

# FIS V Vinylester injection Mortar

The powerful universal mortar for concrete and masonry



CRACKED  
CONCRETE

UN-CRACKED  
CONCRETE



Any connection into Brick or Block



Steel Connection into Concrete



Post Installed Rebar Connections



ETA-20/0603, for cracked concrete  
ETA-20/0729, for Masonry  
ETA-20/0728, for Post installed  
rebar Connections



Seismic C1 and  
C2- Threaded Rod



ESR-2786

ICC-ES UN-  
CRACKED  
CONCRETE



Fire resistance  
classification  
**R 120**

Sizes of anchors  
see examination report
















## APPLICATIONS

- Steel Work Construction
- Guard Rails
- Facades
- Staircases
- Steel Brackets
- Machine Installation
- Post Installed Rebar
- Canopies
- Pipeline work
- Satellite Antennas

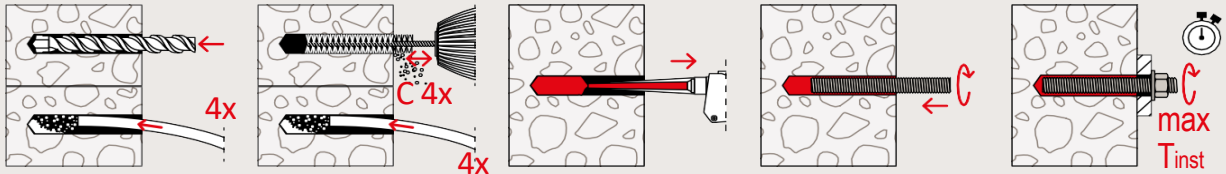
## BUILDING MATERIALS

- Cracked & Un-Cracked Concrete  
2500 psi to 8500 psi
- Natural stone with dense  
structure
- Hollow Blocks made of Concrete
- Vertically Perforated Brick
- Perforated Sand Lime Brick
- Solid Sand lime Brick
- Aerated Concrete
- Solid Brick

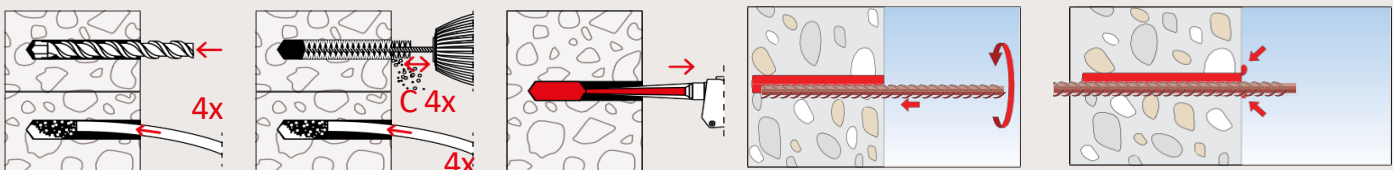
- FIS V has numerous system approvals, such as in cracked and non-cracked concrete, masonry and for special applications.
- The ETA assessment for a service life of 100 years offers permanent safety in concrete for all applications.
- The approved use in water-filled drill holes in concrete enables a wide range of applications even under harsh environmental conditions.

CONCRETE		Solid Brick, Solid AAC Block	Hollow Block, Perforated Brick	Natural Stone, Dense Structure	ICC Approval	Seismic C1/C2	Certification of Fire Protection		Anchor Diameter in Inch	Threaded Rod and Hex Nut	Rebar	Hex Head	Flat Head	Under 500 lbs	Over 500 lbs	Over 5000 lbs	Zinc Plated Carbon Steel	Galvanised Steel	Stainless Steel
CRACKED	UN-CRACKED				INTERNATIONAL CODE COUNCIL ICC ES ICC EVALUATION SERVICE	SEISMIC C1 - C2	ETA	FM APPROVED	Diameter										
										Threaded rod 5/16" to 1-3/16"  Rebar #3 to #9									

## Installation with Threaded Rod with FIS V Chemical Mortar in hammer-drilled drill hole

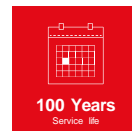


## Installation with Rebar with FIS V Chemical Mortar in hammer-drilled drill hole





- 18 months shelf life provides flexibility of storage
- Approved for Seismic Application
- Cracked and Uncracked Concrete from 2500 psi to 8500 psi
- Installation various Masonry applications
- Service life 100 years
- Threaded Rod Diameter from 5/16" to 1-3/16", Rebar from #3 to #9
- Two Static Mixers Provided with Each Cartridge
- Approved for Hollow Blocks and Aerated Concrete
- Fast Curing mortar



## STEEL DESIGN INFORMATION FOR METRIC THREADED ROD- According to ICC Report ESR 2786

DESIGN INFORMATION		Symbol	Units	Nominal rod diameter (mm)							
				M8	M10	M12	M16	M20	M24	M27	M30
ROD OUTSIDE DIAMETER		$d_a$	mm	8	10	12	16	20	24	27	30
			(in.)	(5/16)	(3/8)	(1/2)	(5/8)	(3/4)	(7/8)	(1)	(1-1/4)
ROD effective cross-sectional area		$A_{se}$	mm <sup>2</sup>	36.6	58.0	84.3	156.7	244.8	352.5	459	560.7
			(in <sup>2</sup> .)	(0.057)	(0.090)	(0.131)	(0.243)	(0.379)	(0.546)	(0.711)	(0.869)
ISO 898-1 Class 5.8	Nominal strength as governed by steel strength	$N_{sa}$	kN	18.3	29.0	42.2	78.4	122.4	176.3	230	280.4
			(lb)	(4,114)	(6,520)	(9,476)	(17,615)	(27,518)	(39,625)	(51,709)	(63,028)
		$V_{sa}$	kN	11.0	17.4	25.3	47.0	73.4	105.8	137.6	168.2
			(lb)	(2,469)	(3,912)	(5,686)	(10,569)	(16,511)	(23,775)	( 30,929)	(37,817)
	Strength reduction factor $\phi$ for tension <sup>2</sup>	$\phi$	-	0.65							
	Strength reduction factor $\phi$ for shear <sup>2</sup>	$\phi$	-	0.60							
ISO 898-1 Class 8.8	Nominal strength as governed by steel strength	$N_{sa}$	kN	29.3	46.4	67.4	125.4	195.8	282.0	368	448.6
			(lb)	(6,583)	(10,432)	(15,162)	(28,183)	(44,029)	(63,399)	(82,734)	(100,845)
		$V_{sa}$	kN	17.6	27.8	40.5	75.2	117.5	169.2	220.1	269.1
			(lb)	(3,950)	(6,259)	(9,097)	(16,910)	(26,417)	(38,040)	( 49,486)	(60,507)
	Strength reduction factor $\phi$ for tension <sup>2</sup>	$\phi$	-	0.65							
	Strength reduction factor $\phi$ for shear <sup>2</sup>	$\phi$	-	0.60							
ISO 3506-1 Class A4-70 and stainless C-70	Nominal strength as governed by steel strength	$N_{sa}$	kN	25.6	40.6	59.0	109.7	171.4	246.8	322	392.5
			(lb)	(5,760)	(9,128)	(13,267)	(24,661)	(38,525)	(55,474)	(72,392)	(88,240)
		$V_{sa}$	kN	15.4	24.4	35.4	65.8	102.8	148.1	192.7	235.5
			(lb)	(3,456)	(5,477)	(7,960)	(14,796)	(23,115)	(33,285)	( 43,300)	(52,944)
	Strength reduction factor $\phi$ for tension <sup>2</sup>	$\phi$		0.65							
	Strength reduction factor $\phi$ for shear <sup>2</sup>	$\phi$		0.60							
ISO 3506-1 Class A4-80 and stainless C-80	Nominal strength as governed by steel strength	$N_{sa}$	kN	29.3	46.4	67.4	125.4	195.8	282.0	368	448.6
			(lb)	(6,583)	(10,432)	(15,162)	(28,183)	(44,029)	(63,399)	(82,734)	(100,845)
		$V_{sa}$	kN	17.6	27.8	40.5	75.2	117.5	169.2	220.1	269.1
			(lb)	(3,950)	(6,259)	(9,097)	(16,910)	(26,417)	(38,040)	( 49,486)	(60,507)
	Strength reduction factor $\phi$ for tension <sup>2</sup>	$\phi$	-	0.65							
	Strength reduction factor $\phi$ for shear <sup>2</sup>	$\phi$	-	0.60							

For SI: 1 inch = 25.4 mm, 1 lbf = 4.448 N, 1 psi = 0.006897 MPa.

For pound-inch-units: 1 mm = 0.03937 inches, 1 N = 0.2248 lbf, 1 MPa = 145.0 psi

<sup>1</sup>Values provided for common rod material types are based on specified strength and calculated in accordance with ACI 318-14 Eq. (17.4.1.2) and Eq. (17.5.1.2b) or ACI 318-11 Eq. (D-2) and Eq. (D-29), as applicable. Nuts and washers must be appropriated for the rod.

<sup>2</sup>For use with load combinations of IBC Section 1605.2, ACI 318-14 5.3 or ACI 318-11 Section 9.2, as applicable, as set forth in ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable. If load combinations of ACI 318-11 Appendix C are used, the appropriate value of  $\phi$  must be determined in accordance with ACI 318-11 D.4.4.

### FIS V

Temperature at anchoring base	Gelling time	Curing time
> 23°F – +32°F	–	24 Hrs.
> 32°F – +41°F	13 min.	3 Hrs.
> 41°F – +50°F	9 min.	90 min.
> 50°F – +68°F	5 min.	60 min.
> 68°F – +86°F	4 min.	45 min.
> 86°F – +104°F	2 min.	35 min.

## Loads solid masonry, perforated brick masonry and aerated concrete with Threaded rod as per European Standard

Type	Compressive brick strength  fb [lbf]	Brick raw density  ρ [kg/dm³]	Minimum brick dimensions <sup>3)</sup>  (L x B x H) [Inch]	Minimum effective anchor- age depth  hef [Inch]	Mini- mum member thick- ness  hmin [Inch]	Maximum installa- tion torque  Tinst, max [Nm]	Permis- sible tensile load <sup>4)</sup>  Nperm [lbf]	Permis- sible Shear load <sup>4)</sup>  Vperm [lbf]	Minimum- spacing <sup>5)</sup>  smin    / smin <sup>L</sup> [Inch]	Charac- teristic resp. minimu m edge dis- tance <sup>5)</sup>  ccr = cmin [Inch]
<b>Solid brick Mz, NF, acc. to EN 771-1</b>										
M6	≥ 2600	≥ 1.8	9.44" x 4.52" x 2.79"	2"	4.5"	4	256	159	9.45"/2.95"	4"
M8	≥ 2600	≥ 1.8	9.44" x 4.52" x 2.79"	2"	4.5"	10	256	159	9.45"/2.95"	4"
M10	≥ 2600	≥ 1.8	9.44" x 4.52" x 2.79"	2"	4.5"	10	224	256	9.45"/2.95"	4"
M12	≥ 2600	≥ 1.8	9.44" x 4.52" x 2.79"	2"	4.5"	10	193	256	9.45"/2.95"	4"
<b>Solid sand-lime brick KS, acc. to EN 771-2</b>										
M6	≥ 2200	≥ 2.0	9.84" x 9.44" x 9.44"	2"	9.5"	4	321	159	3.14"/3.14"	2.36"
M8	≥ 2200	≥ 2.0	9.84" x 9.44" x 9.44"	2"	9.5"	10	449	290	3.14"/3.14"	2.36"
M10	≥ 2200	≥ 2.0	9.84" x 9.44" x 9.44"	2"	9.5"	10	449	290	3.14"/3.14"	2.36"
M12	≥ 2200	≥ 2.0	9.84" x 9.44" x 9.44"	2"	9.5"	10	449	290	3.14"/3.14"	2.36"
M16	≥ 2200	≥ 2.0	9.84" x 9.44" x 9.44"	2"	9.5"	10	352	290	3.14"/3.14"	2.36"
<b>Vertically perforated brick Hlz, acc. to EN 771-1</b>										
12 x 50 M6 / M8	≥ 800	≥ 1.0	19.68" x 6.88" x 9.33" or 14.56" x 9.44" x 9.33"	2"	7"	2	24	31	4" / 4"	4"
16 x 85 M8 / M10	≥ 800	≥ 1.0	19.68" x 6.88" x 9.33" or 14.56" x 9.44" x 9.33"	3.35"	7"	2	58	31	4" / 4"	4"
20 x 130 M12 / M16	≥ 800	≥ 1.0	19.68" x 6.88" x 9.33" or 14.56" x 9.44" x 9.33"	5-1/8"	7"	2	76	38	4" / 4"	4"
<b>Perforated sand-lime brick KSL, acc. to EN 771-2</b>										
12 x 50 M6 / M8	≥ 2600	≥ 1.4	9.45" x 6.89" x 4.45"	2"	7"	2	159	159	4" / 4.5"	2.36"
16 x 85 M8 / M10	≥ 2600	≥ 1.4	9.45" x 6.89" x 4.45"	3.5"	7"	2	193	290	4" / 4.5"	3.15"
20 x 85 M12	≥ 2600	≥ 1.4	9.45" x 6.89" x 4.45"	3.5"	7"	2	224	290	4" / 4.5"	3.15"
<b>Lightweight concrete hollow block Hbl, acc. to EN 771-3</b>										
12 x 50 M6 / M8	≥ 450	≥ 1.0	14.25" x 9.45" x 9.45"	2"	9.45"	2	76	58	4" / 9.45"	2.36"
16 x 85 M8 / M10	≥ 450	≥ 1.0	14.25" x 9.45" x 9.45"	3.5"	9.45"	2	96	58	4" / 9.45"	2.36"
20 x 200 M12 / M16	≥ 450	≥ 1.0	14.25" x 9.45" x 9.45"	7"	9.45"	2	159	58	4" / 9.45"	2.36"
<b>Aerated concrete acc. to EN 771-4</b>										
M8 <sup>6)</sup>	≥ 450	≥ 0.35	-	4"	5-1/8"	1	121	96	10"	4"
M10 <sup>6)</sup>	≥ 450	≥ 0.35	-	4"	5-1/8"	2	121	96	10"	4"
M12 <sup>6)</sup>	≥ 450	≥ 0.35	-	4"	5-1/8"	2	159	121	10"	4"
M16 <sup>6)</sup>	≥ 450	≥ 0.35	-	4"	5-1/8"	2	159	96	10"	4"
M8, M10, M12 <sup>7)</sup>	≥ 450	≥ 0.35	-	3"	4"	2	159	200	10"	5"
M8, M10, M12 <sup>7)</sup>	≥ 450	≥ 0.35	-	4"	5"	2	200	200	10"	6"

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma = 1.4$  are considered. Load values are valid for zinc-plated steel, stainless steel R and highly corrosion-resistant steel HCR.

<sup>2)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to 122 °F (resp. short term up to 176 °F) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>3)</sup> Hole patterns see assessment.

<sup>4)</sup> In the case of combinations of tensile and shear loads, bending moments and reduced edge and axial spacings (anchor groups), the design must be carried out in accordance with the provisions of the complete assessment.

<sup>5)</sup> Minimum feasible spacing resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>6)</sup> Cylindrical drill hole.

<sup>7)</sup> Conical drill hole.

## Fischer Corporate Video Fischer Group:



**Founded: 1948**  
**Founder: Sir Arthur Fischer**  
**Headquarters: Waldachtal,**  
**Baden-Württemberg, Germany**  
**Revenue: \$1 billion**  
**Divisions: Fixings, Automotive, Consulting, Toys**

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Promotional Video- FIS V Plus