

# R-HPTII-A4 Stainless Steel Throughbolt

Stainless steel throughbolt anchor for cracked and non-cracked concrete



## Approvals and Reports

- ETA 17/0185
- UKTA-22/6203



## Product information

### Features and benefits

- Stainless steel anchor for the highest corrosion resistance
- 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
- Suitable for installation in corrosive environments category C1, C2, C3, C4 and C5
- Anchors can be used in earthquake risk zones - seismic category C1 and C2

### Applications

- Cladding restraints
- Barriers
- Structural steel
- Curtain walling
- Handrails
- Heavy Plant
- Balustrading
- Passenger lifts
- Facades
- Fencing & gates manufacturing and installation
- Masonry support
- Platforms
- Public seating
- Racking systems

### Base materials

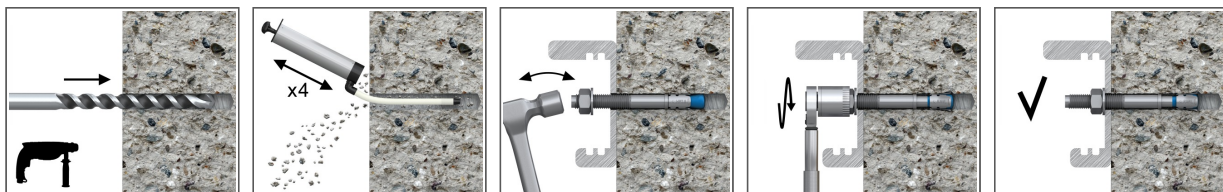
#### Approved for use in:

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

#### Also suitable for use in:

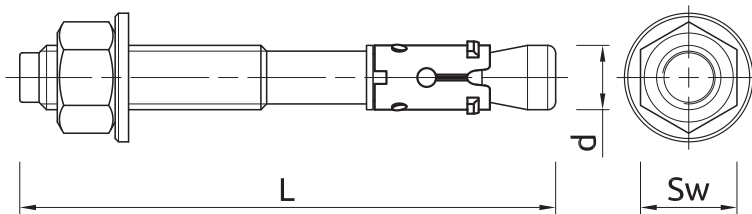
- Natural Stone (after site testing)

## Installation guide



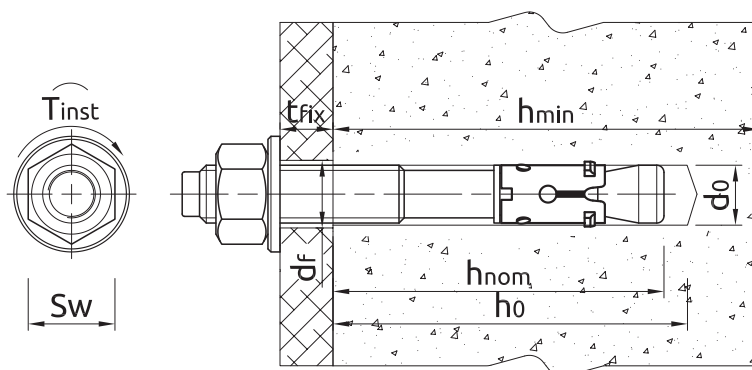
1. Drill a hole of required diameter and depth
2. Clear the hole of drilling dust and debris (using blowpump or equivalent method)
3. Lightly tap the throughbolt through the fixture into hole with a hammer, until fixing depth is reached
4. Tighten to the recommended torque

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-HPTIIA4-08060/10	8	60	10	-	9
	R-HPTIIA4-08075/10	8	75	25	10	9
	R-HPTIIA4-08085/20	8	85	35	20	9
	R-HPTIIA4-08095/30	8	95	45	30	9
	R-HPTIIA4-08105/40	8	105	55	40	9
	R-HPTIIA4-08115/50	8	115	65	50	9
M10	R-HPTIIA4-10065/5	10	65	5	-	12
	R-HPTIIA4-10080/20	10	80	20	-	12
	R-HPTIIA4-10095/15	10	95	35	15	12
	R-HPTIIA4-10115/35	10	115	55	35	12
	R-HPTIIA4-10130/50	10	130	70	50	12
	R-HPTIIA4-10140/60	10	140	80	60	12
M12	R-HPTIIA4-12080/5	12	80	5	-	14
	R-HPTIIA4-12100/5	12	100	25	5	14
	R-HPTIIA4-12115/20	12	115	40	20	14
	R-HPTIIA4-12125/30	12	125	50	30	14
	R-HPTIIA4-12150/55	12	150	75	55	14
	R-HPTIIA4-12180/85	12	180	105	85	14
M16	R-HPTIIA4-16125/5	16	125	25	5	18
	R-HPTIIA4-16140/20	16	140	40	20	18
	R-HPTIIA4-16150/30	16	150	50	30	18
	R-HPTIIA4-16180/60	16	180	80	60	18

Installation data



Size		M8	M10	M12	M16
Thread diameter	d [mm]	8	10	12	16
Hole diameter in substrate	$d_0$ [mm]	8	10	12	16
Installation torque	$T_{inst}$ [Nm]	15	30	50	100
Wrench size	Sw [mm]	13	17	19	24
External diameter of washer	[mm]	16	20	24	30

## Installation data

Size			M8	M10	M12	M16
<b>STANDARD EMBEDMENT DEPTH</b>						
Min. hole depth in substrate	$h_{0,s}$	[mm]	65	80	90	110
Min. installation depth	$h_{nom,s}$	[mm]	55	69	80	100
Min. substrate thickness	$h_{min,s}$	[mm]	100	120	140	170
Min. spacing (Non-cracked concrete)	$s_{min,s}$	[mm]	55	70	90	135
Min. spacing (Cracked concrete)	$s_{min,s}$	[mm]	55	70	90	135
Min. edge distance (Non-cracked concrete)	$c_{min,s}$	[mm]	40	50	55	80
Min. edge distance (Cracked concrete)	$c_{min,s}$	[mm]	40	45	55	70
<b>REDUCED EMBEDMENT DEPTH</b>						
Min. hole depth in substrate	$h_{0,r}$	[mm]	50	60	70	90
Min. installation depth	$h_{nom,r}$	[mm]	40	49	60	80
Min. substrate thickness	$h_{min,r}$	[mm]	100	100	100	130
Min. spacing (Non-cracked concrete)	$s_{min,r}$	[mm]	50	70	120	150
Min. spacing (Cracked concrete)	$s_{min,r}$	[mm]	50	70	120	150
Min. edge distance (Non-cracked concrete)	$c_{min,r}$	[mm]	50	60	70	90
Min. edge distance (Cracked concrete)	$c_{min,r}$	[mm]	40	50	70	85

## Mechanical properties

Size			M8	M10	M12	M16
Nominal ultimate tensile strength - tension	$f_{uk}$	[N/mm <sup>2</sup> ]	600	600	550	550
Nominal yield strength - tension	$f_{yk}$	[N/mm <sup>2</sup> ]	450	450	413	413
Cross sectional area - tension	$A_s$	[mm <sup>2</sup> ]	36.6	58	84.3	157
Elastic section modulus	$W_{el}$	[mm <sup>3</sup> ]	50.27	98.17	169.65	402.12
Characteristic bending resistance	$M_{Rk,s}^0$	[Nm]	22	45	72	180
Design bending resistance	M	[Nm]	18	36	57	144

## Basic performance data

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

Size		M8	M10	M12	M16
<b>NON-CRACKED CONCRETE</b>					
Standard embedment depth $h_{ef}$	[mm]	47.00	59.00	68.00	85.00
Reduced embedment depth $h_{ef}$	[mm]	32.00	39.00	48.00	65.00
<b>CRACKED CONCRETE</b>					
Standard embedment depth $h_{ef}$	[mm]	47.00	59.00	68.00	85.00
Reduced embedment depth $h_{ef}$	[mm]	32.00	39.00	48.00	65.00
<b>MEAN ULTIMATE LOAD</b>					
<b>TENSION LOAD <math>N_{Ru,m}</math></b>					
<b>NON-CRACKED CONCRETE</b>					
Standard embedment depth	[kN]	15.40	22.80	29.20	55.80
Reduced embedment depth	[kN]	10.40	16.00	22.10	37.90
<b>CRACKED CONCRETE</b>					
Standard embedment depth	[kN]	9.70	11.50	18.60	30.40
Reduced embedment depth	[kN]	5.60	9.80	13.40	22.20
<b>SHEAR LOAD <math>V_{Ru,m}</math></b>					
<b>NON-CRACKED CONCRETE</b>					
Standard embedment depth	[kN]	14.00	22.20	29.60	54.50
Reduced embedment depth	[kN]	12.22	19.73	22.45	54.50
<b>CRACKED CONCRETE</b>					
Standard embedment depth	[kN]	12.87	21.20	29.60	54.50
Reduced embedment depth	[kN]	8.60	13.88	15.80	49.78

## Basic performance data

Size		M8	M10	M12	M16
<b>CHARACTERISTIC LOAD</b>					
<b>TENSION LOAD <math>N_{Rk}</math></b>					
<b>NON-CRACKED CONCRETE</b>					
Standard embedment depth	[kN]	9.00	16.00	25.00	38.55
Reduced embedment depth	[kN]	7.50	11.98	16.36	25.78
<b>CRACKED CONCRETE</b>					
Standard embedment depth	[kN]	6.00	9.00	12.00	25.00
Reduced embedment depth	[kN]	3.00	7.50	9.00	16.00
<b>SHEAR LOAD <math>V_{Rk}</math></b>					
<b>NON-CRACKED CONCRETE</b>					
Standard embedment depth	[kN]	11.70	18.50	24.60	45.40
Reduced embedment depth	[kN]	8.90	14.38	16.36	45.40
<b>CRACKED CONCRETE</b>					
Standard embedment depth	[kN]	11.10	15.61	24.60	45.40
Reduced embedment depth	[kN]	6.23	10.06	11.45	36.09
<b>DESIGN LOAD</b>					
<b>TENSION LOAD <math>N_{Rd}</math></b>					
<b>NON-CRACKED CONCRETE</b>					
Standard embedment depth	[kN]	5.00	10.67	16.70	25.70
Reduced embedment depth	[kN]	4.17	6.66	10.91	17.19
<b>CRACKED CONCRETE</b>					
Standard embedment depth	[kN]	3.33	6.00	8.00	16.67
Reduced embedment depth	[kN]	1.67	4.17	6.00	10.67
<b>SHEAR LOAD <math>V_{Rd}</math></b>					
<b>NON-CRACKED CONCRETE</b>					
Standard embedment depth	[kN]	9.36	14.80	19.68	36.32
Reduced embedment depth	[kN]	5.94	9.59	10.91	34.37
<b>CRACKED CONCRETE</b>					
Standard embedment depth	[kN]	7.40	10.40	19.68	35.98
Reduced embedment depth	[kN]	4.16	6.71	7.63	24.06

## Design performance data

(-) failure is not decisive

Size			M8		M10		M12		M16	
Effective embedment depth	$h_{ef}$	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00
<b>TENSION LOAD</b>										
<b>STEEL FAILURE</b>										
Characteristic resistance	$N_{Rk,s}$	[kN]	21.20	21.20	33.60	33.60	44.80	44.80	82.60	82.60
Partial safety factor	$\gamma_{Ms}$	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
<b>PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25</b>										
Characteristic resistance	$N_{Rk,p}$	[kN]	7.50	9.00	12.00	16.00	-	25.00	-	-
<b>PULL-OUT FAILURE; CRACKED CONCRETE C20/25</b>										
Characteristic resistance	$N_{Rk,p}$	[kN]	3.00	6.00	7.50	9.00	9.00	12.00	16.00	25.00
<b>PULL-OUT FAILURE</b>										
Installation safety factor	$\gamma_{inst}$	-	1.20	1.20	1.20	1.00	1.00	1.00	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C30/37	$\psi_c$	-	1.07	1.16	1.07	1.26	1.16	1.23	1.18	1.18
Increasing factors for $N_{Rd,p}$ - C40/50	$\psi_c$	-	1.13	1.33	1.13	1.52	1.32	1.45	1.37	1.37
Increasing factors for $N_{Rd,p}$ - C50/60	$\psi_c$	-	1.20	1.50	1.20	1.78	1.49	1.67	1.55	1.55
<b>CONCRETE CONE FAILURE</b>										
Factor for cracked concrete	$k_{cr,N}$	-	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70
Factor for non-cracked concrete	$k_{ucr,N}$	-	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
Installation safety factor	$\gamma_{inst}$	-	1.20	1.20	1.20	1.00	1.00	1.00	1.00	1.00
Spacing	$s_{cr,N}$	[mm]	96.00	141.0	117.0	177.0	144.0	204.0	195.0	255.0
Edge distance	$c_{cr,N}$	[mm]	48.00	71.00	59.00	89.00	72.00	102.0	98.00	128.0
<b>CONCRETE SPLITTING FAILURE</b>										
Spacing	$s_{cr,sp}$	[mm]	160.0	240.0	200.0	300.0	250.0	340.0	320.0	430.0
Edge distance	$c_{cr,sp}$	[mm]	80.00	120.0	100.0	150.0	125.0	170.0	160.0	215.0
Installation safety factor	$\gamma_{inst}$	-	1.20	1.20	1.20	1.00	1.00	1.00	1.00	1.00
<b>SHEAR LOAD</b>										
<b>STEEL FAILURE</b>										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	11.70	11.70	18.50	18.50	24.60	24.60	45.40	45.40
Ductility factor	$k_{\gamma}$	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	22.00	22.00	42.00	45.00	72.00	72.00	180.0	180.0
Partial safety factor	$\gamma_{Ms}$	-	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
<b>CONCRETE PRY-OUT FAILURE</b>										
Factor	$k$	-	1.00	1.00	1.20	1.00	1.00	2.00	2.00	2.00
Installation safety factor	$\gamma_{inst}$	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<b>CONCRETE EDGE FAILURE</b>										
Effective length of anchor	$\ell_f$	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00
Anchor diameter	$d_{nom}$	[mm]	8.00	8.00	10.00	10.00	12.00	12.00	16.00	16.00
Installation safety factor	$\gamma_{inst}$	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

The use of the reduced embedment depth M8 and M10 is restricted to anchoring statically indeterminate structural components.

## Design performance data

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

Size			M8	M10	M12	M16				
<b>R (for EI) = 30 min</b>										
Effective embedment depth	$h_{ef}$	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00
<b>TENSION LOAD</b>										
<b>STEEL FAILURE</b>										
Characteristic resistance	$N_{Rk,s}$	[kN]	0.70	0.70	1.50	1.50	2.50	2.50	4.70	4.70
<b>PULL-OUT FAILURE</b>										
Characteristic resistance	$N_{Rk,p}$	[kN]	0.80	1.50	1.90	2.30	2.30	3.00	4.00	6.30
<b>SHEAR LOAD</b>										
<b>STEEL FAILURE</b>										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.70	0.70	1.50	1.50	2.50	2.50	4.70	4.70
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.70	0.70	1.90	1.90	3.90	3.90	10.00	10.00
<b>R (for EI) = 60 min</b>										
Effective embedment depth	$h_{ef}$	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00
<b>TENSION LOAD</b>										
<b>STEEL FAILURE</b>										
Characteristic resistance	$N_{Rk,s}$	[kN]	0.60	0.60	1.20	1.20	2.10	2.10	3.90	3.90
<b>PULL-OUT FAILURE</b>										
Characteristic resistance	$N_{Rk,p}$	[kN]	0.80	1.50	1.90	2.30	2.30	3.00	4.00	6.30
<b>SHEAR LOAD</b>										
<b>STEEL FAILURE</b>										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.60	0.60	1.20	1.20	2.10	2.10	3.90	3.90
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.60	0.60	1.50	1.50	3.30	3.30	8.30	8.30
<b>R (for EI) = 90 min</b>										
Effective embedment depth	$h_{ef}$	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00
<b>TENSION LOAD</b>										
<b>STEEL FAILURE</b>										
Characteristic resistance	$N_{Rk,s}$	[kN]	0.40	0.40	0.90	0.90	1.70	1.70	3.10	3.10
<b>PULL-OUT FAILURE</b>										
Characteristic resistance	$N_{Rk,p}$	[kN]	0.80	1.50	1.90	2.30	2.30	3.00	4.00	6.30
<b>SHEAR LOAD</b>										
<b>STEEL FAILURE</b>										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.40	0.40	0.90	0.90	1.70	1.70	3.10	3.10
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.40	0.40	1.20	1.20	2.60	2.60	6.70	6.70
<b>R (for EI) = 120 min</b>										
Effective embedment depth	$h_{ef}$	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00
<b>TENSION LOAD</b>										
<b>STEEL FAILURE</b>										
Characteristic resistance	$N_{Rk,s}$	[kN]	0.40	0.40	0.80	0.80	1.30	1.30	2.50	2.50
<b>PULL-OUT FAILURE</b>										
Characteristic resistance	$N_{Rk,p}$	[kN]	0.60	1.20	1.50	1.80	1.80	2.40	3.20	5.00
<b>SHEAR LOAD</b>										
<b>STEEL FAILURE</b>										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.40	0.40	0.80	0.80	1.30	1.30	2.50	2.50
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.40	0.40	1.00	1.00	2.10	2.10	5.30	5.30

## Design performance data

Allowable values for resistance in case of Seismic performance category C1

Size			M8		M10		M12		M16	
Effective embedment depth	$h_{ef}$	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00
<b>TENSION LOAD, STEEL FAILURE</b>										
Characteristic resistance	$N_{Rk,s}$	[kN]	21.20	21.20	33.60	33.60	44.80	44.80	82.60	82.60
Partial safety factor	$\gamma_{MsN,seisC1}$	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
<b>TENSION LOAD, PULL-OUT FAILURE</b>										
Characteristic resistance	$N_{Rk,p}$	[kN]	3.00	6.00	7.50	9.00	9.00	12.00	16.00	25.00
Installation safety factor	$\gamma_{inst}$	-	1.20	1.20	1.20	1.00	1.00	1.00	1.00	1.00
<b>SHEAR LOAD, STEEL FAILURE</b>										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	-	6.70	-	12.50	18.40	18.40	39.00	39.00
Partial safety factor	$\gamma_{MsV,seisC1}$	-	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25

Allowable values for resistance in case of Seismic performance category C2

Size			M10		M12	
Effective embedment depth	$h_{ef}$	[mm]	39.00	59.00	48.00	68.00
<b>TENSION LOAD, STEEL FAILURE</b>						
Characteristic resistance	$N_{Rk,s}$	[kN]	33.60	33.60	44.80	44.80
Partial safety factor	$\gamma_{MsN,seisC2}$	-	1.50	1.50	1.50	1.50
<b>TENSION LOAD, PULL-OUT FAILURE</b>						
Characteristic resistance	$N_{Rk,p}$	[kN]	2.60	3.00	3.00	4.20
Installation safety factor	$\gamma_{inst}$	-	1.20	1.00	1.00	1.00
<b>SHEAR LOAD, STEEL FAILURE</b>						
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	-	8.30	-	11.10
Partial safety factor	$\gamma_{MsV,seisC2}$	-	1.25	1.25	1.25	1.25

## Product commercial data

Product Code	Anchor		Quantity [pcs]			Weight [kg]			Bar Codes
	Diameter [mm]	Length [mm]	Box	Outer	Pallet	Box	Outer	Pallet	
R-HPTIIA4-08060/10 <sub>1)</sub>	8	60	100	100	16000	2.6	2.6	441.0	5906675046419
R-HPTIIA4-08075/10 <sub>1)</sub>	8	75	100	100	16000	3.1	3.1	520.1	5906675046426
R-HPTIIA4-08085/20 <sub>1)</sub>	8	85	100	100	16000	3.4	3.4	571.4	5906675046433
R-HPTIIA4-08095/30 <sub>1)</sub>	8	95	100	100	12000	3.7	3.7	474.0	5906675046440
R-HPTIIA4-08105/40 <sub>1)</sub>	8	105	50	50	8000	2.0	2.0	354.8	5906675046457
R-HPTIIA4-08115/50 <sub>1)</sub>	8	115	100	100	12000	4.3	4.3	547.9	5906675046464
R-HPTIIA4-10065/5 <sub>1)</sub>	10	65	50	50	8000	2.4	2.4	410.5	5906675046471
R-HPTIIA4-10080/20 <sub>1)</sub>	10	80	50	50	8000	2.8	2.8	469.7	5906675046488
R-HPTIIA4-10095/15 <sub>1)</sub>	10	95	50	50	8000	3.1	3.1	529.7	5906675046495
R-HPTIIA4-10115/35 <sub>1)</sub>	10	115	50	50	6000	3.7	3.7	468.1	5906675046501
R-HPTIIA4-10130/50 <sub>1)</sub>	10	130	50	50	8000	4.0	4.0	670.0	5906675046518
R-HPTIIA4-10140/60 <sub>1)</sub>	10	140	50	50	8000	4.3	4.3	709.7	5906675046532
R-HPTIIA4-12080/5 <sub>1)</sub>	12	80	50	50	8000	4.1	4.1	688.7	5906675046549
R-HPTIIA4-12100/5 <sub>1)</sub>	12	100	50	50	8000	4.8	4.8	797.4	5906675046556
R-HPTIIA4-12115/20 <sub>1)</sub>	12	115	50	50	6000	5.4	5.4	676.4	5906675388106

**Product commercial data**

Product Code	Anchor		Quantity [pcs]			Weight [kg]			Bar Codes
	Diameter [mm]	Length [mm]	Box	Outer	Pallet	Box	Outer	Pallet	
R-HPTIIA4-12125/30 <sup>1)</sup>	12	125	50	50	6000	5.8	5.8	721.9	5906675046563
R-HPTIIA4-12150/55 <sup>1)</sup>	12	150	50	50	4000	6.7	6.7	567.4	5906675046570
R-HPTIIA4-12180/85 <sup>1)</sup>	12	180	50	50	4000	7.8	7.8	651.3	5906675046587
R-HPTIIA4-16125/5 <sup>1)</sup>	16	125	25	25	4000	5.3	5.3	879.1	5906675046594
R-HPTIIA4-16140/20 <sup>1)</sup>	16	140	25	25	4000	5.8	5.8	957.4	5906675034898
R-HPTIIA4-16150/30 <sup>1)</sup>	16	150	25	25	4000	6.1	6.1	1007.0	5906675046600
R-HPTIIA4-16180/60 <sup>1)</sup>	16	180	25	25	3000	7.2	7.2	888.7	5906675046617

1) ETA 17/0185