G&B Fissaggi S.r.l. Italia

C.so Savona 22,1029 Villastellone (TO), Italia
tel. +39 011 9619433 - fax +39 011 9619382
www.gebfissaggi.com - info@gebfissaggi.com

G&B Fissaggi UK
G&B Fissaggi Vertretung Deutschland
G&B Fissaggi Ibérica
G&B Fissaggi Benelux
G&B Fissaggi France

TECHNICAL DATASHEET

MULTI ANCHOR GREEN PLUS styrene-free hybrid formulation chemical anchor

Certificates

ETA 16/0596 Certification for anchoring of threaded bars on non-cracked concrete (Option 7)
ETA 16/0595 Certification for anchoring on solid and hollow masonry, with threaded bar or internal threaded socket and plastic sleeve
Complies with LEED® requirements, IEQ Credit 4.1
Class A+ for emission of volatile organic compounds (VOCs) in living spaces

Base material

certified use	specific use	suitable use
non-cracked concrete solid masonry hollow masonry lightweight concrete hollow block concrete masonry unit	natural stone solid, perforated and hollow masonry	cellular concrete

Sizes

art.	content	mixer	gun
CC24	300 ml	1 M17	CP07, CP17
CC25	410 ml	1 M17	CP01, CP11, CP15, CP16
CC26	350 ml	1 M17	CP05

Intended use

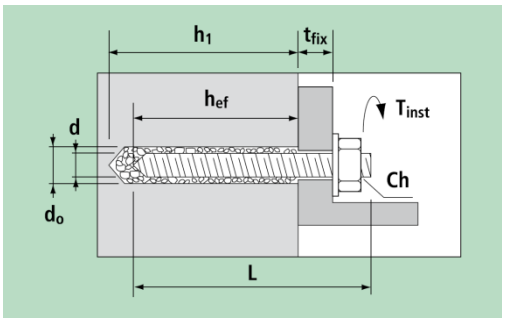
Dry or wet non-cracked concrete
Dry masonry, installation in dry or wet substrate
Installation temperature: between +5 and +30 °C
Work temperature: between -40 and +40 °C (maximum short term temperature +40 °C; long term +24 °C)
Shelf life: 18 months for 410 ml and 350 ml cartridges, 12 months for 300 ml cartridges (storage temperature between +5 and +25 °C)

Time and temperatures

temperature of base material	working time	full curing
-5 ÷ +4 °C *	20 min *	12 h *
+5 ÷ +9 °C	10 min	145 min
+10 ÷ +14 °C	8 min	85 min
+15 ÷ +19 °C	6 min	70 min
+20 ÷ +29 °C	4 min	50 min
+30 ÷ +34 °C	3 min	35 min
+35 ÷ 39 °C	3 min	20 min

* usage not covered by certification

Cartridge temperature must be between +5 and +20 °C

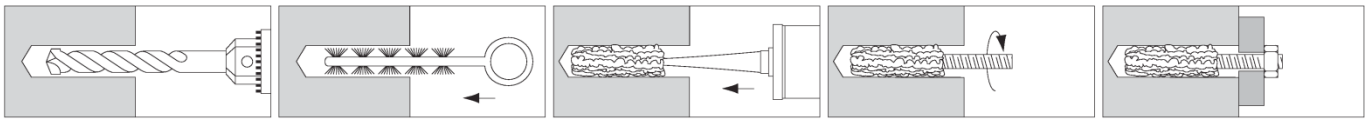


d = bar diameter
L = bar length
t_{fix} = fixable thickness
d_0 = hole diameter
h_1 = minimum hole depth
h_{nom} = setting depth
h_{ef} = effective anchorage depth
T_{inst} = tightening torque

use without sleeve: $h_{ef} = h_1 = h_{nom}$

- **Use on non-cracked concrete**

Installation



Setting parameters

bar size		M8	M10	M12	M16	M20	M24
hole diameter	d_0 mm	10	12	14	18	22	28
hole depth	$h_{ef.min}$ mm	64	80	96	128	160	192
	$h_{ef.max}$ mm	96	120	144	192	240	288
minimum spacing	s_{min} mm	50	60	70	95	120	145
minimum edge distance	c_{min} mm	50	60	70	95	120	145
min. base material thickness	h_{min} mm	h_{ef} + 30 ≥ 100				h_{ef} + $2d_0$	
tightening torque	T_{inst} Nm	10	20	40	80	150	200

Strength data

Valid for a single anchor far from the edges, on a thick concrete member of class C20/25 with sparse reinforcing.

Characteristic resistance (kN)

bar size		M8	M10	M12	M16	M20	M24
embedment depth	h_{ef} mm	**80**	**90**	**110**	**128**	**170**	**210**
tension	N_{Rk} kN	16.1	19.8	29.0	45.0	74.78	95.0
shear	V_{Rk} kN	9.2	14.5	21.1	39.3	61.3	88.3

Design resistance (kN)

bar size		M8	M10	M12	M16	M20	M24
embedment depth	h_{ef} mm	**80**	**90**	**110**	**128**	**170**	**210**
tension	N_{Rd} kN	10.7	13.2	19.4	30.0	49.8	63.3
shear	V_{Rd} kN	7.3	11.6	16.9	31.4	49.0	70.6

Recommended load (kN)

bar size		M8	M10	M12	M16	M20	M24
embedment depth	h_{ef} mm	**80**	**90**	**110**	**128**	**170**	**210**
tension	N_{rec} kN	7.7	9.4	13.8	21.4	35.6	45.2
shear	V_{rec} kN	5.2	8.3	12.0	22.4	35.0	50.4

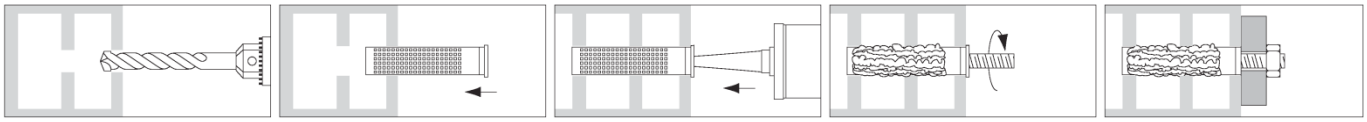
1 kN ≈ 100 kg
steel failure, class 5.8

Characteristic resistances N_{Rk} and V_{Rk} derive from parameters certified in European Technical Assessment ETA 16/0596. Design resistances N_{Rd} e V_{Rd} include partial safety factors on strengths. Recommended loads N_{rec} and V_{rec} include the further 1.4 safety factor.

For the design of fixing with reduced spacing, near the edge or on concrete with increased resistance, reduced thickness or dense reinforcement refer to ETA 16/0596 or to Declaration of Performance DPGEB1006 and use the design method outlined in EOTA's *Technical Report 029* or in CEN/TS 1992-4-5:2009. One can also calculate and verify the fixings made with MULTI ANCHOR Green Plus by means of *G&B Calculation Program* available on the website www.gebfissaggi.com.

- **Use on masonry**

Installation



Base material

		classification (acc. to EN 771-1)	L/W/H (mm)	min. density ρ (kg/dm³)	min. compr. strength f_b (N/mm²)
solid brick	clay brick	MZ 12-2,0-NF	240/116/71	2.0	12
	calcium silicate brick	KS 12-2,0-NF	240/115/70	2.0	12
hollow brick	hollow clay brick (c1)	HLZ 12-1,0-2DF	235/112/115	1.0	12
	hollow clay brick (c2)	HLZW 6-0,7-8DF	250/240/240	0.8	6
	hollow calcium silicate brick (c3)	KSL 12-1,4-3DF	240/175/113	1.4	12
	hollow calcium silicate brick (c4)	KSL 12-1,4-8DF	250/240/237	1.4	12
	lightweight concrete hollow block (c5)	HBL 2-0,45-10DF	250/300/248	0.45	2
	lightweight concrete hollow block (c6)	HBL 4-0,7-8DF	250/240/248	0.7	4
	concrete masonry unit (c7)	HBN 4-12DF	370/240/238	1.2	4

It is possible to use other bricks after job site tests conducted according to *Annex B* of ETAG 029

Setting parameters

Anchor rod in solid masonry without sleeve

bar size		M8	M10	M12
nominal diameter of drill bit	d_0 mm	15	15	20
effective anchorage depth	h_{ef} mm	85	85	85
diameter of clearance hole in the fixture	d_{fix} mm	9	12	14
depth of the drilling hole	h_1 mm	90	90	90
maximum installation torque	T_{inst} Nm	2	2	2

Anchor rod in solid and hollow or perforated masonry with sleeve

bar size		M8	M10	M12
sleeve		BR16x85	BR16x85	BR20x85
nominal diameter of drill bit	d_0 mm	16	16	20
effective anchorage depth	h_{ef} mm	85	85	85
installation depth of sleeve	h_{nom} mm	85	85	85
diameter of clearance hole in the fixture	d_{fix} mm	9	12	14
depth of the drilling hole	h_1 mm	90	90	90
maximum installation torque	T_{inst} Nm	2	2	2

Internal threaded socket in solid and hollow or perforated masonry with sleeve

bar size		M8	M10	M12
internal threaded socket		CBA08 - 12x80	CBA10 - 14x80	CBA12 - 16x80
sleeve		BR16x85	BR20x85	BR20x85
nominal diameter of drill bit	d_0 mm	16	20	20
effective anchorage depth	h_{ef} mm	80	80	80
installation depth of sleeve	h_{nom} mm	85	85	85
diameter of clearance hole in the fixture	d_{fix} mm	9	12	14
depth of the drilling hole	h_1 mm	90	90	90
maximum installation torque	T_{inst} Nm	2	2	2

Minimum and critical spacing and distances – anchor rod

bar size			M8	M10	M12
clay brick	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	255	255	255
	spacing perpendicular to horizontal joint	$s_{cr\perp} = s_{min\perp}$ mm	255	255	255
	edge distance	$c_{cr} = c_{min}$ mm	128	128	128
calcium silicate brick	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	255	255	255
	spacing perpendicular to horizontal joint	$s_{cr\perp} = s_{min\perp}$ mm	255	255	255
	edge distance	$c_{cr} = c_{min}$ mm	128	128	128
hollow clay brick (c1)	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	235	235	235
	spacing perpendicular to horizontal joint	$s_{cr\perp} = s_{min\perp}$ mm	115	115	115
	edge distance	$c_{cr} = c_{min}$ mm	100	100	120
hollow clay brick (c2)	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	250	250	250
	spacing perpendicular to horizontal joint	$s_{cr\perp} = s_{min\perp}$ mm	240	240	240
	edge distance	$c_{cr} = c_{min}$ mm	100	100	120
hollow calcium silicate brick (c3)	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	240	240	240
	spacing perpendicular to horizontal joint	$s_{cr\perp} = s_{min\perp}$ mm	113	113	113
	edge distance	$c_{cr} = c_{min}$ mm	100	100	120
hollow calcium silicate brick (c4)	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	250	250	250
	spacing perpendicular to horizontal joint	$s_{cr\perp} = s_{min\perp}$ mm	237	237	237
	edge distance	$c_{cr} = c_{min}$ mm	100	100	120
lightweight concrete hollow block (c5)	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	250	250	-
	spacing perpendicular to horizontal joint	$s_{cr\perp} = s_{min\perp}$ mm	248	248	-
	edge distance	$c_{cr} = c_{min}$ mm	100	100	-
lightweight concrete hollow block (c6)	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	250	250	250
	spacing perpendicular to horizontal joint	$s_{cr\perp} = s_{min\perp}$ mm	248	248	248
	edge distance	$c_{cr} = c_{min}$ mm	100	100	120
concrete masonry unit (c7)	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	370	370	370
	spacing perpendicular to horizontal joint	$s_{cr\perp} = s_{min\perp}$ mm	238	238	238
	edge distance	$c_{cr} = c_{min}$ mm	100	100	120

Minimum and critical spacing and distances – internal threaded socket

bar size			M8	M10	M12
clay brick	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	255	255	255
	spacing perpendicular to horizontal joint	$s_{cr\perp} = s_{min\perp}$ mm	255	255	255
	edge distance	$c_{cr} = c_{min}$ mm	128	128	128
calcium silicate brick	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	255	255	255
	spacing perpendicular to horizontal joint	$s_{cr\perp} = s_{min\perp}$ mm	255	255	255
	edge distance	$c_{cr} = c_{min}$ mm	128	128	128
hollow clay brick (c1)	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	235	235	235
	spacing perpendicular to horizontal joint	$s_{cr\perp} = s_{min\perp}$ mm	115	115	115
	edge distance	$c_{cr} = c_{min}$ mm	100	120	120
hollow clay brick (c2)	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	250	250	250
	spacing perpendicular to horizontal joint	$s_{cr\perp} = s_{min\perp}$ mm	240	240	240
	edge distance	$c_{cr} = c_{min}$ mm	100	120	120
hollow calcium silicate brick (c3)	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	240	240	240
	spacing perpendicular to horizontal joint	$s_{cr\perp} = s_{min\perp}$ mm	113	113	113
	edge distance	$c_{cr} = c_{min}$ mm	100	120	120

hollow calcium silicate brick (c4)	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	-	250	250
	spacing perpendicular to horizontal joint	$s_{cr\,\perp} = s_{min\,\perp}$ mm	-	237	237
	edge distance	$c_{cr} = c_{min}$ mm	-	120	120
lightweight concrete hollow block (c5)	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	250	250	250
	spacing perpendicular to horizontal joint	$s_{cr\,\perp} = s_{min\,\perp}$ mm	248	248	248
	edge distance	$c_{cr} = c_{min}$ mm	100	120	120
lightweight concrete hollow block (c6)	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	-	250	250
	spacing perpendicular to horizontal joint	$s_{cr\,\perp} = s_{min\,\perp}$ mm	-	248	248
	edge distance	$c_{cr} = c_{min}$ mm	-	120	120
concrete masonry unit (c7)	spacing parallel to horizontal joint	$s_{cr\,II} = s_{min\,II}$ mm	370	370	370
	spacing perpendicular to horizontal joint	$s_{cr\,\perp} = s_{min\,\perp}$ mm	238	238	238
	edge distance	$c_{cr} = c_{min}$ mm	100	120	120

Strength data

Valid for a single anchor far from the edges.

Characteristic resistance under tension and shear – anchor rod (kN)

bar size		**M8**	**M10**	**M12**
clay brick	$N_{Rk} = V_{Rk}$	1.5	1.5	3.0
calcium silicate brick	$N_{Rk} = V_{Rk}$	0.75	0.9	1.5
hollow clay brick (c1)	$N_{Rk} = V_{Rk}$	2.5	2.0	2.0
hollow clay brick (c2)	$N_{Rk} = V_{Rk}$	1.2	1.2	0.9
hollow calcium silicate brick (c3)	$N_{Rk} = V_{Rk}$	0.75	1.2	0.5
hollow calcium silicate brick (c4)	$N_{Rk} = V_{Rk}$	0.75	1.2	0.5
lightweight concrete hollow block (c5)	$N_{Rk} = V_{Rk}$	0.6	0.3	-
lightweight concrete hollow block (c6)	$N_{Rk} = V_{Rk}$	0.6	1.5	1.2
concrete masonry unit (c7)	$N_{Rk} = V_{Rk}$	2.5	1.5	2.5

Design resistance under tension and shear – anchor rod (kN)

bar size		**M8**	**M10**	**M12**
clay brick	$N_{Rd} = V_{Rd}$	0.60	0.60	1.20
calcium silicate brick	$N_{Rd} = V_{Rd}$	0.30	0.36	0.60
hollow clay brick (c1)	$N_{Rd} = V_{Rd}$	1.00	0.80	0.80
hollow clay brick (c2)	$N_{Rd} = V_{Rd}$	0.48	0.48	0.36
hollow calcium silicate brick (c3)	$N_{Rd} = V_{Rd}$	0.30	0.48	0.20
hollow calcium silicate brick (c4)	$N_{Rd} = V_{Rd}$	0.30	0.48	0.20
lightweight concrete hollow block (c5)	$N_{Rd} = V_{Rd}$	0.24	0.12	-
lightweight concrete hollow block (c6)	$N_{Rd} = V_{Rd}$	0.24	0.60	0.48
concrete masonry unit (c7)	$N_{Rd} = V_{Rd}$	1.00	0.60	1.00

Recommended load under tension and shear – anchor rod (kN)

bar size		**M8**	**M10**	**M12**
clay brick	$N_{rec} = V_{rec}$	0.43	0.43	0.86
calcium silicate brick	$N_{rec} = V_{rec}$	0.21	0.26	0.43
hollow clay brick (c1)	$N_{rec} = V_{rec}$	0.71	0.57	0.57
hollow clay brick (c2)	$N_{rec} = V_{rec}$	0.34	0.34	0.26
hollow calcium silicate brick (c3)	$N_{rec} = V_{rec}$	0.21	0.34	0.14
hollow calcium silicate brick (c4)	$N_{rec} = V_{rec}$	0.21	0.34	0.14
lightweight concrete hollow block (c5)	$N_{rec} = V_{rec}$	0.17	0.09	-
lightweight concrete hollow block (c6)	$N_{rec} = V_{rec}$	0.17	0.43	0.34
concrete masonry unit (c7)	$N_{rec} = V_{rec}$	0.71	0.43	0.71

1 kN ≈ 100 kg

Characteristic resistance under tension and shear – internal threaded socket (kN)

bar size		**M8**	**M10**	**M12**
clay brick	$N_{Rk} = V_{Rk}$	2.0	3.0	4.0
calcium silicate brick	$N_{Rk} = V_{Rk}$	2.0	1.5	0.9
hollow clay brick (c1)	$N_{Rk} = V_{Rk}$	1.5	2.5	2.5
hollow clay brick (c2)	$N_{Rk} = V_{Rk}$	0.9	1.5	0.6
hollow calcium silicate brick (c3)	$N_{Rk} = V_{Rk}$	0.6	0.75	0.9
hollow calcium silicate brick (c4)	$N_{Rk} = V_{Rk}$	-	0.75	0.4
lightweight concrete hollow block (c5)	$N_{Rk} = V_{Rk}$	0.5	0.3	0.75
lightweight concrete hollow block (c6)	$N_{Rk} = V_{Rk}$	-	0.4	0.6
concrete masonry unit (c7)	$N_{Rk} = V_{Rk}$	0.6	1.2	0.9

Design resistance under tension and shear – internal threaded socket (kN)

bar size		**M8**	**M10**	**M12**
clay brick	$N_{Rd} = V_{Rd}$	0.80	1.20	1.60
calcium silicate brick	$N_{Rd} = V_{Rd}$	0.80	0.60	0.36
hollow clay brick (c1)	$N_{Rd} = V_{Rd}$	0.60	1.00	1.00
hollow clay brick (c2)	$N_{Rd} = V_{Rd}$	0.36	0.60	0.24
hollow calcium silicate brick (c3)	$N_{Rd} = V_{Rd}$	0.24	0.30	0.36
hollow calcium silicate brick (c4)	$N_{Rd} = V_{Rd}$	-	0.30	0.16
lightweight concrete hollow block (c5)	$N_{Rd} = V_{Rd}$	0.20	0.12	-
lightweight concrete hollow block (c6)	$N_{Rd} = V_{Rd}$	-	0.16	0.24
concrete masonry unit (c7)	$N_{Rd} = V_{Rd}$	0.24	0.48	0.36

Recommended load under tension and shear – internal threaded socket (kN)

bar size		**M8**	**M10**	**M12**
clay brick	$N_{rec} = V_{rec}$	0.57	0.86	1.14
calcium silicate brick	$N_{rec} = V_{rec}$	0.57	0.43	0.26
hollow clay brick (c1)	$N_{rec} = V_{rec}$	0.43	0.71	0.71
hollow clay brick (c2)	$N_{rec} = V_{rec}$	0.26	0.43	0.17
hollow calcium silicate brick (c3)	$N_{rec} = V_{rec}$	0.17	0.21	0.26
hollow calcium silicate brick (c4)	$N_{rec} = V_{rec}$	-	0.21	0.11
lightweight concrete hollow block (c5)	$N_{rec} = V_{rec}$	0.14	0.09	-
lightweight concrete hollow block (c6)	$N_{rec} = V_{rec}$	-	0.11	0.17
concrete masonry unit (c7)	$N_{rec} = V_{rec}$	0.17	0.34	0.26

1 kN ≈ 100 kg

Characteristic resistances N_{Rk} and V_{Rk} derive from European Technical Assessment ETA 16/0595. Design resistances N_{Rd} e V_{Rd} include partial safety factor on strengths of 2.5. Recommended values N_{rec} e V_{rec} include the further 1.4 safety factor.

For the design of fixing with reduced spacing or near the edge, or groups of two or more fixings and for the resistance of a bar under shear with lever arm refer to ETA 16/0595 or to Declaration of Performance DPGEB1006 and use the design method A outlined in *Annex C* of ETAG 029 (issued by EOTA).