

No. DEA990150

## DECLARATION OF PERFORMANCE



### Expandet MFA Nylonanchor (Multi Facade Anchor)

Intended use or uses of the construction product		
Generic type	<b>MFA Nylonanchor (Multi Facade Anchor)</b>	
Base material	<ul style="list-style-type: none"> <li>- Reinforced or unreinforced normal weight concrete of strength class C12/15 at minimum to C50/60 at maximum according to EN 206-1. Cracked and non-cracked concrete.</li> <li>- Masonry walls strength class 19 [N/mm<sup>2</sup>]. Mortar strength class ≥ M 2,5 according to EN 998-2:2003.</li> <li>- Masonry walls according to type B, C, D &amp; E declared in this document. Mortar strength class ≥ M 2,5 according to EN 998-2:2003.</li> <li>- Non-cracked autoclaved aerated concrete block according to AAC2 &amp; AAC6 declared in this document.</li> </ul>	
Material	Sleeve material	Virgin Polyamide PA6.
	Screw materials	Steel, zinc plated ≥ 5 µm Steel, Hot dipped galvanised ≥ 45 µm Steel, ceramic Dual 1000h and Stainless steel.
	Durability	Elements made of galvanized steel or coated with Ceramic Dual may be used in structures subject to dry internal conditions only. - Elements made of stainless steel may be used in structures subject to dry internal conditions and also in concrete subject to external atmospheric exposure (including industrial and marine environment) or exposure in permanently damp internal conditions if no particular aggressive conditions exist. Such 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).
Loading	Static and quasi-static loads. The anchor is to be used only for multiple fixing for non-structural applications.	
Proposed design methods	Static and quasi-static load: ETAG 020 - Plastic anchor for multiple use in concrete and masonry for nonstructural applications, annex C	
Fire Reaction	Class A1	
ETA-14/0243 issued by	ETA-Danmark A/S	
On the basis of	ETAG 020 used as EAD	
Certificates of Conformity 1404-CPR-2536 issued by	ZAG (Zavoda Za Gradbenistvo Slovenije)	
Under System	2+	

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### Installation parameters

Harmonized technical specification: ETAG 020 used as EAD		
Essential characteristics		Performances
Installation parameters		M10
Nominal drilling diameter	$d_0$ [mm]	10
Maximum diameter hole in the fixture	$d_{fix}$ [mm]	11
Embedment depth	$h_{ef,min}$ [mm]	65
	$h_{ef,max}$ [mm]	65
Depth of the drilling hole	$h_1$ [mm]	$t_{fix} + 10$ mm
Length of anchor	$l_t$ [mm]	70 – 290
Screw diameter	$d_v$ [mm]	7
Screw length	$l_v$ [mm]	$\geq 77$
Thickness to be fixed	$t_{fix,min}$ [mm]	$> 5$
	$t_{fix,max}$ [mm]	$< 225$

### Characteristic bending resistance of the screw

		Galvanized Steel	Stainless Steel
Characteristic bending resistance of screw	$M_{Rk,s}$ [Nm]	16,0	14,2
Partial safety factor	$\gamma_M$	1,25	

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### Characteristic resistance of the screw

		Galvanized Steel	Stainless Steel
Characteristic tension resistance of screw	$N_{Rk,s}$ [kN]	17,5	15,5
Partial safety factor	$\gamma_M$	1,5	
Characteristic shear resistance of screw	$V_{Rk,s}$ [kN]	8,8	7,7
Partial safety factor	$\gamma_M$	1,25	

### MFA Sizes

Size	$d_{nom}$ [mm]	$h_{nom}$
M10	10	65

### MFA Screw materials

Part	Designation	
	Steel, zinc plated $\geq 5 \mu\text{m}$ Steel, Hot dipped galvanised $\geq 45 \mu\text{m}$ Steel, ceramic Dual 1000h	Stainless steel
Screws	Steel, property class C1022, 10b21 according to JIS G 3508-1 & JIS G 3508-2 or equivalent from EN 10263 or EN 10016	Steel grade 316CU or equivalent steel grade A4 acc.to EN 3506-1 and EN 10088-3
All screws made from carbon steel are marked "ex" in the head, and all screws made from stainless steel are in addition marked with "A4"		

### MFA Sleeve material

Product	Composition
MFA sleeve	Virgin Polyamide PA6 Color: Silverblue or White
All sleeves are marked "MFA" and with dimension and nominal length	

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### Characteristic values for concrete, class minimum C12/C15

Harmonized technical specification: ETAG 020 used as EAD			
Essential characteristics		Performances	
		<b>M10</b>	
Temperature range		24/40 °C	50/80 °C
Characteristic tension resistance, concrete $\geq$ C16/20	$N_{Rk,p}$ [kN]	4,0	3,0
Characteristic tension resistance, concrete C12/15	$N_{Rk,p}$ [kN]	3,0	2,0
Partial safety factor	$\gamma_M$	1,8	
Characteristic shear resistance	$V_{Rk,p}$ [kN]	Carbon steel: 8,8	
		Stainless steel: 7,7	
Service tension load	$N$ [kN]	1,6	
Displacements	$\delta_{N0}$ [mm]	0,28	
	$\delta_{N\infty}$ [mm]	0,60	0,85
Service shear load	$V$ [kN]	4,3	
Displacements	$\delta_{V0}$ [mm]	1,8	
	$\delta_{V\infty}$ [mm]	2,7	
Minimum thickness of concrete member	$h_{min}$ [mm]	100	
Characteristic edge distance	Concrete $\geq$ C16/20	$c_{cr,N}$ [mm]	98
Minimum edge distance		$c_{min}$ [mm]	50
Minimum spacing		$c_{min}$ [mm]	50
Characteristic edge distance	Concrete C12/15	$c_{cr,N}$ [mm]	138
Minimum edge distance		$c_{min}$ [mm]	70
Minimum spacing		$c_{min}$ [mm]	70

### Geometry and mechanical properties for solid masonry type A

Base material	Drill method	Bulk density class, $\rho$	Mean compressive strength, $f_b$
		[kg/m <sup>3</sup> ]	[N/mm <sup>2</sup> ]
"A" Massive brick in Danish Normal format MB 228x108x54	Rotary + hammer	1,7	19

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### Characteristic values for solid masonry type A

Harmonized technical specification: ETAG 020 used as EAD			
Essential characteristics		Performances	
		<b>M10</b>	
Temperature range		24/40 °C	50/80 °C
Characteristic resistance <sup>1)</sup>	$F_{Rk}$ [kN]	2,5	
Partial safety factor	$\gamma_M$	2,5	
Service tension load	$N$ [kN]	0,7	
Displacements	$\delta_{NO}$ [mm]	0,03	
	$\delta_{N\infty}$ [mm]	0,06	
Service shear load	$V$ [kN]	0,7	
Displacements	$\delta_{VO}$ [mm]	0,6	
	$\delta_{V\infty}$ [mm]	0,9	
Minimum thickness of member	$h_{min}$ [mm]	108	
Characteristic edge distance for a single anchor	$c_{cr,N}$ [mm]	110	
Single anchor			
Minimum spacing	$s_{min}$ [mm]	250	
Minimum edge distance	$c_{min}$ [mm]	110	
Anchor Group			
Minimum spacing perpendicular to free edge	$s_{1,min}$ [mm]	440	
Minimum spacing parallel to free edge	$s_{2,min}$ [mm]	220	
Minimum edge distance	$c_{min}$ [mm]	110	

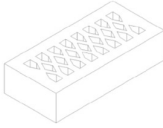
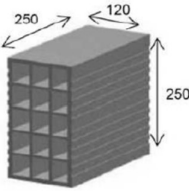
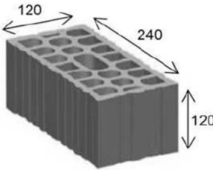

1) Characteristic resistance  $F_{Rk}$  for tension, shear or combined tension and shear loading, is valid for single anchor or for a group of two or four plastic anchors with spacing equal to or larger than the minimum spacing  $s_{min}$

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### Geometry and mechanical properties for hollow masonry

Base material	Drill method	Bulk density class, $\rho$	Mean compressive strength, $f_b$
		[kg/m <sup>3</sup> ]	[N/mm <sup>2</sup> ]
"B" Hollow brick in Danish Normal format HB 228x108x54 	Rotary + hammer	1,7	28
"C" Hollow brick type Forato 250x120x250 	Rotary + hammer	1,7	1,0
"D" Hollow brick type Mattone Doppio UNI 240x120x120 	Rotary + hammer	1,7	15,7
"E" Hollow brick type Porotherm BIO PLAN 30-25/24,9 	Rotary + hammer	1,7	12,0

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### Characteristic values for hollow masonry

Harmonized technical specification: ETAG 020 used as EAD			
Essential characteristics		Performance	
<b>Type B</b>		<b>M10</b>	
Temperature range		24/40 °C	50/80 °C
Characteristic resistance <sup>1)</sup>	$F_{RK}$ [kN]	1,5	1,2
Partial safety factor	$\gamma_M$	2,5	
Service tension load	$N$ [kN]	0,43	
Displacements	$\delta_{N0}$ [mm]	0,02	
	$\delta_{N\infty}$ [mm]	0,04	
Service shear load	$V$ [kN]	0,43	
Displacements	$\delta_{V0}$ [mm]	0,4	
	$\delta_{V\infty}$ [mm]	0,6	
<b>Type C</b>		<b>M10</b>	
Temperature range		24/40 °C	50/80 °C
Characteristic resistance <sup>1)</sup>	$F_{RK}$ [kN]	0,30	0,15
Partial safety factor	$\gamma_M$	2,5	
Service tension load	$N$ [kN]	0,10	
Displacements	$\delta_{N0}$ [mm]	0,30	
	$\delta_{N\infty}$ [mm]	0,60	
Service shear load	$V$ [kN]	0,10	
Displacements	$\delta_{V0}$ [mm]	0,2	
	$\delta_{V\infty}$ [mm]	0,3	

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### Characteristic values for hollow masonry

Harmonized technical specification: ETAG 020 used as EAD			
Essential characteristics		Performance	
<b>Type D</b>		<b>M10</b>	
Temperature range		24/40 °C	50/80 °C
Characteristic resistance <sup>1)</sup>	$F_{RK}$ [kN]	2,0	1,5
Partial safety factor	$\gamma_M$	2,5	
Service tension load	$N$ [kN]	0,57	
Displacements	$\delta_{N0}$ [mm]	0,40	
	$\delta_{N\infty}$ [mm]	0,80	
Service shear load	$V$ [kN]	0,57	
Displacements	$\delta_{V0}$ [mm]	1,1	
	$\delta_{V\infty}$ [mm]	1,7	
<b>Type E</b>		<b>M10</b>	
Temperature range		24/40 °C	50/80 °C
Characteristic resistance <sup>1)</sup>	$F_{RK}$ [kN]	1,5	1,0
Partial safety factor	$\gamma_M$	2,5	
Service tension load	$N$ [kN]	0,43	
Displacements	$\delta_{N0}$ [mm]	0,03	
	$\delta_{N\infty}$ [mm]	0,06	
Service shear load	$V$ [kN]	0,43	
Displacements	$\delta_{V0}$ [mm]	0,9	
	$\delta_{V\infty}$ [mm]	1,3	

1) Characteristic resistance  $F_{RK}$  for tension, shear or combined tension and shear loading, is valid for single anchor or for a group of two or four plastic anchors with spacing equal to or larger than the minimum spacing  $s_{min}$ .



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### Spacing and edge distance for hollow masonry

Harmonized technical specification: ETAG 020 used as EAD		
Essential characteristics		Performances
<b>Type B</b>		<b>M10</b>
Minimum thickness of member	$h_{min}$ [mm]	108
Characteristic edge distance for a single anchor	$c_{cr,N}$ [mm]	110
Single anchor		
Minimum spacing	$s_{min}$ [mm]	250
Minimum edge distance	$c_{min}$ [mm]	110
Anchor group		
Minimum spacing perpendicular to free edge	$s_{1,min}$ [mm]	440
Minimum spacing parallel to free edge	$s_{2,min}$ [mm]	220
Minimum edge distance	$c_{min}$ [mm]	110
<b>Type C</b>		<b>M10</b>
Minimum thickness of member	$h_{min}$ [mm]	120
Characteristic edge distance for a single anchor	$c_{cr,N}$ [mm]	125
Single anchor		
Minimum spacing	$s_{min}$ [mm]	250
Minimum edge distance	$c_{min}$ [mm]	125
Anchor Group		
Minimum spacing perpendicular to free edge	$s_{1,min}$ [mm]	500
Minimum spacing parallel to free edge	$s_{2,min}$ [mm]	250
Minimum edge distance	$c_{min}$ [mm]	125

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## DECLARATION OF PERFORMANCE



### Spacing and edge distance for hollow masonry

Harmonized technical specification: ETAG 020 used as EAD		
Essential characteristics		Performances
<b>Type D</b>		<b>M10</b>
Minimum thickness of member	$h_{min}$ [mm]	120
Characteristic edge distance for a single anchor	$c_{cr,N}$ [mm]	120
Single anchor		
Minimum spacing	$s_{min}$ [mm]	250
Minimum edge distance	$c_{min}$ [mm]	120
Anchor Group		
Minimum spacing perpendicular to free edge	$S1_{min}$ [mm]	480
Minimum spacing parallel to free edge	$S2_{min}$ [mm]	240
Minimum edge distance	$c_{min}$ [mm]	120
<b>Type E</b>		<b>M10</b>
Minimum thickness of member	$h_{min}$ [mm]	300
Characteristic edge distance for a single anchor	$c_{cr,N}$ [mm]	125
Single anchor		
Minimum spacing	$s_{min}$ [mm]	250
Minimum edge distance	$c_{min}$ [mm]	125
Anchor Group		
Minimum spacing perpendicular to free edge	$S1_{min}$ [mm]	500
Minimum spacing parallel to free edge	$S2_{min}$ [mm]	250
Minimum edge distance	$c_{min}$ [mm]	125

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### Geometry and mechanical properties for Aerated autoclaved concrete

Base material, grade	Drill method	Concrete strength, $f_b$
		[MPa]
AAC2	Rotary drilling	$\geq 2,00$
AAC6	Rotary drilling	$\geq 6,00$

### Characteristic values for Aerated Autoclaved Concrete

Harmonized technical specification: ETAG 020 used as EAD		
Essential characteristics		Performances
<b>AAC2</b>		<b>M10</b>
Temperature range		24/40 °C
Characteristic resistance <sup>1)</sup>	$F_{Rk}$ [kN]	0,30
Partial safety factor	$\gamma_M$	2,0
Service tension load	$N$ [kN]	0,10
Displacements	$\delta_{N0}$ [mm]	0,1
	$\delta_{N\infty}$ [mm]	0,2
Service shear load	$V$ [kN]	0,10
Displacements	$\delta_{V0}$ [mm]	0,2
	$\delta_{V\infty}$ [mm]	0,3
<b>AAC6</b>		<b>M10</b>
Temperature range		24/40 °C
Characteristic resistance <sup>1)</sup>	$F_{Rk}$ [kN]	0,90
Partial safety factor	$\gamma_M$	2,0
Service tension load	$N$ [kN]	0,32
Displacements	$\delta_{N0}$ [mm]	0,10
	$\delta_{N\infty}$ [mm]	0,20
Service shear load	$V$ [kN]	0,32
Displacements	$\delta_{V0}$ [mm]	0,6
	$\delta_{V\infty}$ [mm]	0,9
Minimum thickness of member	$h_{min}$ [mm]	100
Characteristic edge distance for a single anchor	$c_{cr,N}$ [mm]	100
Single anchor		
Minimum spacing	$s_{min}$ [mm]	250
Minimum edge distance	$c_{min}$ [mm]	100
Anchor Group		
Minimum spacing perpendicular to free edge	$S1_{min}$ [mm]	400
Minimum spacing parallel to free edge	$S2_{min}$ [mm]	200
Minimum edge distance	$c_{min}$ [mm]	100

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### Resistance to fire

EOTA TR020	
Essential characteristics	Performances
Resistance to fire	For fastening of facade systems with no permanent centric tension load applied to be used in concrete the fire resistance class is R90 assuming a value of the service load $[F_{Rk} / (\gamma_M \cdot \gamma_F)]$ lower or equal to 0,8 kN.

### Reaction to fire

ETAG 020 used as EAD	
Essential characteristics	Performances
Reaction to fire	Class A1

### Terminology and symbols

Terminology and symbols	
d	Diameter of anchor bolt or thread diameter
d <sub>0</sub>	Drill hole diameter
d <sub>fix</sub>	Diameter of clearance hole in the fixture
h <sub>ef</sub>	Effective anchorage depth
h <sub>1</sub>	Depth of the drilling hole
h <sub>min</sub>	Minimum thickness of concrete member
T <sub>inst</sub>	Torque moment to installation
t <sub>fix</sub>	Thickness to be fixed
S <sub>min</sub>	Minimum allowable spacing
C <sub>min</sub>	Minimum allowable edge distance
S <sub>cr,sp</sub>	Spacing for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects in case of splitting failure
C <sub>cr,sp</sub>	Edge distance for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects in case of splitting failure
F	Service load in un-cracked (ucr) or cracked concrete (cr)
δ <sub>0</sub>	Short term displacement under service load in un-cracked (un-cr) or cracked concrete (cr)
δ <sub>∞</sub>	Long term displacement under service load in un-cracked (un-cr) or cracked concrete (cr)
NPD	No performance determined

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**DECLARATION OF PERFORMANCE**



The performance of the product identified above is in conformity with the set of declared performance/s.

This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of Kyocera Senco Denmark A/S by:

**Place and date of issue: Græsted, 21/06/2017**

A handwritten signature in black ink, appearing to read "Lars Mortensen".

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**Lars Mortensen, Head of Technical Department**