2

BASIC PERFORMANCE DATA

R-HPTII-ZF ZINC FLAKE THROUGHBOLT

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

Size			M8	M10	M12	M16	M20
Standard embedment depth	h_{ef}	[mm]	47	59	68	85	99
Reduced embedment depth	h_{ef}	[mm]	32[1)]	39[1)]	48	65	80
MEAN ULTIMATE RESISTANCE							
TENSION LOAD							
UNCRACKED CONCRETE							
Standard embedment depth	$N_{Ru,m}$	[kN]	12,40	20,60	27,70	45,50	64,80
Reduced embedment depth	$N_{Ru,m}$	[kN]	9,60	13,60	17,60	34,50	47,10
CRACKED CONCRETE							
Standard embedment depth	$N_{Ru,m}$	[kN]	7,50	12,50	19,90	27,30	41,90
Reduced embedment depth	$N_{Ru,m}$	[kN]	4,80	8,60	12,80	26,80	32,70
SHEAR LOAD							
UNCRACKED CONCRETE							
Standard embedment depth	$V_{Ru,m}$	[kN]	12,20	19,20	28,00	51,50	80,90
Reduced embedment depth	$V_{Ru,m}$	[kN]	10,10	16,44	22,45	51,50	80,90
CRACKED CONCRETE							
Standard embedment depth	$V_{Ru,m}$	[kN]	12,20	19,20	28,00	51,50	80,90
Reduced embedment depth	$V_{Ru,m}$	[kN]	8,60	11,57	15,80	49,78	66,66
CHARACTERISTIC RESISTANCE							
TENSION LOAD							
UNCRACKED CONCRETE							
Standard embedment depth	N_{Rk}	[kN]	9,00	12,00	20,00	35,00	48,46
Reduced embedment depth	N_{Rk}	[kN]	7,50	9,00	12,00	25,78	35,20
CRACKED CONCRETE							
Standard embedment depth	N_{Rk}	[kN]	5,00	9,00	12,00	20,00	30,00
Reduced embedment depth	N_{Rk}	[kN]	3,00	6,00	9,00	16,00	24,64
SHEAR LOAD							
UNCRACKED CONCRETE							
Standard embedment depth	V_{Rk}	[kN]	9,10	15,70	23,70	47,10	60,60
Reduced embedment depth	V_{Rk}	[kN]	8,90	11,98	16,36	47,10	60,60
CRACKED CONCRETE							
Standard embedment depth	V_{Rk}	[kN]	9,10	15,61	23,70	47,10	60,60
Reduced embedment depth	V_{Rk}	[kN]	6,23	8,39	11,45	36,09	49,28
DESIGN RESISTANCE							
TENSION LOAD							
UNCRACKED CONCRETE							
Standard embedment depth	N_{Rd}	[kN]	5,00	8,00	13,33	23,33	32,30
Reduced embedment depth	N_{Rd}	[kN]	4,17	5,00	8,00	17,19	23,47
CRACKED CONCRETE							
Standard embedment depth	N_{Rd}	[kN]	2,78	6,00	8,00	13,33	20,00
Reduced embedment depth	N_{Rd}	[kN]	1,67	3,33	6,00	10,67	16,43
SHEAR LOAD							
UNCRACKED CONCRETE							
Standard embedment depth	V_{Rd}	[kN]	7,28	12,56	18,96	37,68	48,48
Reduced embedment depth	V_{Rd}	[kN]	5,94	7,99	10,91	34,37	46,93
CRACKED CONCRETE							
Standard embedment depth	V_{Rd}	[kN]	7,28	10,40	18,96	35,98	45,23
Reduced embedment depth	V_{Rd}	[kN]	4,16	5,59	7,63	24,06	32,85
RECOMMENDED LOAD							
TENSION LOAD							
UNCRACKED CONCRETE							
Standard embedment depth	N_{rec}	[kN]	3,57	5,71	9,52	16,66	23,07
Reduced embedment depth	N_{rec}	[kN]	2,98	3,57	5,71	12,28	16,76
CRACKED CONCRETE							
Standard embedment depth	N_{rec}	[kN]	1,99	4,29	5,71	9,52	14,29
Reduced embedment depth	N_{rec}	[kN]	1,19	2,38	4,29	7,62	11,74
SHEAR LOAD							
UNCRACKED CONCRETE							
Standard embedment depth	V_{rec}	[kN]	5,20	8,97	13,54	26,91	34,63
Reduced embedment depth	V_{rec}	[kN]	4,24	5,71	7,79	24,55	33,52
CRACKED CONCRETE							
Standard embedment depth	V_{rec}	[kN]	5,20	7,43	13,54	25,70	32,31
Reduced embedment depth	V_{rec}	[kN]	2,97	3,99	5,45	17,19	23,46

[1)] Use restricted to anchoring statically indeterminate structural components

DESIGN PERFORMANCE DATA

Static loads

R-HPTII-ZF ZINC FLAKE THROUGHBOLT

Size			M8	M8	M10	M10	M12	M12	M16	M16	M20	M20
Nominal embedment depth	h_{nom}	[mm]	40[1)]	55	49[1)]	69	60	80	80	100	100	119
Effective embedment depth	h_{ef}	[mm]	32[1)]	47	39[1)]	59	48	68	65	85	80	99
TENSION LOAD												
STEEL FAILURE												
Characteristic resistance	$N_{Rk,s}$	[kN]	11,0	11,0	17,5	17,5	25,8	25,8	45,8	45,8	70,0	70,0
Partial safety factor	γ_{MS}	[-]	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,40	1,4	1,4
PULL-OUT FAILURE												
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p,ucr}$	[kN]	7,5	9,0	9,0	12,0	12,0	20,0	-	35,0	-	-
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p,cr}$	[kN]	3,0	5,0	6,0	9,0	9,0	12,0	16,0	20,0	-	30,0
Installation safety factor	γ_{inst}	[-]	1,2	1,2	1,2	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Increasing factors for concrete C30/37	Ψ_c	[-]	1,20	1,12	1,16	1,22	1,22	1,00	1,11	1,14	1,12	1,07
Increasing factors for concrete C40/50	Ψ_c	[-]	1,40	1,22	1,33	1,44	1,44	1,00	1,22	1,28	1,26	1,14
Increasing factors for concrete C50/60	Ψ_c	[-]	1,60	1,33	1,50	1,67	1,67	1,00	1,33	1,43	1,39	1,21
CONCRETE CONE FAILURE												
Installation safety factor	γ_{inst}	[-]	1,2	1,2	1,2	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Factor for uncracked concrete	$k_{ucr,N}$	[-]	11,0	11,0	11,0	11,0	11,0	11,0	11,0	11,0	11,0	11,0
Factor for cracked concrete	$k_{cr,N}$	[-]	7,7	7,7	7,7	7,7	7,7	7,7	7,7	7,7	7,7	7,7
Spacing	$s_{cr,N}$	[mm]	96	141	117	177	144	204	195	255	240	297
Edge distance	$c_{cr,N}$	[mm]	48	71	59	89	72	102	98	128	120	149
CONCRETE SPLITTING FAILURE												
Spacing	$s_{cr,N}$	[mm]	170	220	200	300	250	340	320	430	410	530
Edge distance	$c_{cr,N}$	[mm]	85	110	100	150	125	170	160	215	205	265
Installation safety factor	γ_{inst}	[-]	1,2	1,2	1,2	1,0	1,0	1,0	1,0	1,0	1,0	1,0
SHEAR LOAD												
STEEL FAILURE												
Characteristic resistance without lever arm	$V^0_{Rk,s}$	[kN]	9,1	9,1	15,7	15,7	23,7	23,7	47,1	47,1	60,6	60,6
Ductility factor	k_7	[-]	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8	0,8
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	22,0	22,0	45,0	45,0	79,0	79,0	200,0	200,0	389	389
Partial safety factor	γ_{MS}	[-]	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25	1,25
CONCRETE PRY-OUT FAILURE												
Factor	k	[-]	1,0	1,0	1,0	1,0	1,0	2,0	2,0	2,0	2,0	2,0
Installation safety factor	γ_{inst}	[-]	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
CONCRETE EDGE FAILURE												
Effective length of anchor	ℓ_f	[mm]	32	47	39	59	48	68	65	85	80	99
Anchor diameter	d_{nom}	[mm]	8	8	10	10	12	12	16	16	20	20
Installation safety factor	γ_{inst}	[-]	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0

[1)] Use restricted to anchoring statically indeterminate structural components

(-) failure is not decisive

Resistance to tension and shear loads under fire exposure

Size			M8	M8	M10	M10	M12	M12	M16	M16	M20	M20
Effective embedment depth	h_{ef}	[mm]	32[1)]	47	39[1)]	59	48	68	65	85	80	99
R (for EI) = 30 min												
TENSION LOAD												
STEEL FAILURE												
Characteristic resistance	$N_{Rk,s}$	[kN]	0,4	0,4	0,9	0,9	1,7	1,7	3,1	3,1	4,9	4,9
PULL-OUT FAILURE												
Characteristic resistance	$N_{Rk,s}$	[kN]	0,8	1,3	1,5	2,3	2,3	3,0	4,0	5,0	-	-
SHEAR LOAD												
STEEL FAILURE												
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0,4	0,4	0,9	0,9	1,7	1,7	3,1	3,1	4,9	4,9
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0,4	0,4	1,1	1,1	2,6	2,6	6,7	6,7	13,0	13,0
R (for EI) = 60 min												
Effective embedment depth	h_{ef}	[mm]	32[1)]	47	39[1)]	59	48	68	65	85	80	99
TENSION LOAD												
STEEL FAILURE												
Characteristic resistance	$N_{Rk,s}$	[kN]	0,3	0,3	0,8	0,8	1,3	1,3	2,4	2,4	3,7	3,7
PULL-OUT FAILURE												
Characteristic resistance	$N_{Rk,s}$	[kN]	0,8	1,3	1,5	2,3	2,3	3,0	4,0	5,0	-	-
SHEAR LOAD												
STEEL FAILURE												
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0,3	0,3	0,8	0,8	1,3	1,3	2,4	2,4	3,7	3,7
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0,3	0,3	1,0	1,0	2,0	2,0	5,0	5,0	9,7	9,7
R (for EI) = 90 min												
Effective embedment depth	h_{ef}	[mm]	32[1)]	47	39[1)]	59	48	68	65	85	80	99
TENSION LOAD												

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Size			M8	M8	M10	M10	M12	M12	M16	M16	M20	M20
STEEL FAILURE												
Characteristic resistance	$N_{Rk,s}$	[kN]	0,3	0,3	0,6	0,6	1,1	1,1	2,0	2,0	3,2	3,2
PULL-OUT FAILURE												
Characteristic resistance	$N_{Rk,s}$	[kN]	0,8	1,3	1,5	2,3	2,3	3,0	4,0	5,0	-	-
SHEAR LOAD												
STEEL FAILURE												
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0,3	0,3	0,6	0,6	1,1	1,1	2,0	2,0	3,2	3,2
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0,3	0,3	0,7	0,7	1,7	1,7	4,3	4,3	8,4	8,4
R (for EI) = 120 min												
Effective embedment depth	h_{ef}	[mm]	32[1)]	47	39[1)]	59	48	68	65	85	80	99
TENSION LOAD												
STEEL FAILURE												
Characteristic resistance	$N_{Rk,s}$	[kN]	0,2	0,2	0,5	0,5	0,8	0,8	1,6	1,6	2,5	2,5
PULL-OUT FAILURE												
Characteristic resistance	$N_{Rk,s}$	[kN]	0,6	1,0	1,2	1,8	1,8	2,4	3,2	4,0	-	-
SHEAR LOAD												
STEEL FAILURE												
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0,2	0,2	0,5	0,5	0,8	0,8	1,6	1,6	2,5	2,5
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0,2	0,2	0,6	0,6	1,3	1,3	3,3	3,3	6,5	6,5

[1)] Use restricted to anchoring statically indeterminate structural components

* In absence of other national regulations the partial safety factor for resistance under fire exposure. $\gamma_{M,fi}$ = 1,0 is recommended

Allowable values for resistance in case of seismic performance category C2

Size			M8	M8	M10
Effective embedment depth	h_{ef}	[mm]	59	68	85
SEISMIC CATEGORY C2					
TENSION LOAD, STEEL FAILURE					
Characteristic resistance	$N_{Rk,s,C2}$	[kN]	17,5	25,8	45,8
Partial safety factor	$\gamma_{MsN,seisC2}$	[-]	1,4	1,4	1,4
TENSION LOAD, PULL-OUT FAILURE					
Characteristic resistance	$N_{Rk,p,C2}$	[kN]	3,4	7,0	10,9
Installation safety factor	γ_{inst}	[-]	1,0	1,0	1,0
SHEAR LOAD, STEEL FAILURE					
Characteristic resistance without lever arm	$V_{Rk,s,C2}$	[kN]	9,2	11,1	28,2
Partial safety factor	$\gamma_{MsV,seisC2}$	[-]	1,25	1,25	1,25

LOGISTICAL DATA

SKU	Base-sales unit	Unit pack	Bulk pack	Pallet	Single Package - Gross Weight	Bulk Package - Gross Weight	Palette - Gross Weight	Barcode
R-HPTIIZF-08065/15	pcs.	100.0	100.0	16000.0	2.8	2.8	444.6	5906675022840
R-HPTIIZF-08080/15	pcs.	100.0	100.0	16000.0	3.2	3.2	508.3	5906675022857
R-HPTIIZF-08100/35	pcs.	100.0	100.0	12000.0	3.9	3.9	464.3	5906675034881
R-HPTIIZF-08115/50	pcs.	100.0	100.0	12000.0	4.3	4.3	511.3	5906675022871
R-HPTIIZF-10065/5	pcs.	50.0	50.0	8000.0	2.4	2.4	379.4	5906675022888
R-HPTIIZF-10080/20	pcs.	50.0	50.0	8000.0	2.8	2.8	441.1	5906675022895
R-HPTIIZF-10095/15	pcs.	50.0	50.0	8000.0	3.1	3.1	498.2	5906675022901
R-HPTIIZF-10115/35	pcs.	50.0	50.0	6000.0	3.6	3.6	433.3	5906675022918
R-HPTIIZF-10130/50	pcs.	50.0	50.0	8000.0	4.0	4.0	640.2	5906675022925
R-HPTIIZF-12080/5	pcs.	50.0	50.0	8000.0	4.1	4.1	649.8	5906675022932
R-HPTIIZF-12100/5	pcs.	50.0	50.0	8000.0	4.8	4.8	764.3	5906675022949
R-HPTIIZF-12120/25	pcs.	50.0	50.0	6000.0	5.4	5.4	649.8	5906675022956
R-HPTIIZF-12135/40	pcs.	50.0	50.0	6000.0	6.0	6.0	721.2	5906675022963
R-HPTIIZF-12150/55	pcs.	50.0	50.0	4000.0	6.6	6.6	527.2	5906675022970
R-HPTIIZF-16105/10	pcs.	25.0	25.0	4000.0	4.6	4.6	735.7	5906675022987
R-HPTIIZF-16125/5	pcs.	25.0	25.0	4000.0	5.2	5.2	839.6	5906675483658
R-HPTIIZF-16140/20	pcs.	25.0	25.0	4000.0	5.7	5.7	911.2	5906675022994
R-HPTIIZF-16150/30	pcs.	25.0	25.0	4000.0	5.8	5.8	953.0	5906675517513
R-HPTIIZF-16180/60	pcs.	25.0	25.0	3000.0	7.1	7.1	853.3	5906675023007
R-HPTIIZF-20125/5	pcs.	25.0	25.0	3000.0	8.2	8.2	983.3	5906675023021
R-HPTIIZF-20160/20	pcs.	25.0	25.0	2000.0	10.0	10.0	803.4	5906675023038
R-HPTIIZF-20180/40	pcs.	10.0	10.0	1200.0	4.6	4.6	572.2	5906675517537
R-HPTIIZF-20200/60	pcs.	10.0	10.0	1200.0	4.9	4.9	583.2	5906675023045
R-HPTIIZF-20230/90	pcs.	10.0	10.0	1200.0	5.3	5.3	655.0	5906675517520
R-HPTIIZF16220/100	pcs.	25.0	25.0	3000.0	8.2	8.2	988.9	5906675023014

RELATED PRODUCTS

SAFETY	Protective gloves for power tools **R-PGL** 			
DRILLING	Rotary Hammer Drill SDS plus; 850W; 26mm; 2.5J **R-PRH-26850** 	Drill bits Aggressor SDS plus **RT-SDSA** 	Drill bits Rebardrill SDS plus **RT-SDSR** 	Cordless RawlHammer 18V SDS plus **R-PRH18-S** 
CLEANING	Blow Pump **R-BLOWPUMP** 			
ANCHORING	Hammer **RT-HAM-0500** 	Long impact sockets **RT-IS** 	Torque wrench **RT-RW-20-400** 	MECHANICAL ANCHOR SETTING TOOL SDS PLUS **RT-SDSI-MA** 