

for Construction Prague Prosecká 811/76a 190 00 Prague Czech Republic eota@tzus.cz





European Technical Assessment

ETA 18/0818 of 19/03/2025

Technical Assessment Body issuing the E for Construction Prague	TA: Technical and Test Institute
Trade name of the construction product	R-FFS
Product family to which the construction product belongs	Plastic anchors for multiple use in concrete and masonry for non-structural applications
Manufacturer	Rawlplug S.A. Ul. Kwidzyńska 6 51-416 Wrocław Poland
Manufacturing plant(s)	Plant No.3
This European Technical Assessment contains	16 pages including 13 Annexes which form an integral part of this assessment.
This ETA is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 330284-00-0604
This version replaces	ETA 18/0818 issued on 26/05/2020

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1. Technical description of the product

The anchor R-FFS consists of a plastic sleeve made of polyamide and specific screw made of steel with electroplated zinc coating, zinc flake coating or stainless steel as expansion element.

The plastic sleeve is expanded by screwing in the specific screw which presses the sleeve against the wall of the drilled or punched hole.

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

2. Specification of the intended use in accordance with the applicable EAD

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B.

The provisions made in this European Technical Assessment are based on an assumed working life of the anchor of 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the products in relation to the expected economically reasonable working life of the works.

3. Performance of the product and references to the methods used for its assessment

3.1 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchorages satisfy requirements for Class A 1
Resistance to fire	See Annex C2

3.2 Mechanical resistance and stability (BWR 4)

Essential characteristic	Performance
Resistance to steel failure under tension loading	See Annex C1
Resistance to steel failure under shear loading	See Annex C1
Resistance to pull-out or concrete failure under tension	See Annex C2
loading (base material group a)	
Resistance in any load direction without lever arm	See Annex C3, C4
(base material group b, c and d)	
Edge distances and spacing	See Annex B2
(base material group a)	
Edge distances and spacing	See Annex B3, B4
(base material group b, c and d)	
Displacements under short-term and long-term loading	See Annex C2, C3, C4
Durability	See Annex B1

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

According to the Decision 97/463/EC of the European Commission¹, the system 2+ of assessment verification of constancy of performance (see Annex V to the Regulation (EU) No 305/2011) given in the following table applies.

Product	Intended use	Level or class	System
Plastic anchors for use in concrete and masonry	For use in systems, such as façade systems, for fixing or supporting elements which contribute to the stability of the systems	-	2+

¹ Official Journal of the European Communities L 198/31 25.7.1997

5. Technical details necessary for the implementation of the AVCP system, as provided in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Technical and Test Institute for Construction Prague.

Issued in Prague on 19.03.2025

By

Ing. Jiří Studnička, Ph.D. Head of the Technical Assessment Body

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R-FFS



Screw



Pre-assembled





able A1: Dime	nsions					
Anchortuno	Anchor	sleeve ¹⁾	Screw ¹⁾			
Anchor type	d _{nom} [mm]	I _{a1,nom} [mm]	I _{s,min} [mm]	l _{g,min} [mm]	d _s [mm]	
	10	50	59±1	37 _{±0,2}	7-0,2	
	10	60	69 _{±1}	37 _{±0,2}	7-0,2	
R-FFS10	10	80	89 _{±1}	37 _{±0,2}	7-0,2	
	10	100	109 _{±1}	37 _{±0,2}	7-0,2	
	10	120	129 _{±1}	37 _{±0,2}	7-0,2	

¹⁾ The anchor (plastic sleeve and specific screw) shall only be packaged and supplied as a complete unit

Table A2: Materials

Element	
Anchor sleeve	Polyamide, PA6
	colour blue
Specific screw	Steel grade 6.8 ($f_{y,k} \ge 480 \text{ MPa}$, $f_{u,k} \ge 600 \text{ MPa}$) according EN ISO 898-1
	 a) electroplated zinc coating ≥ 5µm according to EN ISO 4042 or
	b) zinc flake coated ≥ 36 g/m² according to EN ISO 10683
	Stainless steel grade according to EN 10088

Product description Dimensions Materials Annex A3

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Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads.
- Redundant non-structural systems.

Base materials:

- Reinforced or unreinforced normal weight concrete with strength classes ≥ C12/15 (Base material group a), according to EN 206.
- Solid masonry (Base material group b), according to Annex C3, according to EN 771-1 or EN 771-2. Note: The characteristic resistance is also valid for larger brick sizes and higher compressive strength of the masonry unit.
- Hollow or perforated masonry (Base material group c), according to Annex C3, according to EN 771-1, EN 771-2 or EN 771-3
- Autoclaved aerated concrete (Base material group d), according to Annex C3, according to EN 771-4.
- Mortar strength class of the masonry M2,5 at minimum according to EN 998-2.
- For other base materials of the use categories a, b, c and d the characteristic resistance of the anchor may be determined by job site tests according to TR 051:2018.

Temperature range:

- a) -30°C to +40°C (max. short term temperature +40°C and max. long term temperature +24°C)
- b) -30°C to +80°C (max. short term temperature +80°C and max. long term temperature +50°C)

Use conditions:

- Structures subject to dry internal conditions (electroplated zinc coating steel, zinc flake coated steel or stainless steel).
- The specific screw made of zinc coated or zinc flake coated steel may also be used in structures subject to external atmospheric exposure if the area of the head of the screw is protected against moisture and driving rain after mounting of the fixing unit in this way, that intrusion of moisture into the anchor shaft is prevented. Therefore there shall be an external cladding or a ventilated rain screen mounted in front of the head of the screw and the head of the screw itself shall be coated with a soft plastic, permanently elastic bitumen-oil-combination coating.
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel or corrosion resistance class CRC III).

Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

Design:

- The anchorages are designed in accordance with TR 064:2018, under the responsibility of an engineer experienced in anchorages and masonry work.
- Verifiable calculation notes and drawings shall be prepared taking account the loads to be anchored, the nature and strength of the base materials and the dimensions of the anchorage members as well as of the relevant tolerances. The position of the anchor is indicated on the design drawings.

Installation:

- Hole shall be drilled by the drill methods given in Annexes C2 and C3 for use categories a, b, c and d; the influence of other drilling methods may be determined by job side tests according to TR 051:2018.
- Anchor installation shall be carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Installation shall be executed in temperature from -10°C to +40°C.
- Exposure to UV due to solar radiation of the anchor not protected by the mortar shall not exceed 6 weeks.

R-FFS	
Intended use Specifications	Annex B1

Table B1: Installation parameters			-		
Anchor type			R-FF	S10	
Base material group			а	b, c, d	
Nominal drill hole diameter	d _o	[mm]	10		
Cutting diameter of drill bit	d _{cut} ≤	[mm]	10,3		
Depth of drill hole to deepest point	h₁≥	[mm]	50	60	
Overall embedment depth in the base material	h _{nom} ≥	[mm]	40	50	
Diameter of clearance hole in the fixture	d _f	[mm]	12,5		
Torque wrench			SW13 TX40		

Table B2: Minimum thickness of member, edge distance and anchor spacing in concrete

Anchor type	Base material	h _{min} [mm]	C _{cr,N} [mm]	C _{min} [mm]	S _{min} [mm]
R-FFS10	Concrete ≥ C12/15	100	98	70	98
	Concrete ≥ C16/20	100	70	50	70

Scheme of edge distance and spacing in concrete



		Si	Single anchor			Anchor group ¹⁾	
Anchor type	Base material	h _{min} [mm]	C _{min} [mm]	anchor Anchor gr amin $s_{1,min}^{21}$ nm] [mm] [mm] 100 250 200 100 250 200 100 250 200 100 250 200 100 250 100 100 250 100 100 250 100 100 250 100 100 250 100 100 250 100	S _{2,min} ³⁾ [mm]		
	Clay brick Mz-DF	115	100	250	200	100	
	Calcium silicate brick KS-NF	115	100	250	200	100	
	Calcium silicate brick KS20	200	100	250	200	100	
	Perforated ceramic brick HLzB 12-0,9	175	100	250	100	100	
K-FF310	Hollow calcium silicate block KSL12	198	100	250	100	100	
	Hollow calcium silicate block SENDWIX 8DF-LD	240	100	250	100	100	
	Hollow lightweight aggregate concrete Bloc creux B40	200	100	250	100	100	
	Autoclaved aerated concrete according to EN 771-4	100	70	250	80	80	

¹⁾ The design method valid for single anchor and anchor groups with two or four anchors

²⁾ In direction perpendicular to free edge

³⁾ In direction parallel to free edge

Scheme of edge distance and spacing in masonry



Table B4: Minimum thickness of member, edge distance and anchor spacing in autoclaved aerated concrete for installation with punch-tool

		Si	ngle anch	le anchor Anchor grou		
Anchor type	Base material	h _{min} [mm]	C _{min} [mm]	a _{min} [mm]	S _{1,min} ²⁾ [mm]	S _{2,min} ³⁾ [mm]
R-FFS10	Autoclaved aerated concrete according to EN 771-4	120	100	250	80	80

¹⁾ The design method valid for single anchor and anchor groups with two or four anchors

²⁾ In direction perpendicular to free edge

³⁾ In direction parallel to free edge

Scheme of edge distance and spacing in masonry







Table C1: Characteristic bending resistance of the screw	

Steel type			Zinc coated steel	Stainless steel
Characteristic bending resistance	$M_{Rk,s}$	[Nm]	15,3	15,3
Partial safety factor	$\gamma_{Ms}{}^{1)}$		1,25	1,58

¹⁾in the absence of other national regulations

Table C2: Characteristic resistance of the screw

Steel type			Zinc coated steel	Stainless steel
Characteristic tension resistance	$N_{Rk,s}$	[kN]	17,0	17,0
Partial safety factor	$\gamma {\rm Ms}^{1)}$		1,50	1,90
Characteristic shear resistance	V _{Rk,s}	[kN]	8,5	8,5
Partial safety factor	$\gamma_{Ms}{}^{1)}$		1,25	1,58

¹⁾in the absence of other national regulations

R-F	FS
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Performances

Annex C1

Characteristic resistance of the screw

Table C3: Characteristic resistance for use in cracked and non-cracked concrete, pull-out failure hammer drilling

Anchor type		R-FFS10					
Concrete ≥ C16/20							
Temperature range	[°C]	24/40	50/80				
Characteristic resistance	N _{Rk,p} [kN]	4,0	3,5				
Partial safety factor	γмс ¹⁾	1,8					
	Concrete	C12/15					
Characteristic resistance	N _{Rk,p} [kN]	3,0	2,5				
Partial safety factor $\gamma_{Mc}^{1)}$ 1,8							

Valid for temperature ranges according to Annex B1

¹⁾in the absence of other national regulations

Table C4: Displacement under tension and shear loading in concrete

		Tension load			Shear load	
Anchor type	N [kN]	δ _№ [mm]	δ _{N∞} [mm]	V [kN]	δν₀ [mm]	δv∞ [mm]
R-FFS10	1,39	1,06	2,12	1,39	0,57	0,85

Valid for temperature ranges according to Annex B1

Table C5: Characteristic values F_{Rk} in any load direction under fire exposure in concrete C20/25 to C50/60, no permanent centric tension load and shear load with lever arm

Anchor type	Fire resistance class	F _{Rk} [kN]
R-FFS10	R90	0,8

R-FFS	
Performances Characteristic resistance in concrete (use category a) Displacement in concrete	Annex C2

Base material	Bulk density class [kg/dm³]	Compressive strength class [N/mm ²]	Dimensions length/width/height [mm]	Picture	Drill method	F _R [k	k ¹⁾ N]
Temperature range [°C]						24/40	50/80
Clay brick Mz-DF	1,7	20	240 x 115 x 55		hammer drilling	2,	0
Calcium silicate brick KS-NF	2	40	240 x 115 x 71		hammer drilling	3,	5
Calcium silicate brick KS20	2	20	332 x 200 x 180		hammer drilling	4,	0
Perforated ceramic brick HLzB 12-0,9	1,6	5	498 x 175 x 238		rotary drilling only	0,6	0,5
Hollow calcium silicate block KSL12	1,4	12	332 x 198 x 180		rotary drilling only	2,0	1,5
Hollow calcium silicate block SENDWIX 8DF-LD	1,4	20	248 x 240 x 248	The second secon	rotary drilling only	2,5	2,0
Hollow lightweight aggregate concrete Bloc creux B40	0,8	4	494 x 200 x 190		rotary drilling only	0,75	0,6
Partial safety factor $\gamma_{Mm^{2)}}$			2,5				

¹⁾Characteristic resistance F_{Rk} for tension, shear or combined tension and shear loading.

The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with spacing equal or larger than the minimum spacing s_{min} according to table B3 (Annex B3)

²⁾In the absence of other national regulations

Table C7: Displacement under tension and shear loading in masonry

Anohor		T	ension loa	ld	Shear load		
Anchor	Base material	Ν	δΝΟ	δ _{N∞}	V	δνο	δγ∞
type		[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
	Clay brick Mz-DF	0,57	0,18	0,37	0,57	0,48	0,71
]	Calcium silicate brick KS-NF	1,00	0,45	0,90	1,00	0,83	1,25
]	Calcium silicate brick KS20	1,14	0,48	0,95	1,14	0,95	1,43
]	Perforated ceramic brick HLzB 12-0,9	0,14	0,63	1,27	0,14	0,12	0,18
R-FFS10	Hollow calcium silicate block KSL12	0,43	0,94	1,87	0,43	0,48	0,71
	Hollow calcium silicate block SENDWIX 8DF-LD	0,57	0,40	0,80	0,57	0,36	0,54
	Hollow lightweight aggregate concrete Bloc creux B40	0,17	0,62	1,23	0,17	0,14	0,21

R-FFS	
Performances Characteristic resistance in masonry (base material group b, c) Displacement in masonry	Annex C3

Base material		Bulk density class [kg/dm³]	Compressive strength class [N/mm ²]	Drill method	F _R [k	.k ¹⁾ N]
Temperature range	[°C]				24/40	50/80
Autoclaved aerated concrete		0,5	4	rotary drilling only	0,	,9
Autoclaved aerated concrete		0,6	5	rotary drilling only	0,	,9
Partial safety factor	γмаас ²⁾			2,0		

¹⁾Characteristic resistance F_{Rk} for tension, shear or combined tension and shear loading.

The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with spacing equal or larger than the minimum spacing s_{min} according to table B3 (Annex B3)

²⁾In the absence of other national regulations

Table C9: Characteristic resistance for use in autoclaved aerated concrete installation with punch-tool

Base material		Bulk density class [kg/dm ³]	Compressive strength class [N/mm ²]	Drill method	F _{Rk} ¹⁾ [kN]	
Temperature range	[°C]				24/40	50/80
Autoclaved aerated concrete		0,5	4	-	1,5	
Autoclaved aerated concrete		0,6	5	-	1,5	
Partial safety factor	γмаас ²⁾			2,0		

¹⁾Characteristic resistance F_{Rk} for tension, shear or combined tension and shear loading.

The characteristic resistance is valid for single plastic anchor or for a group of two or four plastic anchors with

spacing equal or larger than the minimum spacing s_{min} according to table B4 (Annex B4)

²⁾In the absence of other national regulations

Table C10: Displacement under tension and shear loading in autoclaved aerated concrete

	Bulk	Compressive strength class [N/mm ²]	Tension load			Shear load		
Base material	density class [kg/dm³]		N [kN]	δ _{N0} [mm]	δ _{N∞} [mm]	V [kN]	δ _{ν₀} [mm]	δγ∞ [mm]
Autoclaved aerated concrete	0,5	4	0,32	0,79	1,58	0,32	0,64	0,96
Autoclaved aerated concrete	0,6	5	0,32	0,64	1,27	0,32	0,64	0,96

Table C11: Displacement under tension and shear loading in autoclaved aerated concrete installation with punch-tool

	Bulk	Compressive	Tension load			Shear load		
Base material	density class	strength class	Ν	δ _{N0}	δ _{N∞}	v	δνο	δγ∞
	[kg/dm³]	[N/mm ²]	[kN]	[mm]	[mm]	[kN]	[mm]	[mm]
Autoclaved aerated concrete	0,5	4	0,54	0,75	1,51	0,54	1,08	1,62
Autoclaved aerated concrete	0,6	5	0,54	0,98	1,95	0,54	1,08	1,62

R-FFS

Performances

Characteristic resistance in autoclaved aerated concrete (base material group d) Displacement in masonry autoclaved aerated concrete Annex C4