Trutek Fasteners Polska Sp. z o.o.
Al. Krakowska 38, Janki
05-090 Raszyn
NIP: PL 5342256188 REGON: 015722173

Declaration of Performance

Nr: TNFAM/01/20190424/0679-CPR-0843

Revision No:	1
Revision carried out by:	Tomasz Golon
Revision date:	24.04.2019

1.	**Unique identyfiaction code of product-type:**	
	TNFAM MULTIEXPANSION nylon frame anchor	
2.	**Indended use/es:**	
	Plastic anchor for multiple use in concrete and masonry for non-structural applications	
3.	**Manufacturer:**	
	Name:	Trutek Fasteners Polska Sp. z o.o.
	Address:	Al. Krakowska 38, Sękocin Janki 05-090 Raszyn, Polska
4.	**System/s of AVCP:**	
	System:	2+
5.	**European Assessment Document:**	
	In accordance with regulation (EU) No 305/2011 on the basis of ETAG20 edition March 2012 used as European Assessment Document EAD	
	European Technical Assessment	ETA-13/0030 of 14th of December 2017
	Issued by:	CSTB Centre Scientifique et Technique Bâtiment
6.	**Notyfied body/ies:**	
	Name:	CSTB Centre Scientifique et Technique Bâtiment
	Notified body/ies No:	0679
	No of Certificate of Constancy of Performance:	0679-CPR-0843
7.	**Declared performance/es:**	
	Mechanical resistance and stability (BWR 1)	
	For Basic Requirement Mechanical resistance and stability the same criteria are valid as for Basic Requirement Safety in use	
	Safety in case of fire (BWR 2)	
	Essential chracteristic	**Performance**
	Reaction to fire	Anchor satisfy requirements for Class A1
	Resistance to fire	Annex C1
	Hygiene, health and the enviroment (BWR 3)	
	Regarding dangerous substances contained in this European technical assessment, there may be requirements applicable to the products failing within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Product Directive No 305/2011, these requirements need also to be complied with, when and where apply.	
	Safety in use (BWR 4)	
	Essential chracteristic	**Performance**
	Characteristic Ressistances of the screw for tension and shear loads and bending moments in concrete and masonry	Annex C1
	Characteristic Ressistances of the plastic expansion sleeve in concrete	Annex C1
	Characteristic Ressistances of the plastic expansion sleeve in masonry	Annex C2
	Displacements	Annex C3
	Anchor distances and dimensions of members	Annex B2, B3

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

Janki, 24th of April 2019
Signed for and on behalf of the manufacturer by:

Tomasz Golon

Kierownik Produktu / Product Manager

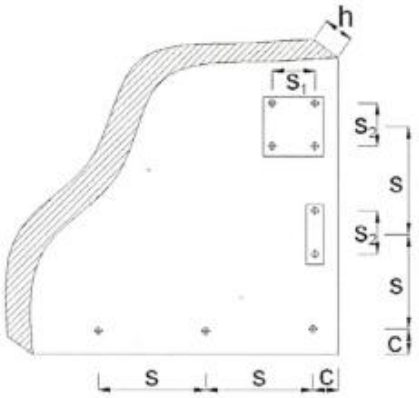
Table 3: Installation Parameters

MULTIEXPANSION				TNFAM 8	TNFAM 10
Drill hole diameter	d_0	=	[mm]	8	10
Cutting diameter of drill bit	d_{cut}	=	[mm]	[8,25 – 8,45]	[10,25 – 10,45]
Depth of drill hole to deepest point	h_1	≥	[mm]	80	80
Plastic anchor embedment depth in the base material	h_{nom}	≥	[mm]	70	70
Diameter of the clearance hole in the fixture	d_f	≤	[mm]	8,5	10,5

Table 4: Minimum thickness of member, edge distance and anchor spacing in concrete

MULTIEXPANSION	Concrete	h_{min}	$c_{cr,N}$	c_{min}	s_{min}
		[mm]	[mm]	[mm]	[mm]
TNFAM 8	Concrete C12/15	100	100	70	70
	Concrete ≥ C16/20	100	70	50	50
TNFAM 10	Concrete C12/15	100	140	70	85
	Concrete ≥ C16/20	100	100	50	60

Scheme of distance and spacing



MULTIEXPANSION Nylon Frame Anchor	Annex B2
Installation parameters (concrete and masonry) Minimum member thickness, edge distance and spacing in concrete	

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Table 5: Minimum thickness of member, edge distance and anchor spacing in masonry for MULTIEXPANSION TNFAM 8 and MULTIEXPANSION TNFAM 10

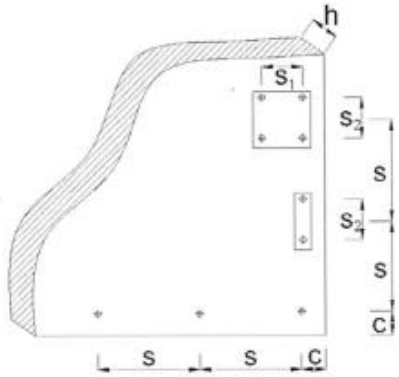
Base material	Minimum thickness of member h_{min} [mm]	Edge distance c_{min} [mm]	Spacing		
			Single anchor s_{min} [mm]	Anchor group Perpendicular to free edge $s_{1,min}$ [mm]	Anchor group Parallel to free edge $s_{2,min}$ [mm]
Solid clay brick, EN 771-1	115	100	250	200	400
Solid sand-lime brick, EN 771-2	115	100	250	200	400
Vertically perforated clay brick, EN 771-1 *e.g.: Wienerberger Doppio Uni*	115	100	250	200	400
Hollow clay brick, EN 771-1 *e.g.: Imerys Optibric PV*	200	100	250	200	400
Vertically perforated clay brick, EN 771-1 *e.g.: Bergmann HLZ 12*	115	100	250	200	400
Sand-lime perforated brick, KSL-R 8DF or DIN 106 / EN 771-2	240	100	250	200	400

1) Information for base material masonry: see Annex C2 , Table 9.

2) The design method is valid for single anchors and anchor groups with two or four anchors.

3) For edge distance c ≥ 200 mm in hollow or perforated masonry (use category "c") the values for spacing only may be reduced to $s_{1,min} = s_{2,min} = 100$ mm, , if the characteristic resistance for an anchor group F_{Rk} according to Table 9 of Annex C2 is reduced with the factor 0,5. Intermediate values by linear interpolation.

Scheme of distances and spacing



MULTIEXPANSION Nylon Frame Anchor	**Annex B3**
Minimum thickness, edge distances and spacings in masonry	

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Table 6: Characteristic resistance of the screw for use in concrete and masonry

MULTIEXPANSION			Galvanized steel		Stainless steel	
			TNFAM 8	TNFAM 10	TNFAM 8	TNFAM 10
Screw diameter	d_s	[mm]	5,5	7,0	5,5	7,0
Characteristic tension resistance	$N_{Rk,s}$	[kN]	9,6	12,8	6.0	12,3
Partial safety factor	γ_{Ms} 1)	[-]	1,50	1,49	2.86	2,86
Characteristic shear resistance	$V_{Rk,s}$	[kN]	4,8	6,4	3.0	6,2
Partial safety factor	γ_{Ms} 1)	[-]	1,25	1,50	2.38	2,38
Characteristic bending resistance	$M_{Rk,s}$	[Nm]	5,6	10,7	3.5	10,3
Partial safety factor	γ_{Ms} 1)	[-]	1,25	1,50	2.38	2,38

1) In absence of other national regulations

Table 7: Characteristic resistance of the plastic sleeve for use in concrete

MULTIEXPANSION			TNFAM 8	TNFAM 10
Pull-out failure				
Characteristic resistance, concrete ≥ C16/20	$N_{Rk,p}$	[kN]	2,0	3,0
Characteristic resistance, concrete C12/15	$N_{Rk,p}$	[kN]	1,2	2,0
Partial safety factor	γ_{Mc} 1)	[-]	1,8	1,8

1) In absence of other national regulations

Table 8: Concrete cone failure and concrete edge failure for single anchor and anchor group

Tension load 2)

$$N_{Rk,c} = 7{,}2\sqrt{f_{ck,cube}}\cdot h_{ef}^{1,5}\cdot\frac{c}{c_{cr,N}} = N_{Rk,p}\cdot\frac{c}{c_{cr,N}} \quad \text{with} \quad h_{ef}^{1,5} = \frac{N_{Rk,p}}{7{,}2\sqrt{f_{ck,cube}}} \quad \text{et} \quad \frac{c}{c_{cr,N}} \le 1$$

Shear load 2)

$$V_{Rk,c} = 0{,}45\cdot\sqrt{d_{nom}}\cdot(h_{nom}/d_{nom})^{0,2}\cdot\sqrt{f_{ck,cube}}\cdot c_1^{1,5}\cdot\left(\frac{c_2}{1{,}5c_1}\right)^{0,5}\cdot\left(\frac{h}{1{,}5c_1}\right)^{0,5} \quad \text{avec:} \quad \left(\frac{c_2}{1{,}5c_1}\right)^{0,5} \le 1 \text{ et } \left(\frac{h}{1{,}5c_1}\right)^{0,5} \le 1$$

c_1 Edge distance closest to the edge in loading direction
c_2 Edge distance perpendicular to direction 1
$f_{ck,cube}$ Nominal characteristic concrete compression strength (based on cubes), value for C50/60 at most

Partial safety factor	γ_{Mc} 1)	1,8

1) In absence of other national regulations
2) The design according to ETAG020, Annex C shall be used

According to the Technical Report TR 020 "Evaluation of anchorages in concrete concerning resistance to fire" it can be assumed that, for fastening of facade systems, the load bearing behavior of the MULTIEXPANSION TNFAM 10 has a sufficient resistance to fire of at least 90 minutes (R90) if the admissible load $F_{Rk} / (\gamma_M \cdot \gamma_F)$ is ≤ 0,8 kN (no permanent centric tension load).

MULTIEXPANSION Nylon Frame Anchor	**Annex C1**
Characteristic resistance in concrete	

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Table 9: Characteristic resistance in masonry

Base material MULTIEXPANSION	Picture / Measures [mm]	Drill method [1]	Density class [kg/dm³]	Compressive strength class [N/mm²]	F_{rk} [2] [kN] TNFAM 8	F_{rk} [2] [kN] TNFAM 10
Solid clay brick, EN 771-1	 247x118x73	P	>2,1	$f_b \geq 75$ [3]	3,5	4,0
				$f_b \geq 20$ [3]	1,5	1,2
Solid sand-lime brick, EN 771-2	 240x114x71	P	>1,9	$f_b \geq 30$ [3]	1,5	2,5
Vertically perforated clay brick, EN 771-1 *e.g.: Wienerberger Doppio Uni*	 120x250x120	P	>0,91	15	0,5	0,75
Hollow clay brick, EN 771-1 *e.g.: Imerys Optibric PV*	 560x200x274	R	>0,60	7,5	0,3	0,5
Vertically perforated clay brick, EN 771-1 *e.g.: Bergmann HLZ 12*	 240x115x113	P	>0,90	12	0,5	0,9
Sand-lime perforated brick, KSL-R 8DF DIN 106 / EN 771-2	 250x240x238	P	>1,3	15	0,5	1,2
Partial safety factor	γ_{Mm} [4]	2,5				

[1] H= Hammer drilling; R= Rotary drilling

[2] 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 a spacing equal or larger than the minimum spacing s_{min} according to Table 5, Annex B3.

[3] f_b = minimum mean compressive strength.

[4] In absence of other national regulations.

MULTIEXPANSION Nylon Frame Anchor	**Annex C2**
Characteristic resistance in masonry	

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Table 10: Displacement under tension / shear loading in concrete

MULTIEXPANSION	Tension load			Shear load		
	F [kN]	δ_{N0} [mm]	$\delta_{N\infty}$ [mm]	F [kN]	δ_{V0} [mm]	$\delta_{V\infty}$ [mm]
TNFAM 8	0,79	0,46	0,21	1,14	0,74	1,11
TNFAM 10	1,19	0,35	0,47	1,71	1,57	2,35

Table 11: Displacements under tension / shear loading in masonry

	Displacement									
	MULTIEXPANSION TNFAM 8					MULTIEXPANSION TNFAM 10				
	F	Tension		Shear		F	Tension		Shear	
Base material [1]	[kN]	δ_{N0}	$\delta_{N\infty}$	δ_{V0}	$\delta_{V\infty}$	[kN]	δ_{N0}	$\delta_{N\infty}$	δ_{V0}	$\delta_{V\infty}$
Solid clay brick, EN 771-1	1,00	0,20	0,40	0,83	1,25	1,14	0,39	0,78	0,95	1,43
Solid sand-lime brick, EN 771-2	0,43	0,17	0,34	0,35	0,54	0,71	0,13	0,26	0,59	0,88
Vertically perforated clay brick, *EN 771-1* *e.g.: Wienerberger Doppio Uni*	0,14	0,15	0,30	0,12	0,18	0,21	0,11	0,22	0,18	0,27
Hollow clay brick, EN 771-1 *e.g.: Imerys Optibric PV*	0,09	0,09	0,18	0,07	0,11	0,14	0,10	0,20	0,12	0,18
Vertically perforated clay brick, EN 771-1 *e.g.: Bergmann HLZ 12*	0,14	0,10	0,20	0,12	0,18	0,26	0,27	0,54	0,22	0,33
Sand-lime perforated brick, KSL-R 8DF DIN 106 / EN 771-2	0,14	0,13	0,26	0,12	0,18	0,34	0,15	0,30	0,29	0,43

[1] Information for masonry base material : see Annex C2, Table 9

MULTIEXPANSION Nylon Frame Anchor	**Annex C3**
Displacements in concrete and masonry	