

# **MQL Universal Nylon Frame Plug**

MQL Universal Nylon Frame Plug with a special screw made from high quality Polyamide PA6, approved for multiple use in concrete and masonry



#### 1 SPECIFICATIONS OF INTENDED USE

### Anchorages subject to:

 For multiple use in concrete and masonry for non-structural applications, such as façade systems, for fixing or supporting elements which contribute to the stability of the systems

#### **Base materials:**

- Cracked and non-cracked, reinforced or unreinforced normal weight concrete of strength classes  $\geq$  C12/15 according to EN 206-1:2014
- -Masonry walls and aerated concrete blocks

#### **Approvals:**

- European Technical Approval, ETAG 020 anchors for multiple use in concrete and masonry for non-structural applications

#### Installation:

-The influence of larger embedment depths, lower mortar strength and/or different bricks and blocks (according ETA-11/0008 regarding base material, size of the units, compressive strength) has to be detected by job site tests)

#### **Product assortment:**

- MQL Universal Nylon Frame Plug for softer materials can be complied with countersunk, hexagon or with hexagon collar screw in in zinc plated version and with countersunk or with hexagon collar screw in stainless steel (A4/316)

## Safety in case of fire:

- Anchorages satisfy requirements for Class A 1
- Assessment of resistance under fire exposure F90 for fastening of façade systems (for further information see ETA-11/0008)

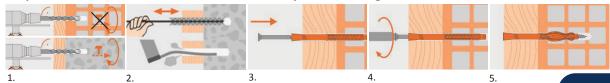
#### **2 PRODUCT DESCRIPTION - MATERIALS**

Product	Designation	Material	Nominal characteristic steel yield strength $f_{yk} [N/mm^2]$	Nominal characteristic steel ultimate strength $f_{uk} \left[ N/mm^2 \right]$	Surface coating
1	MQL Frame Plug (sleeve)	Polyamide, PA6 (Nylon)	_	_	_
2	Carbon steel (screw)	Carbon steel	480	600	Galvanized >5μm, blue passivated
3	Stainless steel (screw)	Stainless steel A4 (EN 10088)	450	700	_

## **3 INSTALATION INSTRUCTIONS**

- 1. Make the hole (no hammer drilling in hollow masonry brick or aerated concrete),
- 2. Cleaning the hole (not necessary with hollow brick),
- 3. Setting the preassembled fastener through the part to be fixed,
- 4. Push the anchor till the collar of the sleeve contacts the part to be fixed, then fix the part with screw and
- 5. Tighten the screw until the MQL Universal Nylon Frame Plug collar contact the screw.

#### Graphic installation instruction for MQL Universal Nylon Frame Plug



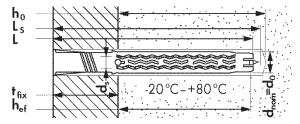
HOBSON



## **4 INSTALATION DATA**

Fastener size			MQL 10	MQL 8 <sup>2)</sup>
Anchor outer diameter	$d_{nom}$	[mm]	10	8
Anchor length	L	[mm]	80-300	80-160
Screw diameter	ds	[mm]	7	6
Installation parameters				
Nominal drilling diameter	d <sub>o</sub>	[mm]	10	8
Depth of the drill hole	h <sub>0</sub> ≥	[mm]	80	80
Effective anchorage depth	h <sub>ef</sub>	[mm]	70	70
Screw length	Ls	[mm]	L+5	mm
Maximum fixture thickness	t <sub>fix</sub>	[mm]	≤230	≤90

<sup>2)</sup> Not part of the European Technical Assessment



## **5 BASIC PERFORMANCE DATA IN CRACKED OR NON-CRACKED CONCRETE**

Basic performance data for MQL Universal Nylon Frame Plug in cracked or non-cracked concrete, without influence of edge distance, spacing and splitting failure due to dimensions of concrete member.

CONCRETE				MQL 10	MQL 8 <sup>2)</sup>
Effective anchorage depth		h <sub>ef</sub>	[mm]	70	70
Minimum thickness of concrete member		h <sub>min</sub>	[mm]	100	100
Minimum adga distance	≥ C16/20	C <sub>min</sub>	[mm]	50	50
Minimum edge distance	C12/15	C <sub>min</sub>	[mm]	70	70
Minimum spacing	≥ C16/20	$S_{min}$	[mm]	70 100 50	100
Willing Spacing	C12/15	$S_{min}$	[mm]	140	140
CHARACTERISTI	IC RESISTANCE				
Tension load for non-cracked concrete <sup>1)</sup>	≥ C20/25	$N_{Rk}$	[kN]	5.00	4.50
Tension load for cracked concrete	≥ C16/20	$N_{Rk}$	[kN]	2.50	-
Tension load for cracked concrete	C12/15	$N_{Rk}$	[kN]	1.50	70         70           70         100           70         100           70         70           70         100           100         140           140         140           150         -           50         -           50         5.90           50         6.80           .30         8.80           80         10.30           80         -           80         -           80         -           80         4.70           40         4.40           .20         7.00           .40         6.60           .00         1.80           .00         -           .60         -           .90         3.40           .90         3.10           .70         5.00
Shear load for cracked or non-cracked concrete	Galvanized Steel	$V_{Rk}$	[kN]	70 100 50 70 100 140 5.00 2.50 1.50 8.50 15.30 17.80 1 2.80 1.40 0.80 6.80 5.40 12.20 11.40 2.00 1.00 0.60 4.90 3.90 8.70	5.90
Shear load for chacked of horr-chacked concrete	Stainless Steel	hef         [mm]         70         70           hmin         [mm]         100         100           Cmin         [mm]         50         50           Cmin         [mm]         70         70           Smin         [mm]         100         100           Smin         [mm]         140         140           NRk         [kN]         5.00         4.50           NRk         [kN]         2.50         -           NRk         [kN]         1.50         -           VRk         [kN]         8.50         5.90           VRk         [kN]         8.50         6.80           MRk         [Nm]         17.80         10.30           NRd         [kN]         2.80         2.50           NRd         [kN]         2.80         2.50           NRd         [kN]         1.40         -           NRd         [kN]         0.80         -           VRd         [kN]         0.80         -           VRd         [kN]         5.40         4.40           MRd         [Nm]         11.40         6.60           Nrec         [kN]			
Bending moment, steel failure	Galvanized Steel	$M_{Rk}$	[Nm]	15.30	8.80
bending moment, steer failure	Stainless Steel	$M_{Rk}$	[Nm]	5.00 4.50 2.50 - 1.50 - 8.50 5.90 8.50 6.81 15.30 8.81 17.80 10.3  2.80 2.50 1.40 - 0.80 - 6.80 4.70 5.40 4.40 12.20 7.00 11.40 6.60	10.30
DESIGN RE	SITANCE				
Tension load for non-cracked concrete <sup>1)</sup>	≥ C20/25	$N_{Rd}$	[kN]	2.80	2.50
Tension load for cracked or non-cracked concrete	≥ C16/20	$N_{Rd}$	[kN]	70 100 50 70 100 140 50 70 100 140 5.00 2.50 1.50 8.50 8.50 15.30 17.80  2.80 1.40 0.80 6.80 5.40 12.20 11.40  2.00 1.00 0.60 4.90 3.90 8.70	-
Tension load for cracked of non-cracked concrete	C12/15	$N_{Rd}$	[kN]		-
Shear load for cracked or non-cracked concrete	Galvanized Steel	$V_{Rd}$	[kN]	6.80	4.70
Shear load for chacked of horr-chacked concrete	Stainless Steel	$V_{Rd}$	[kN]	70 100 50 70 100 140 5.00 2.50 1.50 8.50 15.30 17.80  2.80 1.40 0.80 6.80 5.40 12.20 11.40 2.00 1.00 0.60 4.90 3.90 8.70	4.40
Bending moment, steel failure	Galvanized Steel	$M_{Rd}$	[Nm]	12.20	7.00
bending moment, steer failure	Stainless Steel	$M_{Rd}$	[Nm]	11.40	6.60
RECOMENDED	RESISTANCE				
Tension load for non-cracked concrete <sup>1)</sup>	≥ C20/25	$N_{rec}$	[kN]	2.00	1.80
Tension load for cracked or non-cracked concrete	≥ C16/20	$N_{rec}$	[kN]	1.00	-
ובווזוטוו וטמע וטו כומכאבע טו ווטוויכו מכאבע כטווכו בנפ	C12/15	$N_{rec}$	[kN]	0.60	-
Shear load for cracked or non-cracked concrete	Galvanized Steel	$V_{rec}$	[mm] 50 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3.40	
Silear load for cracked or flori-cracked concrete	Stainless Steel	V <sub>rec</sub>	[kN]	3.90	3.10
Bending moment, steel failure	Galvanized Steel	M <sub>rec</sub>	[Nm]	8.70	5.00
1) Ad and the band	Stainless Steel	$M_{rec}$	[Nm]	8.10	4.70

<sup>1)</sup> Mungo lab tested



<sup>&</sup>lt;sup>2)</sup> Not part of the European Technical Assessment



## **6 VALUES OF RESISTANCE UNDER TENSION AND SHEAR LOADS IN MASONRY UNITS**

## 6.1 Clay masonry

CLAY SOLID BRICK						MQL 10	MQL 8 <sup>2)</sup>
Effective anchorage depth				h <sub>ef</sub>	[mm]	70	70
		Brick dimens	ions [mm]		240x1	15x113	
Clay solid brick acc. to EN		Bulk density		≥p	[kg/dm <sup>3</sup> ]	2.	00
771-1:2011 / din 105- 100:2012-01 Mz 20/2.0		Minimum me	ember thickness	h <sub>min</sub>	[mm]	115	115
	A Company of the Comp	Minimum ed	ge distance	C <sub>min</sub>	[mm]	100	100
		Min. spacing	(Vertical to edge)	S <sub>1,min</sub>	[mm]	200	200
		Min. spacing	(Parallel to edge)	S <sub>2,min</sub>	[mm]	400	400
	CI	HARACTERISTI	C RESISTANCE				
Tension load for minimum o	ompressive strength		≥ 10 N/mm <sup>2</sup>	N <sub>Rk</sub>	[kN]	2.00	-
Tension load for minimum c	ompressive strength		≥ 20 N/mm <sup>2</sup>	$N_{Rk}$	[kN]	3.00	-
Shear load for minimum cor	hear load for minimum compressive strength		≥ 10 N/mm <sup>2</sup>	$V_{Rk}$	[kN]	2.00	-
Silear load for milliminum cor	iipi essive sti eligtii		≥ 20 N/mm <sup>2</sup>	$V_{Rk}$	[kN]	3.00	-
		DESIGN RE	SITANCE				
Tension load for minimum o	omprossive strength		≥ 10 N/mm <sup>2</sup>	$N_{Rd}$	[kN]	0.80	-
Terision load for minimum c	ompressive strength		≥ 20 N/mm <sup>2</sup>	$N_{Rd}$	[kN]	1.20	-
Shear load for minimum cor	maracciva strangth		≥ 10 N/mm <sup>2</sup>	$V_{Rd}$	[kN]	0.80	-
Silear load for milliminum cor	iipi essive sti eligtii		≥ 20 N/mm <sup>2</sup>	$V_{Rd}$	[kN]	1.20	-
	F	RECOMENDED	RESISTANCE				
Toncion load for minimum a	omprossive strongth		$\geq$ 10 N/mm <sup>2</sup>	$N_{rec}$	[kN]	0.60	-
Tension load for minimum C	Tension load for minimum compressive strength		≥ 20 N/mm <sup>2</sup>	N <sub>rec</sub>	[kN]	0.90	-
Charlesd for minimum sar	marossivo strongth		≥ 10 N/mm <sup>2</sup>	V <sub>rec</sub>	[kN]	0.60	
Shear load for minimum cor			≥ 20 N/mm <sup>2</sup>	V <sub>rec</sub>	[kN]	0.90	-

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CLAY HOLLOW BRICK							MQL 8 <sup>2)</sup>
Effective anchorage depth				h <sub>ef</sub>	[mm]	70	70
		Brick dimension	s [mm]		300x2	40x240	
		Bulk density		≥P	[kg/dm <sup>3</sup> ]	1.3	20
Clay brick Hlz 12/1.2		Minimum meml	oer thickness	h <sub>min</sub>	[mm]	240	240
Clay Drick Hiz 12/1.2		Minimum edge	distance	C <sub>min</sub>	[mm]	100	100
		Min. spacing (Ve	ertical to edge)	S <sub>1,min</sub>	[mm]	200	200
		Min. spacing (Pa	arallel to edge)	S <sub>2,min</sub>	[mm]	400	400
	CH	ARACTERISTIC R	ESISTANCE				
Tension load for minimum c	ompressive strength		≥ 12 N/mm <sup>2</sup>	$N_{Rk}$	[kN]	1.20	-
Tension load for millimum c	ompressive strength		≥ 20 N/mm <sup>2</sup>	$N_{Rk}$	[kN]	2.00	-
Shear load for minimum compressive strength 3)			≥ 12 N/mm <sup>2</sup>	$V_{Rk}$	[kN]	1.20	-
Shear load for minimum cor	npressive strengtn		≥ 20 N/mm <sup>2</sup>	$V_{Rk}$	[kN]	2.00	-
		DESIGN RESIT					
Tansian land for minimum a	ommunesius strongth		≥ 12 N/mm <sup>2</sup>	N <sub>Rd</sub>	[kN]	0.50	-
Tension load for minimum c	ompressive strength		≥ 20 N/mm <sup>2</sup>	N <sub>Rd</sub>	[kN]	0.80	-
Shear load for minimum cor	3)		≥ 12 N/mm <sup>2</sup>	$V_{Rd}$	[kN]	0.50	-
Shear load for minimum cor	npressive strength		≥ 20 N/mm <sup>2</sup>	$V_{Rd}$	[kN]	0.80	1
	R	RECOMENDED RE	SISTANCE				
Tension load for minimum c	omnressive strength		≥ 12 N/mm <sup>2</sup>	N <sub>rec</sub>	[kN]	0.40	-
Tension load for minimum c	ompressive su crigui	≥ 20 N/mm <sup>2</sup>		N <sub>rec</sub>	[kN]	0.60	-
Shear load for minimum cor	narossivo strongth 3)		≥ 12 N/mm <sup>2</sup>	$V_{rec}$	[kN]	0.40	-
Silear load for minimum cor	iipi essive sit engin		≥ 20 N/mm <sup>2</sup>	$V_{rec}$	[kN]	0.60	-

<sup>&</sup>lt;sup>2)</sup> Not part of the European Technical Assessment <sup>3)</sup> Shear load with lever arm is not allowed





CLAY HOLLOW BRICK					MQL 10	MQL 8 <sup>2)</sup>		
Effective anchorage depth			h <sub>ef</sub>	f [mm] 70 70 300x240x195				
Ital. perforated brick Mattone		Brick dimensions [mm]		300x2	40x195			
		Bulk density	≥p	[kg/dm <sup>3</sup> ]	0.	84		
		Minimum member thickness	h <sub>min</sub>	[mm]	240	240		
		Minimum edge distance	C <sub>min</sub>	[mm]	100	100		
		Min. spacing (Vertical to edge)	S <sub>1,min</sub> [mm]		200	200		
		Min. spacing (Parallel to edge)	S <sub>2,min</sub>	[mm]	400	400		
	C	HARACTERISTIC RESISTANCE						
Tension load for minimum c	ompressive strength	≥ 10 N/mm <sup>2</sup>	$N_{Rk}$	[kN]	0.90	0.90		
Shear load for minimum cor	npressive strength 3)	≥ 10 N/mm <sup>2</sup>	$V_{Rk}$	[kN]	0.90	0.90		
		DESIGN RESISTANCE						
Tension load for minimum c	ompressive strength	≥ 10 N/mm <sup>2</sup>	$N_{Rd}$	[kN]	0.40	0.40		
Shear load for minimum cor	npressive strength 3)	≥ 10 N/mm <sup>2</sup>	$V_{Rd}$	[kN]	0.40	0.40		
RECOMENDED RESISTANCE								
Tension load for minimum compressive strength $\geq 10 \text{ N/mm}^2$ $N_{rec}$ [kN] 0.30 0.					0.30			
Shear load for minimum cor	npressive strength 3)	≥ 10 N/mm <sup>2</sup>	$V_{rec}$	[kN]	0.30	0.30		

Not part of the European Technical Assessment

# 6.2 Calcium silicate masonry

CALCIUM SILICATE SOLID BRICK						MB 10	MQL 8 <sup>2)</sup>
Effective anchorage depth				h <sub>ef</sub>	[mm]	70	70
		Brick dimens	ions [mm]		240x1	15x113	
		Bulk density		≥p	[kg/dm <sup>3</sup> ]	2.	00
Calcium silicate solid brick		Minimum me	ember thickness	h <sub>min</sub>	[mm]	115	115
KSV 12/2.0		Minimum ed	ge distance	C <sub>min</sub>	[mm]	100	100
		Min. spacing	(Vertical to edge)	S <sub>1,min</sub>	[mm]	200	200
		Min. spacing	(Parallel to edge)	S <sub>2,min</sub>	[mm]	400	400
	CH	IARACTERISTI	C RESISTANCE				
Tension load for minimum c	omprossive strength		≥ 10 N/mm <sup>2</sup>	$N_{Rk}$	[kN]	1.50	-
Tension load for minimum c	ompressive strength		≥ 20 N/mm <sup>2</sup>	$N_{Rk}$	[kN]	2.50	-
Shear load for minimum compressive strength			≥ 10 N/mm <sup>2</sup>	$V_{Rk}$	[kN]	1.50	-
Shear load for minimum cor	iipi essive su eligui		≥ 20 N/mm <sup>2</sup>	$V_{Rk}$	[kN]	2.50	-
		DESIGN RE	SITANCE				
Tension load for minimum c	omprossive strength		≥ 10 N/mm <sup>2</sup>	$N_{Rd}$	[kN]	0.60	-
Tension load for minimum c	ompressive strength		≥ 20 N/mm <sup>2</sup>	$N_{Rd}$	[kN]	1.00	-
Shear load for minimum cor	maracciva etranath		≥ 10 N/mm <sup>2</sup>	$V_{Rd}$	[kN]	0.60	-
Shear load for minimum cor	iipi essive su eligui		≥ 20 N/mm <sup>2</sup>	$V_{Rd}$	[kN]	1.00	-
	R	RECOMENDED	RESISTANCE				
Tension load for minimum c	omnressive strength	·	≥ 10 N/mm <sup>2</sup>	N <sub>rec</sub>	[kN]	0.40	-
Tension load for minimum compressive strength  ≥ 20 N/mm <sup>2</sup>		N <sub>rec</sub>	[kN]	0.70	-		
Shear load for minimum cor	maracciva strangth	·	≥ 10 N/mm <sup>2</sup>	$V_{rec}$	[kN]	0.40	-
Shear load for minimum compressive strength		≥ 20 N/mm <sup>2</sup>	$V_{rec}$	[kN]	0.70	-	

<sup>2)</sup> Not part of the European Technical Assessment



<sup>&</sup>lt;sup>3)</sup> Shear load with lever arm is not allowed



CALCIUM SILICATE HOLLOW BRICK							MQL 8 <sup>2)</sup>
Effective anchorage depth				h <sub>ef</sub>	[mm]	70	70
	-	Brick dimensi	ons [mm]		300x2	40x115	
		Bulk density		≥ P	[kg/dm <sup>3</sup> ]	1.4	40
Calcium silicate KSL		Minimum me	mber thickness	h <sub>min</sub>	[mm]	240	240
12/1.4		Minimum edg	ge distance	C <sub>min</sub>	[mm]	100	100
	4	Min. spacing	(Vertical to edge)	S <sub>1,min</sub>	[mm]	200	200
		Min. spacing	(Parallel to edge)	S <sub>2,min</sub>	[mm]	400	400
	CI	HARACTERISTIC	CRESISTANCE				
Tension load for minimum o	compressive strongth		≥ 8 N/mm <sup>2</sup>	$N_{Rk}$	[kN]	1.20	1.20
Tension load for minimum c	ompressive strength		≥ 12 N/mm <sup>2</sup>	$N_{Rk}$	[kN]	2.00	2.00
Shear load for minimum compressive strength <sup>3)</sup>			≥ 8 N/mm <sup>2</sup>	$V_{Rk}$	[kN]	1.20	1.20
Shear load for minimum cor	inpressive strength		≥ 12 N/mm <sup>2</sup>	$V_{Rk}$	[kN]	2.00	2.00
		DESIGN RES	ISTANCE				
Tension load for minimum o	compressive strongth		≥ 8 N/mm <sup>2</sup>	$N_{Rd}$	[kN]	0.50	0.50
Tension load for minimum c	compressive strength		≥ 12 N/mm <sup>2</sup>	$N_{Rd}$	[kN]	0.80	0.80
Shear load for minimum cor	mproceive etropath 3)		≥ 8 N/mm <sup>2</sup>	$V_{Rd}$	[kN]	0.50	0.50
Shear load for minimum cor	npressive strength		≥ 12 N/mm <sup>2</sup>	$V_{Rd}$	[kN]	0.80	0.80
	1	RECOMENDED	RESISTANCE				
Tonsion load for minimum of	compressive strongth		≥ 10 N/mm <sup>2</sup>	$N_{rec}$	[kN]	0.40	0.40
TELISION IOAU TOT THIRITIUM C	minimum compressive strength		0.60	0.60			
Shear load for minimum cor	mprossive strongth 3)		≥ 10 N/mm <sup>2</sup>	$V_{rec}$	[kN]	0.40	0.40
Silear IOdu IOI IIIIIIIIIIIIIIIIIIIIIIIIIIIIII	iibi essive strenktii		≥ 12 N/mm <sup>2</sup>	$V_{rec}$	[kN]	0.60	0.60

<sup>2)</sup> Not part of the European Technical Assessment

## 6.3 Autoclaved aerated concrete (AAC)

AUTOCLAVED AERATED CONCRETE						MQL 8 <sup>2)</sup>	
Effective anchorage depth	h <sub>ef</sub>	[mm]	70	70			
		Brick dimensions [mm]		250x150x240			
Autoslavad aavatad	0	Bulk density	≥p	[kg/dm <sup>3</sup> ]	0.5	55	
Autoclaved aerated concrete (EN 771-4:2011)		Minimum member thickness	h <sub>min</sub>	[mm]	150	150	
		Minimum edge distance	C <sub>min</sub>	[mm]	125	125	
		Min. spacing (Vertical to edge)	S <sub>1,min</sub>	[mm]	250	250	
		Min. spacing (Parallel to edge)	S <sub>2,min</sub> [mm]		500	500	
	СН	IARACTERISTIC RESISTANCE					
Tension load for minimum of	compressive strength	≥ 5.2 N/mm <sup>2</sup>	N <sub>Rk</sub> [kN] 1.40 1		1.20		
Shear load for minimum cor	mpressive strength	≥ 5.2 N/mm <sup>2</sup>	$V_{Rk}$	[kN] 1.40 1.2		1.20	
		DESIGN RESISTANCE					
Tension load for minimum of	compressive strength	≥ 5.2 N/mm <sup>2</sup>	$N_{Rd}$	[kN]	0.70	0.60	
Shear load for minimum cor	mpressive strength	≥ 5.2 N/mm <sup>2</sup>	$V_{Rd}$	[kN]	0.70	0.60	
RECOMENDED RESISTANCE							
Tension load for minimum o	compressive strength	≥ 5.2 N/mm <sup>2</sup>	N <sub>rec</sub> [kN] 0.50 0.4			0.40	
Shear load for minimum cor	mpressive strength	≥ 5.2 N/mm <sup>2</sup>	$V_{rec}$	[kN]	0.50	0.40	
2) Not part of the European Tec	chnical Assassment	· · · · · · · · · · · · · · · · · · ·					

Not part of the European Technical Assessment

## **7 IMPORTANT NOTICE**

Values given in this document are valid under the assumptions of sufficient cleaning of the drill hole (not necessary with hollow brick). Resistance for tension, shear or combined tension and shear loading, is valid for a group of ≥ 3 anchors. For the design the complete European Technical Assessment has to be considered. In recommended resistance the partial safety factor for material as regulated in the ETA, as well as a partial safety factor for load action  $\gamma L = 1.4$  are considered. For combination of tensile loads, shear loads, bending moments as well as reduced edge distances or spacing's (anchor groups) see ETA or Mungo design software. The data must be checked by the user under the responsibility of an engineer experienced in anchorage and concrete work. This is to ensure there are no errors and all data is complete and accurate and complies with all rules and regulations for the actual conditions and application.



<sup>3)</sup> Shear load with lever arm is not allowed