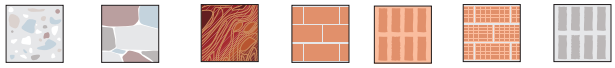
PRO V PLUS

Polyester styrene free chemical anchor with European Technical Approval. Injection anchor for use in masonry and non-cracked concrete

PRO V PLUS 410 ml

Suitable
- concrete
- natural stone
- wood
- solid brick
- marble
- hollow brick
- solid brick
- perforated cement

To fix
- non-structural fixings
- light metal structures
- light structural works
- solar panels
- scaffolding links
- floor reinforcement
- construction joints
- railings



approvals

ETAG 029
For masonry & hollow brick
Use category c, w/d Size M10
Steel elements according to Table 2
Annex 5 of ETA-11/0511

ETAG 001-05 option 7
M8-M16 non cracked concrete

VOC CLASSIFICATION A+

ISTITUTO GIORDANO

Test report nr. 276986
del 14/12/2010 on wood substrates

Turbo Mixer®

SOCOTEC
Technical Report
CAZ 0834/2

WYRÓB BUDOWLANY
0978/W

Thixotropic

STYRENE FREE

PRO V PLUS

Polyester styrene free chemical anchor with European Technical Approval. Injection anchor for use in masonry and non-cracked concrete

product information

Characteristics
- Rapid curing, two part chemical anchoring system based on unsaturated polyester resin in styrene free monomers. Applied in one single action, this resin will produce a cost effective, strong, chemical resistant fixing.

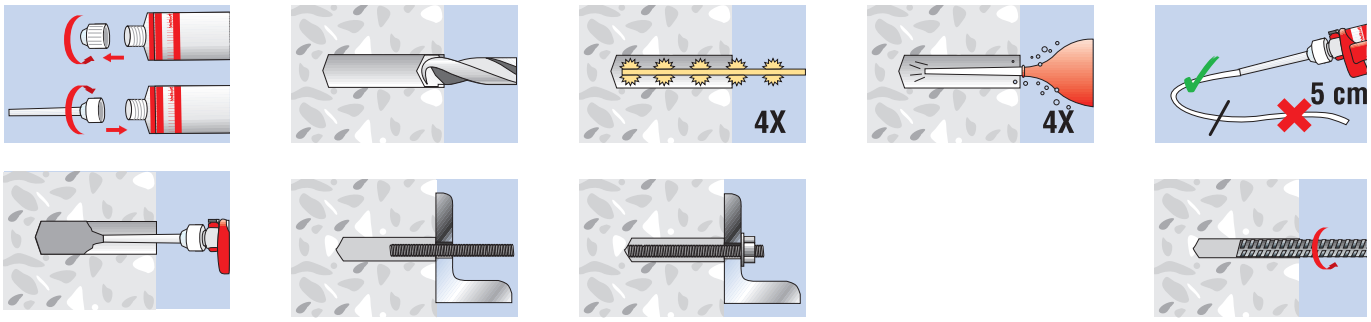
Benefits
- ETA Approval as an injection anchor for use in masonry and non-cracked concrete
- Styrene free. Low odour, ideal for indoor usage. A+rating
- Chemical corrosion resistant
- Suitable for close edge applications, no tension on base material
- High performance
- No leakage

Characteristics
- Non-flammable and non-hazardous
- Cartridge can be used to the end of the expiry date by replacing the static mixer or releasing cartridge with the sealing cap
- For applications on hollow materials, use the appropriate perforated sleeves.

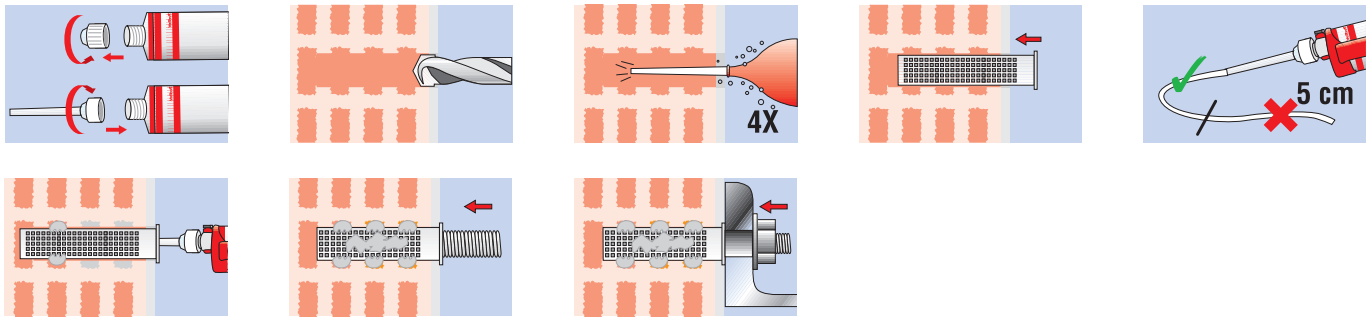
Useage
- Performance based on clean holes. hammer drilled – blown and then brushed with a stiff metal brush and blown again.

installation sequence

Concrete



Hollow brick



Description	Contents	Dispenser
PRO V PLUS	410 ml	co-axial

technical data

Minimum Curing Time

Concrete Temperature	Gel-working Time	Minimum curing time in dry concrete	Minimum curing time in wet concrete
-10°C *	40 min	240 min	x2
-5°C *	40 min	240 min	x2
5°C	15 min	120 min	x2
15°C	8 min	60 min	x2
25°C	5 min	45 min	x2
35°C	3 min	30 min	x2

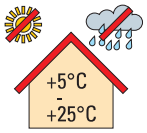
* Resin temperature must be at least 20°C
- Full cure 24 hours
- All specifications based on supplied mixer

Temperature Ranges

Temperature Range	Concrete Service Temperature	Maximum Long Term Concrete Temp	Maximum Short Term Concrete Temp
Range I	-40°C to +40°C	+24°C	+40°C
Range II	-40°C to +60°C	+43°C	+60°C

Service temperature range: Range of ambient temperatures after installation and during the lifetime of the anchor.
Short term temperature: Temperature within the service temperature range which vary over short intervals, e.g. day/night cycles and freeze/thaw cycles.
Long term temperature: Temperature within the service temperature range, which will be approximately constant over significant periods of time.

Physical Properties	N/mm2 (MPa)	Test Method
Compressive Strength	43,5	EN ISO 604 / ASTM 695
Flexural Strength	15,9	EN ISO 178 / ASTM 790
Flexural Modulus	2803,0	EN ISO 178 / ASTM 790
Tensile Strength	9,3	EN ISO 527 / ASTM 638
E Modulus	4874,5	EN ISO 527 / ASTM 638
VOC Content	A+	-



Loads, Edge and Spacings based on Characteristic bond strengths - Showing steel failure with 5.8 grade steel studding

	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic distances (mm)			Min Edge and Spacing	Nominal Embedment	Hole diameter concrete	Hole diameter fixture	Max Torque
Ø mm	Tension (N_{rk})	Shear (V_{rk})	Tension (N_{rd})	Shear (V_{rd})	Tension (N_{rec})	Shear (V_{rec})	Edge ($N_{cr,N}$)	Spacing ($S_{cr,N}$)	Edge ($C_{cr,V}$)	(mm) (C_{min} S_{min})	(mm)	(mm)	(mm)	(Nm)
	15,71		7,27		5,20						60			
8	19,00	9,00	12,70	7,20	9,07	5,14	80	160	80	40	80	10	9	10
	19,00		12,70		9,07						160			
	17,53		8,12		5,80						60			
10	26,30	15,00	12,17	12,00	8,70	8,57	100	200	90	50	90	12	12	20
	30,20		20,10		14,36						200			
	23,09		10,69		7,64						70			
12	36,29	21,00	16,80	16,80	12,00	12,00	120	240	110	60	110	14	14	40
	43,80		29,20		20,86						240			
	33,38		15,45		11,04						80			
16	52,15	39,00	24,14	31,20	17,25	22,29	160	320	125	80	125	18	18	80
	81,60		54,40		38,86						320			
	43,60		20,18		14,42						90			
20	82,35	61,00	38,13	48,80	27,23	34,86	200	400	180	100	170	24	22	120
	127,40		84,90		60,64						400			
	49,01		22,69		16,21						100			
24	102,92	88,00	47,65	70,40	34,03	50,29	225	450	220	120	210	28	26	160
	183,60		122,40		87,43						480			
	61,07		28,27		20,20						110			
30	142,50	142,50	65,97	114,00	47,12	81,43	260	520	280	150	280	35	32	200
	280,00		186,67		133,34						600			

All data is based on correct installation - see instructions
No influence of edge and spacing
Minimum base material thickness hef +30mm >100mm for M8 to M12 and for M16 to M30 hef +2 d
Temperature range i maximum long term / short term temperature +24/40°C

= Steel

technical data

Design resistance of resin with various stud strengths and rebar

5.8 grade steel studding

Ø Stud diameter (mm)	Ø Hole diameter (mm)												hef failure (mm)	Fds design load (mm)
8	10	4,8	6,1	7,3	9,7	12,1	12,7						105	12,7
10	12	5,4	6,8	8,1	10,8	13,5	16,9	20,1					148	20,1
12	14		7,7	9,3	12,4	15,46	19,3	24,7	29,2				189	29,2
16	20				15,4	19,3	24,1	30,89	38,6	46,3	54,4		282	54,4
depth mm		40	50	60	80	100	125	160	200	240	280	320		
20	24	17,9	22,4	26,9	33,7	40,4	47,1	53,84	67,3	78,5	84,9		379	84,93
24	28		22,6	27,1	33,9	40,7	47,5	54,3	67,9	79,2	90,5	108,6	541	122,4
30	35			28,3	35,3	42,4	49,5	56,6	70,7	82,5	94,3	113,1	141,4	825	194,5
depth mm		80	100	120	150	180	210	240	300	350	400	480	600		

8.8 grade steel studding

Ø Stud diameter (mm)	Ø Hole diameter (mm)												hef failure (mm)	Fds design load (mm)
8	10	4,8	6,1	7,3	9,7	12,1	15,1	19,5					161	19,5
10	12	5,4	6,8	8,1	10,8	13,5	16,9	21,67	27,1				228	30,9
12	14		7,7	9,3	12,4	15,5	19,3	24,7	30,92	37,1			291	45,0
16	20				15,4	19,3	24,1	30,9	38,6	46,3	54,1	61,8	434	83,7
depth mm		40	50	60	80	100	125	160	200	240	280	320		
20	24	17,9	22,4	26,9	33,7	40,4	47,1	53,8	67,3	78,5	89,7		582	130,7
24	28		22,6	27,1	33,9	40,7	47,5	54,3	67,9	79,2	90,5	108,6	832	188,3
30	35			28,3	35,3	42,4	49,5	56,6	70,7	82,5	94,3	113,1	141,4	1270	299,2
depth mm		80	100	120	150	180	210	240	300	350	400	480	600		

10.9 grade steel studding

Ø Stud diameter (mm)	Ø Hole diameter (mm)												hef failure (mm)	Fds design load (mm)
8	10	4,8	6,1	7,3	9,7	12,1	15,1	19,4					224	27,2
10	12	5,4	6,8	8,1	10,8	13,5	16,9	21,7	27,1				318	43,1
12	14		7,7	9,3	12,4	15,5	19,3	24,7	30,9	37,1			405	62,6
16	20				15,4	19,3	24,1	30,9	38,6	46,3	54,1	61,8	604	116,6
depth mm		40	50	60	80	100	125	160	200	240	280	320		
20	24	17,9	22,4	26,9	33,7	40,4	47,1	53,8	67,3	78,5	89,7		811	182,0
24	28		22,6	27,1	33,9	40,7	47,5	54,3	67,9	79,2	90,5	108,6	1159	262,2
30	35			28,3	35,3	42,4	49,5	56,6	70,7	82,5	94,3	113,1	141,4	1768	416,7
depth mm		80	100	120	150	180	210	240	300	350	400	480	600		

A4-70 grade steel studding

Ø Stud diameter (mm)	Ø Hole diameter (mm)												hef failure (mm)	Fds design load (mm)
8	10	4,8	6,1	7,3	9,7	12,1	13,7						113	13,7
10	12	5,4	6,8	8,1	10,8	13,5	16,9	21,7					160	21,7
12	14		7,7	9,3	12,4	15,5	19,3	24,7	30,9	31,6			204	31,6
16	20				15,4	19,3	24,1	30,9	38,6	46,3	54,1	58,8	304	58,8
depth mm		40	50	60	80	100	125	160	200	240	280	320		
20	24	17,9	22,4	26,9	33,7	40,4	47,1	53,8	67,3	78,5	89,7		409	91,7
24	28		22,6	27,1	33,9	40,7	47,5	54,3	67,9	79,2	90,5	108,6	584	132,1
30	35			28,3	35,3	42,4	49,5	56,6	70,7	82,48	94,3	113,1	141,4	637	150,0 *1
depth mm		80	100	120	150	180	210	240	300	350	400	480	600		

*1 = tensile strength 500N/mm2

technical data

Characteristic and Design Load resistances based on characteristic bond strengths for hef 4d (minimum embedment) to 20d - threaded rod

	Non Cracked Concrete						Cracked Concrete						
	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Nominal Embedment
Ø mm	Tension (N_{rk})	Shear (V_{rk})	Tension (N_{rd})	Shear (V_{rd})	Tension (N_{rec})	Shear (V_{rec})	Tension (N_{rk})	Shear (V_{rk})	Tension (N_{rd})	Shear (V_{rd})	Tension (N_{rec})	Shear (V_{rec})	(mm)
8	15,71	9,00	7,27	7,20	5,20	5,14	Not applicable		Not applicable		Not applicable		60
	20,95		9,70		6,93								80
	41,90		19,40		13,86								160
10	17,53	15,00	8,12	12,00	5,80	8,57	Not applicable		Not applicable		Not applicable		60
	26,30		12,17		8,70								90
	58,43		27,05		19,32								200
12	23,09	21,00	10,69	16,80	7,64	12,00	Not applicable		Not applicable		Not applicable		70
	36,29		16,80		12,00								110
	79,17		36,65		26,18								240
16	33,38	39,00	15,45	31,20	11,04	22,29	Not applicable		Not applicable		Not applicable		80
	52,15		24,14		17,25								125
	133,51		61,81		44,15								320
20	43,60	61,00	20,18	48,80	14,42	34,86	Not applicable		Not applicable		Not applicable		90
	82,35		38,13		27,23								170
	193,77		89,71		64,08								400
24	49,01	88,00	22,69	70,40	16,21	50,29	Not applicable		Not applicable		Not applicable		100
	102,92		47,65		34,03								210
	235,24		108,91		77,79								480
30	61,07	142,50	28,27	114,00	20,20	81,43	Not applicable		Not applicable		Not applicable		120
	142,50		65,97		47,12								280
	305,36		141,37		100,98								600

All data is based on correct installation - see instructions. No influence of edge and spacing.
Minimumbasematerialthicknesshef+30mm>100mmforM8toM12andforM16toM30hef+2d.Temperaturerangeimaximumlongterm/shorttermtemperature+24/40°C

technical data

Characteristic and Design Load resistances for REBAR based on characteristic bond strengths for hef 4d (minimum embedment) to 20d

	Non Cracked Concrete						Cracked Concrete						
	Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Characteristic Resistance (kN)		Design Resistance (kN)		Recommended Load (kN)		Nominal Embedment
Ø mm	Tension (N_{rk})	Shear (V_{rk})	Tension (N_{rd})	Shear (V_{rd})	Tension (N_{rec})	Shear (V_{rec})	Tension (N_{rk})	Shear (V_{rk})	Tension (N_{rd})	Shear (V_{rd})	Tension (N_{rec})	Shear (V_{rec})	(mm)
8	13,30	11,63	6,33	9,30	4,52	6,64	Not applicable		Not applicable		Not applicable		60
	17,73		8,44		6,03								80
	35,47		16,89		12,06								160
10	15,91	18,38	7,58	14,70	5,41	10,50	Not applicable		Not applicable		Not applicable		60
	23,86		11,36		8,12								90
	53,03		25,25		18,04								200
12	19,84	25,88	9,45	20,70	6,75	14,79	Not applicable		Not applicable		Not applicable		70
	31,18		14,85		10,61								110
	68,04		32,40		23,14								240
16	27,87	45,88	13,27	36,70	9,48	26,22	Not applicable		Not applicable		Not applicable		80
	43,54		20,73		14,81								125
	111,47		53,08		37,91								320
20	32,23	71,63	15,35	57,30	10,96	40,93	Not applicable		Not applicable		Not applicable		90
	60,88		28,99		20,71								170
	143,26		68,22		48,73								400
25	38,80	112,50	18,48	90,00	13,20	64,29	Not applicable		Not applicable		Not applicable		100
	81,48		38,80		27,71								210
	193,99		92,38		65,98								500
28	46,30	140,88	22,05	112,70	15,75	80,50	Not applicable		Not applicable		Not applicable		112
	115,76		55,12		39,37								280
	231,52		110,25		78,75								560
32	54,05	184,13	25,74	147,30	18,38	105,22	Not applicable		Not applicable		Not applicable		128
	135,11		64,34		45,96								320
	270,23		128,68		91,91								640

Alldataisbasedoncorrectinstallation-seeinstructions.Noinfluenceofedgeandspacing.Minimumbasematerialthicknesshef+30mm>100mmforM8toM12andfor M16 to M30 hef +2 d. Temperature range i maximum long term / short term temperature +24/40°C

Bond Strength Factors - Threaded rod

Influence of concrete strength on combined pull out and concrete cone resistance

Concrete Strength N/mm2 (Mpa)	C15/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
non cracked fc=	0.97	1.00	1.02	1.04	1.07	1.10	1.12	1.15

Influence of environmental conditions in non cracked concrete

		M8	M10	M12	M16	M20	M24	M30
Temp I 40°C/24°C	Dry and Wet	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Temp II 80°C/50°C	Dry and Wet	0.90	0.88	0.87	0.86	0.85	0.84	0.82

Bond Strength Factors - rebar

Influence of concrete strength on combined pull out and concrete cone resistance

Concrete Strength N/mm2 (Mpa)	C15/20	C20/25	C25/30	C30/37	C35/45	C40/50	C45/55	C50/60
non cracked fc=	0.97	1.00	1.02	1.04	1.07	1.10	1.12	1.15

Influence of environmental conditions in non cracked concrete

		Ø 8	Ø 10	Ø 12	Ø 16	Ø 20	Ø 25	Ø 28	Ø 32
Temp I 40°C/24°C	Dry and Wet	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Temp II 80°C/50°C	Dry and Wet	0.90	0.90	0.88	0.88	0.86	0.86	0.84	0.84

technical data

Effect of anchor spacing - Tension

Anchor spacing	Stud/Rebar diameter						
(mm)	8	10	12	16	20	24	30
40	0,64						
50	0,67	0,63					
60	0,70	0,65	0,63				
70	0,73	0,67	0,64				
80	0,76	0,69	0,66	0,63			
90	0,79	0,72	0,68	0,64			
100	0,82	0,74	0,70	0,65	0,63		
120	0,87	0,79	0,74	0,68	0,65	0,63	
150	0,96	0,86	0,80	0,73	0,68	0,65	0,63
160	1,00	0,88	0,82	0,74	0,70	0,66	0,64
175		0,92	0,85	0,76	0,71	0,68	0,65
200		1,00	0,90	0,80	0,74	0,71	0,68
225			0,95	0,84	0,77	0,74	0,70
240			1,00	0,86	0,79	0,76	0,72
250				0,87	0,80	0,77	0,73
275				0,91	0,83	0,80	0,75
280				0,92	0,84	0,80	0,76
300				0,95	0,86	0,82	0,78
320				1,00	0,88	0,85	0,80
350					0,92	0,88	0,83
400					1,00	0,94	0,88
425						0,97	0,90
450						1,00	0,93
480							0,96
520							1,00

Effect of edge distance - Tension

Edge distance	Stud/Rebar diameter						
(mm)	8	10	12	16	20	24	30
40	0,64						
50	0,73	0,63					
60	0,82	0,70	0,63				
70	0,90	0,77	0,68				
80	1,00	0,84	0,74	0,63			
90		0,91	0,80	0,67			
100		1,00	0,86	0,71	0,63		
110			0,92	0,76	0,66		
120			1,00	0,80	0,70	0,64	
140				0,89	0,77	0,68	0,63
160				1,00	0,84	0,76	0,66
180					0,91	0,84	0,72
200					1,00	0,92	0,78
225						1,00	0,86
250							0,94
260							1,00

Effect of edge distance - Shear

Edge distance	Stud/Rebar diameter						
(mm)	8	10	12	16	20	24	30
40	0,25						
50	0,44	0,30					
60	0,63	0,48	0,30				
70	0,81	0,65	0,44				
80	1,00	0,83	0,58	0,40			
90		1,00	0,72	0,53			
100			0,86	0,67	0,35		
110			1,00	0,80	0,44		
125				1,00	0,58	0,35	
140					0,72	0,45	0,30
160					0,91	0,58	0,36
180					1,00	0,71	0,47
200						0,84	0,59
225						1,00	0,74
250							0,88
280							1,00

technical data for wood application

Recommended load for applications on glued lamellar wood in conformity with UNI EN 1194

Characteristics of glued lamellar wood UNI EN 1194

Strenght	N/mm2	GL24
Flexion	$f_{m,k}$	24
Parallel Tensile Strength	$f_{t,0,k}$	16,5
Perpendicular Tensile Strength	$f_{t,90,k}$	0,4
Parallel Compressive Strength	$f_{c,0,k}$	24
Perpendicular Compressive Strength	$f_{c,90,k}$	2,7
Shear Strength	$f_{v,k}$	2,7
Average Modulus of Elasticity	$E_{o,mean}$	11.600
Average Modulus of Shear	G_{mean}	720
Volume	P_k	380

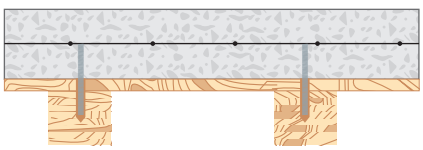
Technical data and recommended loads on glued lamellar wood type GL24h

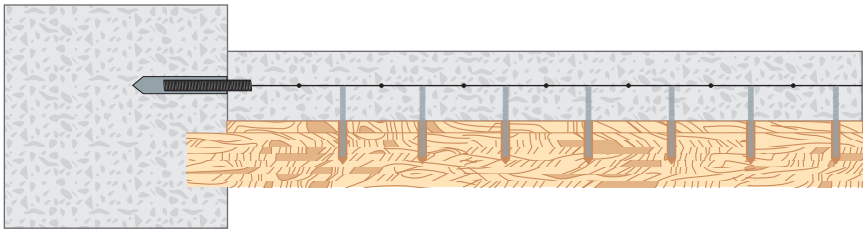
Stud size	Hole diameter (mm)	Hole depth (mm)	Permissible loads kN
		80	
M8	10	90	3,3
M10	12	100	4,5
M12	14		8,1

ISTITUTO GIORDANO

Test report nr. 276986
del 14/12/2010 on wood substrates

Examples of installation





technical data

SOCOTEC SPECIFICATION REPORT No. CAZ 0834/2 – Styrene Free Polyester Resin PRO V PLUS

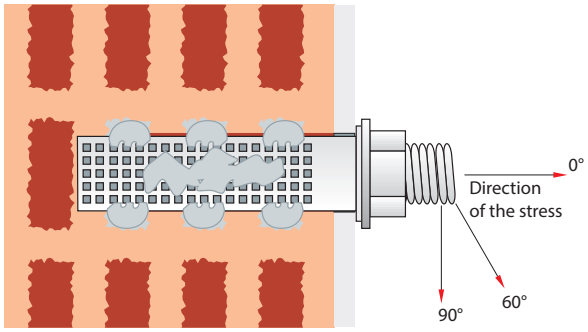
Bonded Anchor with threaded rods and internal threaded sockets into hollow masonry

1. DESIGN OF THE FIXINGS

1.1 RECOMMENDED LOADS

Recommended loads in tension and in shear have been calculated on the basis of the lowest ultimate loads. A safety coefficient of 4 in tension (direction of the stress from 0° to 60°) and in shear (direction of the stress from 60° to 90°) has been applied. All the tests were performed in an accredited laboratory.

Fixing type	Hollow concrete blocks from B40 type according to NF EN 771-3		Hollow brick from RC40 type according to NF EN 771-1	
	Recommended loads			
	Tension	Shear	Tension	Shear
M8 threaded rod	90 daN	160 daN	60 daN	150 daN
M10 threaded rod	90 daN	160 daN	60 daN	150 daN
M12 threaded rod	90 daN	160 daN	60 daN	150 daN
M8 internal threaded socket	70 daN	160 daN	60 daN	150 daN
M10 internal threaded socket	70 daN	160 daN	60 daN	150 daN
M12 internal threaded socket	70 daN	160 daN	60 daN	150 daN



1.2 EDGE DISTANCE AND SPACING

Recommended loads from table 1.1 can be applied only if edge distance and spacing between fixings are respected as follows:

- edge distance: 200 mm;
- spacing: 200 mm.

1.3 RESISTANCE TO CORROSION

For threaded rods, zinc coating of minimum 5 mm thickness is not sufficient to prevent corrosion in the long term. In general, special anti-corrosion treatment is needed for external or internal corrosive atmospheres.

A site supervisor or other representative is responsible for the suitability of the base material to support the load of the fixing and the criteria defined in this document. All instructions relative to the use of the product must be respected.

The manufacturer bears no responsibility when the intended use and the application of the product are not respected, particularly the minimum curing time or if the anchor is insufficiently designed.

2. APPLICATION OF THE PRODUCT

2.1 VOLUME OF RESIN TO BE INJECTED

Extruding tool	Sleeve 16 x 85	Sleeve 16 x 130	Sleeve 20 x 85
	Pressure shots		
380 ml	5	7	6
300 ml	6	9	7

2.1 VOLUME OF RESIN TO BE INJECTED

Temperature (C°)	Processing time (min)	Minimum loading time (min)
-5	50	90
0	35	60
5	21	30
10	17	25
15	13	20
20	10	20
25	8	20
30	5	20
35	3	20

Note: these values pertain to 6ml of resin

2.2 INSTALLATION DATA

Fixing	Sleeve	Drill diameter	Embedment depth	Effective anchoring length hef
	Concrete hollow block			
M8 threaded rod	16 x 130	16 mm	135 mm	130 mm
M10 threaded rod	16 x 130	16 mm	135 mm	130 mm
M12 threaded rod	20 x 85	20 mm	90 mm	85 mm
M8 internal threaded socket	16 x 85	16 mm	90 mm	85 mm
M10 internal threaded socket	20 x 85	20 mm	90 mm	85 mm
M12 internal threaded socket	20 x 85	20 mm	90 mm	85 mm
		Hollow brick		
M8 threaded rod	16 x 85	16 mm	90 mm	85 mm
M10 threaded rod	16 x 85	16 mm	90 mm	85 mm
M12 threaded rod	20 x 85	20 mm	90 mm	85 mm
M8 internal threaded socket	16 x 85	16 mm	90 mm	85 mm
M10 internal threaded socket	20 x 85	20 mm	90 mm	85 mm
M12 internal threaded socket	20 x 85	20 mm	90 mm	85 mm