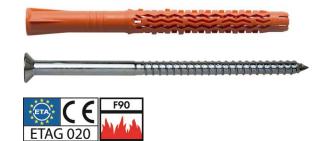


# **MQL Universal Nylon Frame Plug**

**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 <sub>yk</sub> [N/mm <sup>2</sup> ]	Nominal characteristic steel ultimate strength f <sub>uk</sub> [N/mm <sup>2</sup> ]	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

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Mungo Befestigungstechnik AG Bornfeldstrasse 2 CH-4600 Olten · Switzerland Phone +41 62 206 75 75 +41 62 206 75 85 Fax

mungo@mungo.swiss

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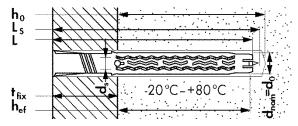
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# **4 INSTALATION DATA**

Fastener size			MQL 10	MQL 8 <sup>2)</sup>
Anchor outer diameter	d <sub>nom</sub>	[mm]	10	8
Anchor length	L	[mm]	80-300	80-160
Screw diameter	ds	[mm]	7	6
Installation parameters				
Nominal drilling diameter	do	[mm]	10	8
Depth of the drill hole	h₀ ≥	[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 edge distance	≥ C16/20	C <sub>min</sub>	[mm]	50	50
Winning edge distance	C12/15	C <sub>min</sub>	[mm]	70	70
Minimum spacing	≥ C16/20	S <sub>min</sub>	[mm]	100	100
	C12/15	S <sub>min</sub>	[mm]	70 100 50 70	140
CHARACT	ERISTIC RESISTANCE		-		
Tension load for non-cracked concrete <sup>1)</sup>	≥ C20/25	N <sub>Rk</sub>	[kN]	5.00	4.50
Tension load for cracked concrete	≥ C16/20	N <sub>Rk</sub>	[kN]	2.50	-
	C12/15	N <sub>Rk</sub>	[kN]	70   100   50   70   100   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   0.60   4.90   3.90   8.70	-
Shear load for cracked or non-cracked concrete	Galvanized Steel	V <sub>Rk</sub>	[kN]	8.50	5.90
	Stainless Steel	V <sub>Rk</sub>	[kN]	8.50	6.80
Bending moment, steel failure	Galvanized Steel	M <sub>Rk</sub>	[Nm]	15.30	8.80
Bending moment, steer failure	Stainless Steel	M <sub>Rk</sub>	[Nm]	70     100     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	10.30
DESI	GN RESITANCE				
Tension load for non-cracked concrete <sup>1)</sup>	≥ C20/25	N <sub>Rd</sub>	[kN]	2.80	2.50
Tension load for cracked or non-cracked concrete	≥ C16/20	N <sub>Rd</sub>	[kN]	1.40	-
	C12/15	N <sub>Rd</sub>	[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	-
Shear load for cracked or non-cracked concrete	Galvanized Steel	V <sub>Rd</sub>	[kN]	70   100   50   70   100   100   100   100   100   140   5.00   2.50   1.50   8.50   8.50   15.30   17.80   2.80   140   0.80   6.80   5.40   12.20   11.40   2.00   1.00   0.60   4.90   3.90   8.70	4.70
	Stainless Steel	V <sub>Rd</sub>	[kN]		4.40
Donding moment, steel failure	Galvanized Steel	M <sub>Rd</sub>	[mm]   100     [mm]   140     [kN]   5.00     [kN]   2.50     [kN]   2.50     [kN]   1.50     [kN]   8.50     [kN]   8.50     [kN]   15.30     [kN]   15.30     [kN]   17.80     [kN]   14.00     [kN]   0.80     [kN]   5.40     [kN]   5.40     [kN]   5.40     [kN]   11.40     [kN]   10.00     [kN]   10.00     [kN]   2.00     [kN]   1.00     [kN]   3.90     [kN]   3.90     [kN]   3.90     [Nm]   8.70	12.20	7.00
Bending moment, steel failure	Stainless Steel	M <sub>Rd</sub>	[Nm]	Imile 100   mile 50   mile 70   mile 70   mile 100   mile 100   mile 100   mile 100   mile 140   Nile 5.00   Nile 1.50   Nile 8.50   mile 15.30   mile 17.80   Nile 0.80   Nile 0.80   Nile 6.80   Nile 5.40   mile 11.40   Nile 2.00   Nile 10.60   Nile 0.60   Nile 3.90   mile 8.70	6.60
RECOME	ENDED RESISTANCE				
Tension load for non-cracked concrete <sup>1)</sup>	≥ C20/25	N <sub>rec</sub>	[kN]	2.00	1.80
Tension load for cracked or non-cracked concrete	≥C16/20	N <sub>rec</sub>	[kN]	1.00	-
	C12/15	N <sub>rec</sub>	[kN]	0.60	-
Shear load for cracked or non-cracked concrete	Galvanized Steel	V <sub>rec</sub>	[kN]	4.90	3.40
	Stainless Steel	V <sub>rec</sub>	[kN]	3.90	3.10
Panding moment, steel failure	Galvanized Steel	M <sub>rec</sub>	[Nm]	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	5.00
Bending moment, steel failure	Stainless Steel	M <sub>rec</sub>	[Nm]		4.70
<sup>1)</sup> Mungo lab tested					

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

Mungo Befestigungstechnik AG Bornfeldstrasse 2 CH-4600 Olten · Switzerland Phone +41 62 206 75 75 +41 62 206 75 85 Fax

mungo@mungo.swiss



## **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-		Minimum me	ember thickness	h <sub>min</sub>	[mm]	115	115
100:2012-01	ALC: A DECEMBER OF	Minimum ed	ge distance	C <sub>min</sub>	[mm]	100	100
Mz 20/2.0		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
	С	HARACTERISTI	C RESISTANCE				
<b>T</b>			≥ 10 N/mm <sup>2</sup>	N <sub>Rk</sub>	[kN]	2.00	-
Tension load for minimum compressive strength			≥ 20 N/mm <sup>2</sup>	N <sub>Rk</sub>	[kN]	3.00	-
			≥ 10 N/mm <sup>2</sup>	V <sub>Rk</sub>	[kN] 2.00		-
Shear load for minimum cor	npressive strength		≥ 20 N/mm <sup>2</sup>	V <sub>Rk</sub>	[kN]	3.00	-
		DESIGN RE	SITANCE				
Toncion load for minimum o	omercecius strongth		≥ 10 N/mm <sup>2</sup>	N <sub>Rd</sub>	[kN]	0.80	-
Tension load for minimum o	ompressive strength		≥ 20 N/mm <sup>2</sup>	N <sub>Rd</sub>	[kN]	1.20	-
Chear load for minimum cor	maraasiya strongth		≥ 10 N/mm <sup>2</sup>	V <sub>Rd</sub>	[kN]	0.80	-
Shear load for minimum cor	npressive strength		≥ 20 N/mm <sup>2</sup>	V <sub>Rd</sub>	[kN]	1.20	-
		RECOMENDED	RESISTANCE				
<b>T</b>			≥ 10 N/mm <sup>2</sup>	N <sub>rec</sub>	[kN]	0.60	-
Tension load for minimum c	compressive strength		≥ 20 N/mm <sup>2</sup>	N <sub>rec</sub>	[kN]	0.90	-
			≥ 10 N/mm <sup>2</sup>	V <sub>rec</sub>	[kN]	0.60	-
Shear load for minimum cor	npressive strength		≥ 20 N/mm <sup>2</sup>	V <sub>rec</sub>	[kN]	100 1   200 1   2.00 1   2.00 1   3.00 1   0.80 1   1.20 0   0.80 1   0.60 0   0.90 1	-
<sup>!)</sup> Not part of the European Ter	haical Accordment						

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

CLAY HOLLOW BRICK						MQL 10	MQL 8 <sup>2)</sup>
Effective anchorage depth				h <sub>ef</sub>	[mm]	70	70
		Brick dimension	s [mm]		300x2	240x240	
	- and the second second	Bulk density		≥P	[kg/dm <sup>3</sup> ]	1.	20
Clay brick Hlz 12/1.2	ALLER AND A	Minimum memb	per thickness	h <sub>min</sub>	[mm]	70     .0x240     1     240     100     200     400     1.20     2.00     1.20     2.00     0.50     0.80     0.50     0.80     0.50     0.80     0.40     0.40	240
		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
	Cł	HARACTERISTIC R	ESISTANCE				
Tension load for minimum	comprossive strongth		≥12 N/mm <sup>2</sup>	N <sub>Rk</sub>	[kN]	1.20	-
	compressive strength		≥ 20 N/mm <sup>2</sup>	N <sub>Rk</sub>	[kN]	2.00	-
Shear load for minimum co	maraasiya strongth <sup>3)</sup>		≥12 N/mm <sup>2</sup>	V <sub>Rk</sub>	[kN]	1.20	-
Shear load for minimum co	mpressive strength '		≥ 20 N/mm <sup>2</sup>	V <sub>Rk</sub>	[kN]	2.00	-
		DESIGN RESIT	ANCE				
Tension load for minimum	comprossive strongth		≥12 N/mm <sup>2</sup>	N <sub>Rd</sub>	[kN]	0.50	-
	compressive strength		≥ 20 N/mm <sup>2</sup>	N <sub>Rd</sub>	[kN]	0.80	-
Shear load for minimum co			≥12 N/mm <sup>2</sup>	V <sub>Rd</sub>	[kN]	0.50	-
Shear load for minimum co	mpressive strength '		≥ 20 N/mm <sup>2</sup>	V <sub>Rd</sub>	[kN]	0.80	-
	F	RECOMENDED RE	SISTANCE				
Tonsion load for minimum	anna ann an ann ann ann ann ann ann ann		≥12 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]	0.60	-
	3)		≥ 12 N/mm <sup>2</sup>	V <sub>rec</sub>	[kN]	0.40	-
Shear load for minimum co	mpressive strength <sup>37</sup>		≥ 20 N/mm <sup>2</sup>	V <sub>rec</sub>	[kN]	0.60	-

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

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

Mungo Befestigungstechnik AG

Bornfeldstrasse 2 CH-4600 Olten · Switzerland Phone +41 62 206 75 75 Fax +41 62 206 75 85

mungo@mungo.swiss



CLAY HOLLOW BRICK					MQL 10	MQL 8 <sup>2)</sup>	
Effective anchorage depth			h <sub>ef</sub> [mm] 70 70				
Ital. perforated brick Mattone		Brick dimensions [mm]		300x2	40x195		
		Bulk density	≥ P	[kg/dm <sup>3</sup> ]	0.	84	
	- Children	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 of	compressive strength	≥ 10 N/mm <sup>2</sup>	N <sub>Rk</sub>	[kN]	0.90	0.90	
Shear load for minimum cor	mpressive strength <sup>3)</sup>	≥ 10 N/mm <sup>2</sup>	V <sub>Rk</sub>	[kN]	0.90	0.90	
		DESIGN RESISTANCE					
Tension load for minimum o	compressive strength	≥ 10 N/mm <sup>2</sup>	N <sub>Rd</sub>	[kN]	0.40	0.40	
Shear load for minimum cor	mpressive strength <sup>3)</sup>	≥ 10 N/mm <sup>2</sup>	V <sub>Rd</sub>	[kN]	0.40	0.40	
		RECOMENDED RESISTANCE					
Tension load for minimum o	compressive strength	≥ 10 N/mm <sup>2</sup>	Nrec	[kN]	0.30	0.30	
Shear load for minimum cor	mpressive strength <sup>3)</sup>	≥ 10 N/mm <sup>2</sup>	V <sub>rec</sub>	[kN]	0.30	0.30	
<sup>2)</sup> Not part of the European Te	chnical Assessment						

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

# 6.2 Calcium silicate masonry

CALCIUM SILICATE SOLID BI	RICK					MB 10	MQL 8 <sup>2)</sup>
Effective anchorage depth				h <sub>ef</sub>	[mm]	70	70
		Brick dimensi	ons [mm]		240x1	15x113	
Calcium silicate solid brick KSV 12/2.0		Bulk density		≥P	[kg/dm <sup>3</sup> ]	2.	00
		Minimum me	mber thickness	h <sub>min</sub>	[mm]	115	115
		Minimum edg	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
CHARACTERISTIC RESISTANCE							
Tension load for minimum c	omprossive strongth		≥ 10 N/mm <sup>2</sup>	N <sub>Rk</sub>	[kN]	1.50	-
	ompressive strength		≥ 20 N/mm <sup>2</sup>	N <sub>Rk</sub>	[kN]	2.50	-
Shear load for minimum con	aproceivo etropath		≥ 10 N/mm <sup>2</sup>	V <sub>Rk</sub>	[kN]	1.50	-
	ipressive strengtri		≥ 20 N/mm <sup>2</sup>	V <sub>Rk</sub>	[kN]	2.50	-
		DESIGN RE	SITANCE				
Tension load for minimum c	omproceivo etronath		≥ 10 N/mm <sup>2</sup>	N <sub>Rd</sub>	[kN]	0.60	-
	ompressive strength		≥ 20 N/mm <sup>2</sup>	N <sub>Rd</sub>	[kN]	1.00	-
Shear load for minimum con	aprossivo strongth		≥ 10 N/mm <sup>2</sup>	V <sub>Rd</sub>	[kN]	0.60	-
	ipressive strength		≥ 20 N/mm <sup>2</sup>	V <sub>Rd</sub>	[kN]	1.00	-
	F	RECOMENDED	RESISTANCE				
Tansian load for minimum a			≥ 10 N/mm <sup>2</sup>	N <sub>rec</sub>	[kN]	( <b>N</b> ] 0.40	
Tension load for minimum c	ompressive strength		≥ 20 N/mm <sup>2</sup>	N <sub>rec</sub>	[kN]	0.70	-
Channel and fam wining and			≥ 10 N/mm <sup>2</sup>	V <sub>rec</sub>	[kN]		
Shear load for minimum con	npressive strength		≥ 20 N/mm <sup>2</sup>	V <sub>rec</sub>	[kN]	0.70	-

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

Mungo Befestigungstechnik AG Bornfeldstrasse 2 CH-4600 Olten · Switzerland Phone +41 62 206 75 75 Fax +41 62 206 75 85

mungo@mungo.swiss



CALCIUM SILICATE HOLLO	W BRICK					MQL 10	MQL 8 <sup>2)</sup>
Effective anchorage depth				h <sub>ef</sub>	[mm]	70	70
		Brick dimen	sions [mm]		300x2	40x115	
		Bulk density	1	≥P	[kg/dm <sup>3</sup> ]	1.4	40
Calcium silicate KSL		Minimum m	ember thickness	h <sub>min</sub>	[mm]	240	240
12/1.4		Minimum eo	dge distance	C <sub>min</sub>	[mm]	100	100
		Min. spacing	g (Vertical to edge)	S <sub>1,min</sub>	[mm]	200	200
		Min. spacing	g (Parallel to edge)	S <sub>2,min</sub>	[mm]	400	400
	C	HARACTERIST	IC RESISTANCE				
Tension load for minimum	comprossive strongth		≥8 N/mm <sup>2</sup>	N <sub>Rk</sub>	[kN]	1.20	1.20
	compressive strength		≥ 12 N/mm <sup>2</sup>	N <sub>Rk</sub>	[kN]	2.00	2.00
Shear load for minimum co	marcacius strongth <sup>3)</sup>		≥8 N/mm <sup>2</sup>	V <sub>Rk</sub>	[kN]	1.20	1.20
Shear load for minimum co	mpressive strength		≥ 12 N/mm <sup>2</sup>	V <sub>Rk</sub>	[kN]	2.00	2.00
		DESIGN RE	SISTANCE				
Tension load for minimum	comprossive strongth		≥8 N/mm <sup>2</sup>	N <sub>Rd</sub>	[kN]	0.50	0.50
	compressive strength		≥ 12 N/mm <sup>2</sup>	N <sub>Rd</sub>	[kN]	0.80	0.80
Shear load for minimum co	marcocius strongth <sup>3)</sup>		≥8 N/mm <sup>2</sup>	V <sub>Rd</sub>	[kN]	0.50	0.50
Shear load for minimum co	mpressive strength		≥ 12 N/mm <sup>2</sup>	V <sub>Rd</sub>	[kN]	0.80	0.80
		RECOMENDE	D RESISTANCE				
Tension load for minimum	comprossivo strongth		≥ 10 N/mm <sup>2</sup>	N <sub>rec</sub>	[kN]	0.40	0.40
	compressive su eligui		≥ 12 N/mm <sup>2</sup>	N <sub>rec</sub>	[kN]	0.60	0.60
Shear load for minimum co	more strength $3^{3}$		≥ 10 N/mm <sup>2</sup>	V <sub>rec</sub>	[kN]	0.40	0.40
Shear load for minimum co	inpressive strength '		≥ 12 N/mm <sup>2</sup>	V <sub>rec</sub>	[kN]	0.60	0.60

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

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

# 6.3 Autoclaved aerated concrete (AAC)

AUTOCLAVED AERATED CC	MQL 10 <sup>2)</sup>	MQL 8 <sup>2)</sup>						
Effective anchorage depth			h <sub>ef</sub>	[mm]	70 70			
Autoclaved aerated concrete (EN 771-4:2011)		Brick dimensions [mm]		250x1	50x240			
		Bulk density	≥ P	[kg/dm <sup>3</sup> ]	0.!	55		
	9	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		
	C	HARACTERISTIC RESISTANCE						
Tension load for minimum o	compressive strength	≥5.2 N/mm <sup>2</sup>	N <sub>Rk</sub>	[kN]	1.40	1.20		
Shear load for minimum co	mpressive strength	≥5.2 N/mm <sup>2</sup>	V <sub>Rk</sub>	[kN]	1.40 1.2			
		DESIGN RESISTANCE						
Tension load for minimum o	compressive strength	≥ 5.2 N/mm <sup>2</sup>	N <sub>Rd</sub>	[kN]	0.70	0.60		
Shear load for minimum co	mpressive strength	≥ 5.2 N/mm <sup>2</sup>	V <sub>Rd</sub>	[kN]	0.70 0.6			
		RECOMENDED RESISTANCE						
Tension load for minimum o	compressive strength	≥5.2 N/mm <sup>2</sup>	N <sub>rec</sub>	[kN]	0.50	0.40		
Shear load for minimum co	mpressive strength	≥ 5.2 N/mm <sup>2</sup>	V <sub>rec</sub>	[kN]	0.50	0.40		
Not part of the European Te	chnical Assessment							

<sup>1</sup> 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  $\geq$  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.

Mungo Befestigungstechnik AG Bornfeldstrasse 2 CH-4600 Olten · Switzerland Phone +41 62 206 75 75 Fax +41 62 206 75 85