EC410+® injection mortar

VJ Technology

Technical Data Sheet

Description

EC410+® is an express cure epoxy acrylate injection mortar with approvals for concrete and masonry substrates. This product is used in conjunction with a hand, battery or pneumatic tool and static mixer nozzle.

EC410+® consists of 2 components, resin and hardener, which are stored in separate compartments in a coaxial catridge. These are mixed when extruded through the mixer nozzle and allow the mortar to set. Cartridges may be reused up to end of shelf life by replacing the static mixer nozzle or resealing the cap.

CCPI verified product information: Verification Number 002400004/1027

Usage/Purpose

EC410+® is suitable for anchoring of facades, roofs, timber construction, metal profiles, consoles, railings, sanitary devices, cable trays, piping, fixing to masonry and more.

Key Benefits

- ETA for non-cracked concrete, C20/25 to C50/60
- ETA for use in masonry applications
- Design according to EN 1992-4
- Suitable for dry and wet concrete including flooded holes
- Suitable for overhead application
- High chemical resistance
- Low odour
- Small allowable edge distance and anchor spacing
- Design check can be performed using free to download VJT DesignFiX software - alternatively contact technical@vjtechnology.com to model applications

Applications

EC410+® injection mortar is designed to be used in conjunction with the following:

- Threaded rods eg. VJT Chemical Anchor Studs, available in carbon steel (zinc/HDG) and stainless steel (A2/A4). High corrosion resistant anchor studs available on request

Handling & Storage

- Storage and transportation: store in a cool dry place from +5°C to +25°C. Keep out of direct sunlight
- Shelf life: 18 months for cartridges when stored as recommended in original, unopened condition

Certificates

ETA CE 2873		1343-CPR-M 532-3-CE	1343-CPR-M 532-4-CE
		ETA-12/0570	ETA-17/0378
		26	26
		EAD 330499-02-0601	EAD 330076-01-0604
BWR 1	Mechanical resistance and stability	Option 7 M8 - M24 for non-cracked concrete see DoP Annex C1 to C5 & B1	M8 - M16 for solid and hollow masonry see DoP Annex C1 to C40
BWR 2	Safety in case of fire	NPA	NPA
BWR 3	Hygiene, health and the environment	NPA	NPA

LEED tested

ÉMISSIONS DANS L'AIR INTÉRIEUR* A+ (A+ A B C)

CCPI ASSESSED PRODUCT INFORMATION 002400004/1027 VJT Resin Injection Mortar

Approvals & Certificates

Description	Authority / Laboratory	Guideline for Assessment	Number / Issue Date
ETA “Bonded injection type anchor for use in non-cracked concrete”	TZUS, Prague	EAD 330499-02-0601	ETA 12/0570: July 2025
ETA “Injection anchors for use in masonry”	TZUS, Prague	EAD 330076-01-0604	ETA 17/0378: July 2025
VOC Emissions test report	Eurofins	DEVL 1101903D, DEVL 1104875A	G17690R
Test report LEED	Eurofins	Leed 2009 EQ c4.1	G17689-14

Loads - Threaded Rod

Static/Quasi-static Loads

Data in this section is based on the following criteria:

- Design according to EN 1992-4
- EC410+® injection mortar with threaded rod (zinc plated steel grade 5.8/zinc plated steel grade 8.8/stainless steel A4-70)
- Correct anchor setting according to installation instructions
- Static and quasi-static loading
- Single anchor with edge distance, $c \geq 2.4 \times h_{ef}$ and spacing, $s \geq 3{,}0 \times h_{ef}$
- A single “typical” effective embedment depth as detailed in the table below
- Minimum thickness of base material as per typical effective embedment depth
- Temperature range I: -40°C to +40°C (max long term temperature +24°C and max short term temperature +40°C)
- Hammer drilled holes
- **Bold** figures denote steel failure

Note that for a full design with combinations of tensile/shear loads and where edge distance, spacing and member thickness are less than the values stated above, loads will be reduced. In this case the complete assessment ETA 12/0570 must be considered. Contact VJT Technical for further advice.

Embedment

Anchor size		M8	M10	M12	M16	M20	M24
Typical effective embedment depth[1], h_{ef}	[mm]	80	90	110	125	170	210
Min. base material thickness for typical effective embedment, h_{min}	[mm]	110	120	140	165	220	270

1) Full embedment depth range is shown in the Installation Parameters table (page 4)

Characteristic Resistance

Anchor size			M8	M10	M12	M16	M20	M24
Non-cracked normal concrete class C20/25								
Tension N_{Rk}	5.8	[kN]	17,1	22,6	33,2	50,3	85,5	126,7
	8.8	[kN]	17,1	22,6	33,2	50,3	85,5	126,7
	A4-70	[kN]	17,1	22,6	33,2	50,3	85,5	126,7
Shear V_{Rk}	5.8	[kN]	**11,0**	**17,0**	**25,0**	**47,0**	**74,0**	**106,0**
	8.8	[kN]	**15,0**	**23,0**	**34,0**	**63,0**	**98,0**	**141,0**
	A4-70	[kN]	**13,0**	**20,0**	**30,0**	**55,0**	**86,0**	**124,0**

Design Resistance

Anchor size			M8	M10	M12	M16	M20	M24
Non-cracked normal concrete class C20/25								
Tension N_{Rd}	5.8	[kN]	9,5	12,6	18,4	27,9	47,5	70,4
	8.8	[kN]	9,5	12,6	18,4	27,9	47,5	70,4
	A4-70	[kN]	9,5	12,6	18,4	27,9	47,5	70,4
Shear V_{Rd}	5.8	[kN]	8,8	13,6	20,0	37,6	59,2	84,8
	8.8	[kN]	12,0	18,4	27,2	50,4	78,4	112,8
	A4-70	[kN]	8,3	12,8	19,2	35,3	55,1	79,5

Recommended Load[1)]

Anchor size			M8	M10	M12	M16	M20	M24
Non-cracked normal concrete class C20/25								
Tension N_{Rec}	5.8	[kN]	6,8	9,0	13,2	19,9	33,9	50,3
	8.8	[kN]	6,8	9,0	13,2	19,9	33,9	50,3
	A4-70	[kN]	6,8	9,0	13,2	19,9	33,9	50,3
Shear V_{Rec}	5.8	[kN]	6,3	9,7	14,3	26,9	42,3	60,6
	8.8	[kN]	8,6	13,1	19,4	36,0	56,0	80,6
	A4-70	[kN]	6,0	9,2	13,7	25,2	39,4	56,8

1) Partial safety factor γ = 1.4 for load actions is considered

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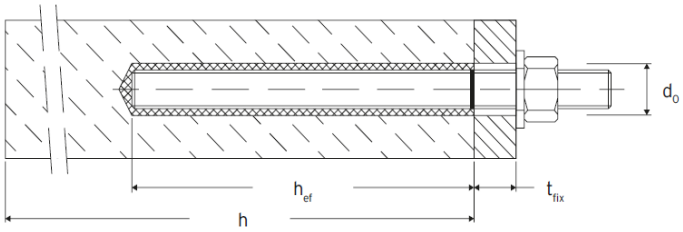
Setting and Installation - Threaded Rod



Installation Parameters

Anchor size			M8	M10	M12	M16	M20	M24
Nominal drill hole diameter	d_0	[mm]	10	12	14	18	24	28
Effective embedment depth	$h_{ef,min}$	[mm]	60	60	70	80	90	96
	$h_{ef,max}$	[mm]	160	200	240	320	400	480
Maximum torque moment	$T_{inst} \leq$	[Nm]	10	20	40	80	120	160
Minimum base material thickness	h_{min}	[mm]	h_{ef} + 30mm ≥ 100mm			h_{ef} + $2d_0$		
Minimum spacing	s_{min}	[mm]	40	50	60	80	100	120
Minimum edge distance	c_{min}	[mm]	40	50	60	80	100	120
Critical spacing for splitting failure	$s_{cr,sp}$	[mm]	2 $c_{cr,sp}$					
Critical edge distance for splitting failure	$c_{cr,sp}$	[mm]	1,0 h_{ef}			for $h/h_{ef} \geq 2,0$		
			2 h_{ef} (2,5 - h/h_{ef})			for $2,0 > h/h_{ef} > 1,3$		
			2,4 h_{ef}			for $h/h_{ef} \leq 1,3$		
Critical spacing for concrete cone failure	$s_{cr,N}$	[mm]	3,0 h_{ef}					
Critical edge distance for concrete cone failure	$c_{cr,N}$	[mm]	1,5 h_{ef}					

Working and Curing Time

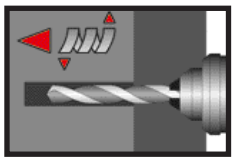
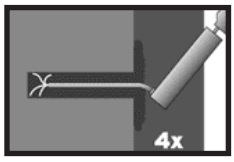
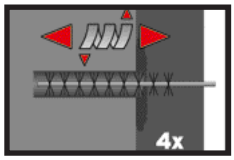
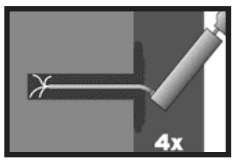
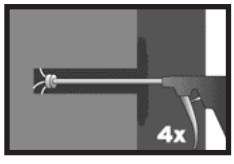
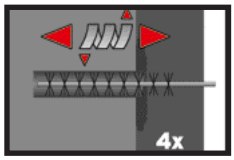
Concrete temperature	Gelling working time	Minimum curing time
-10°C to -6°C	60 mins	4 hours
-5°C to -1°C	45 mins	2 hours
0°C to +4°C	25 mins	80 mins
+5°C to +9°C	10 mins	45 mins
+10°C to +14°C	4 mins	25 mins
+15°C to +19°C	3 mins	20 mins
+20°C to +29°C	2 mins	15 mins
Cartridge temperature	+5°C to +30°C	

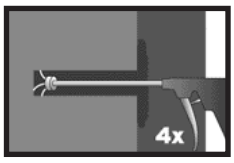
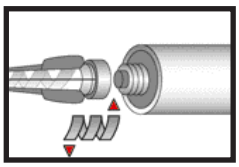
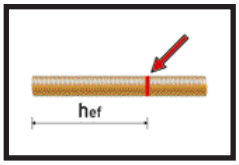
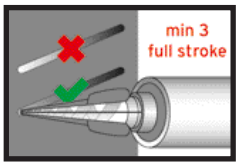
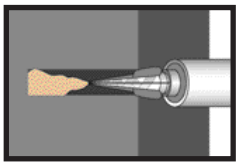
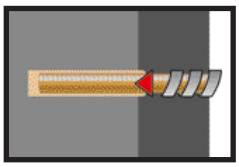
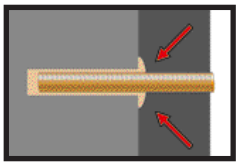
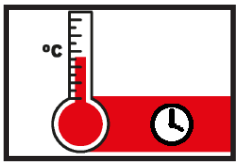
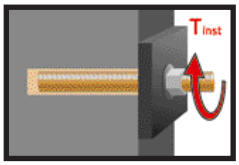
Cleaning and Setting Tools

Threaded rod size	Drill bit diameter, d0 (mm)	Brush diameter d_b (mm)	Min. brush diameter $d_{b,min}$ (mm)
M8	10	12	10,5
M10	12	14	12,5
M12	14	16	14,5
M16	18	20	18,5
M20	24	26	24,5
M24	28	30	28,5

Installation Instructions

Refer to the Material Safety Data Sheet (MSDS) for guidance on safe and proper handling.

Drilling of the bore hole		
	**1.**	Drill a hole into the base material to the size and embedment depth required by the selected anchor (page 4). In cases of aborted drill holes, the drill hole must be filled with mortar.
Attention! Standing water in the bore hole must be removed before cleaning.		
MAC: Cleaning for dry and wet bore holes with diameter $d_0 \leq 20$mm and bore hole depth $h_0 \leq 240$mm		
	**2a.**	Starting from the bottom or back of the bore hole, blow the hole clean by a hand pump a minimum of four times.
	**2b.**	Check brush (BR) diameter (table above). Brush the hole with an appropriate sized wire brush a minimum of four times in a twisting motion over the entire embedment depth of drilled hole. If the brush does not reach the bottom of the bore hole, a brush extension must be used.
	**2c.**	Finally blow the hole clean again with a hand pump a minimum of four times from the bottom of the drilled hole.
CAC: Cleaning for dry, wet and water-filled bore holes (all diameters)		
	**2a.**	Starting from the bottom or back of the bore hole, blow the hole clean with compressed air (oil free, min. 6 bar) a minimum of four times until return air stream is free of noticeable dust. If the bottom of the bore is not reached an extension must be used.
	**2b.**	Check brush (BR) diameter (table above). Brush the hole with an appropriate sized wire brush a minimum of four times in a twisting motion over the entire embedment depth of drilled hole. If the brush does not reach the bottom of the bore hole a brush extension must be used.

	**2c.**	Finally blow the hole clean again with compressed air (oil free, min. 6 bar) a minimum of four times until return air stream is free of noticeable dust. If the tool does not reach the bottom of the bore hole an extension must be used.
After cleaning, the bore hole has to be protected against re-contamination in an appropriate way, until dispensing the mortar in the bore hole. If necessary, the cleaning has to be repeated directly before dispensing the mortar. In-flowing water must not contaminate the bore hole again.		
Drilling of the bore hole		
	**3.**	Attach (screw) the supplied static mixer nozzle to the cartridge and load the cartridge into the correct dispensing tool. For every working interruption longer than the recommended working time (page 4) as well as for new cartridges, a new static mixer nozzle shall be used.
	**4.**	Prior to inserting the anchor rod into the filled bore hole, the position of the embedment depth shall be marked on the anchor rods. The anchor rod shall be free of dirt, grease, oil or other foreign material.
	**5.**	Prior to dispensing into the anchor hole, squeeze out separately a minimum of three full strokes and discard non-uniformly mixed adhesive components until the mortar shows a consistent grey colour.
	**6.**	Starting from the bottom or back of the cleaned anchor hole, fill the hole up to approximately two-thirds with adhesive. Slowly withdraw the static mixing nozzle as the hole fills to avoid creating air pockets. For embedment larger than 190mm an extension nozzle shall be used. Observe the gel/working times given on page 4.
	**7.**	Push the threaded rod or reinforcing bar into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment depth is reached. The anchor shall be free of dirt, grease, oil or other foreign material.
	**8.**	Be sure that the anchor is fully seated at the bottom of the hole and that excess mortar is visible at the top of the hole. If these requirements are not maintained, the application has to be renewed. For overhead application the anchor rod shall be fixed (eg. using wedges).
	**9.**	Allow the adhesive to cure to the specified time prior to applying any load or torque. Do not move or load the anchor until it is fully cured (refer to page 4).
	**10.**	After full curing, the fixture can be installed up to the max. torque (page 4) by using a calibrated torque wrench.

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Material Properties

Mechanical Properties (Mortar)

Properties	Test Method	Result
UV resistance		pass
watertightness	DIN EN 12390-8	0mm
temperature stability		120°C
pH-value		> 12
density		1,79 kg/dm^3
compressive strength	EN 196-1	88 N/mm^2
flexural strength	EN 196-1	31 N/mm^2
E modulus	EN 196-1	14000 N/mm^2

Chemical Resistance

Chemical	Concentration	Resistant
accumulator acid		O
acetic acid	40	X
acetic acid	10	O
acetone	10	X
ammonia, aqueous solution	5	O
aniline	100	X
beer		O
benzene (kp 100-140°F)	100	O
benzol	100	X
boric acid, aqueous solution		O
calcium carbonate, suspended in water	all	O
calcium chloride, suspended in water		O
calcium hydroxide, suspended in water		O
carbon tetrachloride	100	O
caustic soda solution	10	O
citric acid	all	O
chlorine water, swimming pool	all	O
diesel oil	100	O
ethyl alcohol, aqueous solution	50	X
formic acid	100	X
formaldehyde, aqueous solution	30	O

Chemical	Concentration	Resistant
freon		O
fuel oil		O
gasoline (premium grade)	100	O
glycol (ethylene glycol)		O
hydraulic fluid	conc.	O
hydrochloric acid (muriatic acid)	conc.	X
hydrogen peroxide	30	X
isopropyl alcohol	100	X
lactic acid	all	O
linseed oil	100	O
lubricating oil	100	O
magnesium chloride, aqueous solution	all	O
methanol	100	X
motor oil (SAE 20 W-50)	100	O
nitric acid	10	X
oleic acid	100	O
perchloroethylene	100	O
petroleum	100	O
phenol, aqueous solution	8	X
phosphoric acid	85	O
potash lye (potassium hydroxide)	10	O
potassium carbonate, aqueous solution	all	O
potassium chlorite, aqueous solution	all	O

Chemical	Concentration	Resistant
potassium nitrate, aqueous solution	all	O
sea water, salty	all	O
sodium carbonate	all	O
sodium chloride, aqueous solution	all	O
sodium phosphate, aqueous solution	all	O
sodium silicate	all	O

Chemical	Concentration	Resistant
standard benzine	100	O
sulfuric acid	10	O
sulfuric acid	70	X
tartaric acid	all	O
tetrachloroethylene	100	O
toluene		X
trichloroethylene	100	X
turpentine	100	O

O Resistant when subject to brief periods of chemical contact with a fully cured product
X Not resistant

For further advice please contact VJT Technical dept.

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