Vinylester Injection System with ETA Assessment Option 1 for Cracked & Non-Cracked Concrete. AS 5216:2018 Compliant

Suitable Anchor Rods M8 - M30

- Steel 5.8 and 8.8 Zinc Plated and Hot Dip Galvanized
- Stainless Steel A4-50 and A4-70
- High Corrosion Resistant Steel 1.4529

Use Conditions

- Installation in Cracked & Non-Cracked Concrete C20/25 to C50/60 according to EN 206-1:2000 and AS 5216:2018
- For Static and quasi static loading & Seismic Action C1
- In Dry, Wet and Flooded Holes
- Structures subject to dry internal and permanent damp internal conditions.
- Structures subject to external atmospheric exposure.
- Overhead Installation allowed.

Typical Applications

- Infrastructure Construction (Roads, Viaducts, Sound Barriers, Crash Barriers, Harbours, High Rise Construction, Steel Construction)
- Production Facilities (Installation of Cranes, Robots, Conveyer Lines etc.)

Approvals & Test Reports

1343
B+BTec
Munterij 8, NL 4762AH, Zevenbergen
14
1343-CPR-M 529-3
ETA-14/0323
ETAG 001-5 Option 1
M8 - M30/Ø8 - 32 mm
European Technical Assessment
Option 1 for Cracked Concrete

F120 MPA BRAUNSCHWEIG 3349/800/10

C1 SEISMIC C1: M12 - M30/Ø12 - 32

AS 5216:2018 COMPLIES WITH FOR POST-INSTALLED FASTENINGS

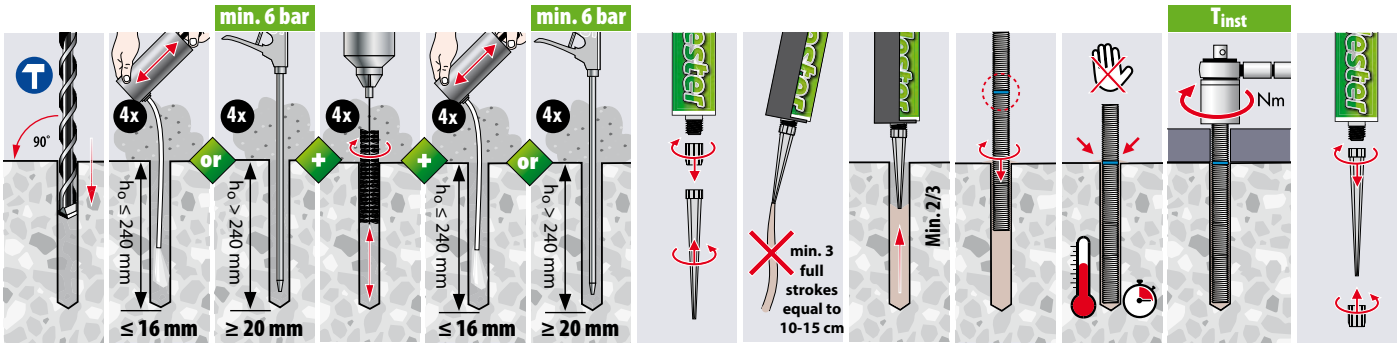
NSF

NCC TM NATIONAL CODE COMPLIANT

LEED Tested

ÉMISSIONS DANS L'AIR INTÉRIEUR A+ A+ A B C

Installation Procedures



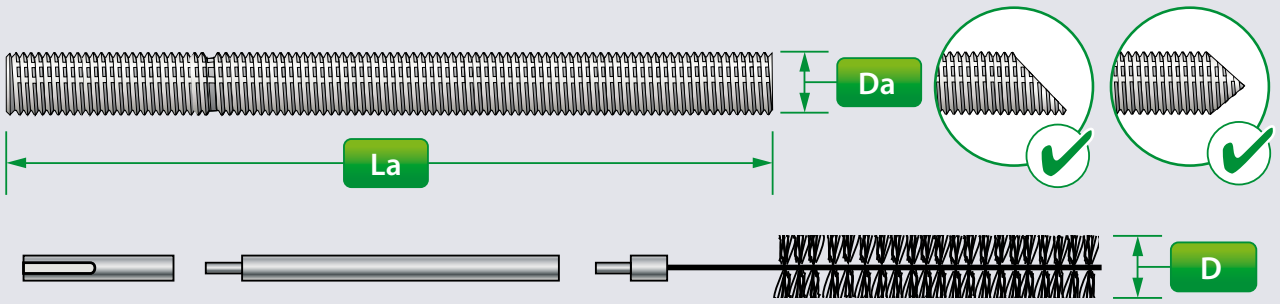
Curing Times

Temperature[1]	°C	-10[2]	-5	0	+5	+10	+20	+30[3]	+35[3]	+40[3]
Processing / Working Time		90 min	90 min	45 min	25 min	15 min	6 min	4 min	2 min	1,5 min
Curing Time Dry Holes		24 h	14 h	7 h	2 h	80 min	45 min	25 min	20 min	15 min
Curing Time Wet Holes		48 h	28 h	14 h	4 h	160 min	90 min	50 min	40 min	30 min

1) Concrete Temperature 2) Cartridge Temperature must be min. +15°C. 3) Cartridge Temperature **must** be under +20°C.

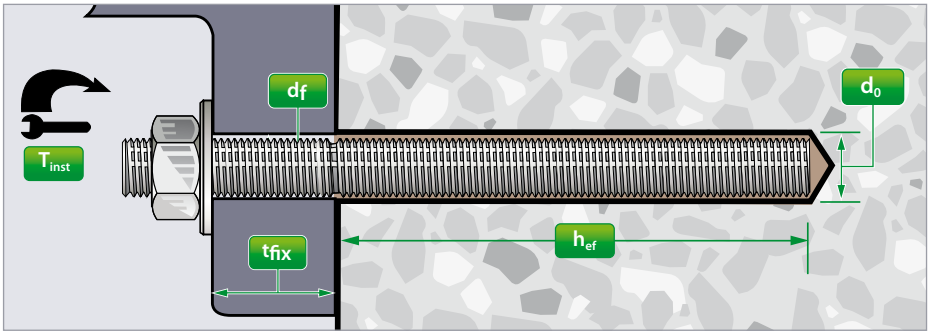
ETA - 14/0323

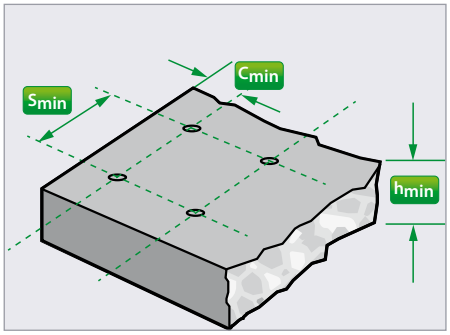
Specification Data for the use in Cracked & Uncracked Concrete and Hammer/Air Drilled Holes according to EN1992-4 & AS 5216:2018



Installation Dimensions

Anchor Size	Da		M8	M10	M12	M16	M20	M24	M27	M30
Rod Length	$l_{a\geq}$	[mm]	110	130	160	190	260	300	340	360
Effective Anchorage Depth	h_{ef}	[mm]	60-160	60-200	70-240	80-320	90-400	96-480	108-540	120-600
Hole Diameter	d_o	[mm]	10	12	14	18	24	28	32	35
Depth of Drill Hole	h_o	[mm]	80	90	110	125	170	210	240	280
Diameter Fixture Hole	d_f	[mm]	9	12	14	18	22	26	30	33
Fixture Thickness	$t_{fix\leq}$	[mm]	20	30	35	45	70	65	70	50
Recommended Torque	T_{inst}	[Nm]	10	20	40	80	120	160	180	200
Required Volume per cm Embedment Depth	V_s	[ml/cm]	0,44	0,59	0,75	1,09	2,25	2,87	3,72	4,37





Member Thickness, Edge Distance & Spacing

Anchor Size	Da		M8	M10	M12	M16	M20	M24	M27	M30
Min. Member Thickness	h_{min}	[mm]	110	120	140	160	220	265	305	350
Min. Edge Distance	c_{min}	[mm]	40	50	60	80	100	120	135	150
Min. Spacing	s_{min}	[mm]	40	50	60	80	100	120	135	150

Steel Brush Dimensions

Anchor Size	Da		M8	M10	M12	M16	M20	M24	M27	M30
Brush Diameter	D	[mm]	12	14	16	20	26	30	34	37
Min. Brush Diameter	D_{min}	[mm]	10,5	12,5	14,5	18,5	24,5	28,5	32,5	35,5

Performance Data[1)] for Hammer/Air Drilled Holes

Steel Failure

1) **Performance Data:** Loads in kN for a single anchor in Concrete C20/C25*. Temperature 24°C/40°C for long/short term. No influence of Edge- or Center to Center Distances.
   Increasing factors for concrete ψ_C: **C30/37**: 1,04 **C40/50**: 1,08 **C50/60**: 1,10
2) **Shear Loads**: Steel strength in kN without bending moment.
3) **Recommended Loads** incl. Safety factor $\gamma_G = 1,4$.

Characteristic Resistance Dry/Wet Holes

Non-Cracked Concrete		Da		M8	M10	M12	M16	M20	M24	M27	M30
Steel 5.8	Tensile	N_{Rk}	[kN]	18,0	29,0	42,0	75,4	123,0	174,2	212,1	237,5
	Shear[2)]	V_{Rk}	[kN]	9,0	14,0	21,0	39,0	61,0	88,0	115,0	140,0
Steel 8.8	Tensile	N_{Rk}	[kN]	20,1	33,9	49,8	75,4	128,2	174,2	212,1	237,5
	Shear[2)]	V_{Rk}	[kN]	15,0	23,0	34,0	63,0	98,0	141,0	184,0	224,0
A4-50	Tensile	N_{Rk}	[kN]							212,1	237,5
	Shear[2)]	V_{Rk}	[kN]							115,0	140,0
A4-70	Tensile	N_{Rk}	[kN]	20,1	33,9	49,8	75,4	128,2	174,2		
	Shear[2)]	V_{Rk}	[kN]	13,0	20,0	30,0	55,0	86,0	124,0		
Cracked Concrete		**Da**		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel 5.8	Tensile	N_{Rk}	[kN]			22,8	34,6	58,7	87,1	137,8	171,5
	Shear[2)]	V_{Rk}	[kN]			21,0	39,0	61,0	88,0	115,0	140,0
Steel 8.8	Tensile	N_{Rk}	[kN]			22,8	34,6	58,7	87,1	137,8	171,5
	Shear[2)]	V_{Rk}	[kN]			34,0	63,0	98,0	141,0	184,0	224,0
A4-50	Tensile	N_{Rk}	[kN]							137,8	171,5
	Shear[2)]	V_{Rk}	[kN]							115,0	140,0
A4-70	Tensile	N_{Rk}	[kN]			22,8	34,6	58,7	87,1		
	Shear[2)]	V_{Rk}	[kN]			30,0	55,0	86,0	124,0		

Characteristic Resistance Flooded Holes

Non-Cracked Concrete		Da		M8	M10	M12	M16	M20	M24	M27	M30
Steel 5.8	Tensile	N_{Rk}	[kN]	15,1	24,0	35,2	53,4				
	Shear[2)]	V_{Rk}	[kN]	9,0	14,0	21,0	39,0				
Steel 8.8	Tensile	N_{Rk}	[kN]	15,1	24,0	35,2	53,4				
	Shear[2)]	V_{Rk}	[kN]	15,0	23,0	34,0	63,0				
A4-50	Tensile	N_{Rk}	[kN]								
	Shear[2)]	V_{Rk}	[kN]								
A4-70	Tensile	N_{Rk}	[kN]	15,1	24,0	35,2	53,4				
	Shear[2)]	V_{Rk}	[kN]	13,0	20,0	30,0	55,0				
Cracked Concrete		**Da**		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel 5.8	Tensile	N_{Rk}	[kN]			22,8	34,6				
	Shear[2)]	V_{Rk}	[kN]			21,0	39,0				
Steel 8.8	Tensile	N_{Rk}	[kN]			22,8	34,6				
	Shear[2)]	V_{Rk}	[kN]			34,0	63,0				
A4-50	Tensile	N_{Rk}	[kN]								
	Shear[2)]	V_{Rk}	[kN]								
A4-70	Tensile	N_{Rk}	[kN]			22,8	34,6				
	Shear[2)]	V_{Rk}	[kN]			30,0	55,0				

Performance Data[1] for Hammer/Air Drilled Holes

Steel Failure

Design Resistance Dry/Wet Holes

Non-Cracked Concrete		Da		M8	M10	M12	M16	M20	M24	M27	M30
Steel 5.8	Tensile	N_{Rd}	[kN]	12,0	18,8	27,6	39,2	62,1	85,4	110,8	131,9
	Shear[2]	V_{Rd}	[kN]	7,2	11,2	16,8	31,2	48,8	70,4	92,0	112,0
Steel 8.8	Tensile	N_{Rd}	[kN]	13,4	18,8	27,6	39,2	62,1	85,4	110,8	131,9
	Shear[2]	V_{Rd}	[kN]	12,0	18,4	27,2	50,4	78,4	112,8	147,2	179,2
A4-50	Tensile	N_{Rd}	[kN]							80,1	97,9
	Shear[2]	V_{Rd}	[kN]							48,3	58,8
A4-70	Tensile	N_{Rd}	[kN]	13,4	18,8	27,6	39,2	62,1	85,4		
	Shear[2]	V_{Rd}	[kN]	8,3	12,8	19,2	35,3	55,1	79,5		
Cracked Concrete		**Da**		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel 5.8	Tensile	N_{Rd}	[kN]			12,7	19,2	32,6	48,4	76,6	93,7
	Shear[2]	V_{Rd}	[kN]			16,8	31,2	48,8	70,4	92,0	112,0
Steel 8.8	Tensile	N_{Rd}	[kN]			12,7	19,2	32,6	48,4	76,6	93,7
	Shear[2]	V_{Rd}	[kN]			27,2	50,4	78,4	112,8	147,2	179,2
A4-50	Tensile	N_{Rd}	[kN]							76,6	93,7
	Shear[2]	V_{Rd}	[kN]							48,3	58,8
A4-70	Tensile	N_{Rd}	[kN]			12,7	19,2	32,6	48,4		
	Shear[2]	V_{Rd}	[kN]			19,2	35,3	55,1	79,5		

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Design Resistance Flooded Holes

Non-Cracked Concrete		Da		M8	M10	M12	M16	M20	M24	M27	M30
Steel 5.8	Tensile	N_{Rd}	[kN]	7,2	11,4	16,8	25,4				
	Shear[2]	V_{Rd}	[kN]	7,2	11,2	16,8	31,2				
Steel 8.8	Tensile	N_{Rd}	[kN]	7,2	11,4	16,8	25,4				
	Shear[2]	V_{Rd}	[kN]	12,0	18,4	27,2	50,4				
A4-50	Tensile	N_{Rd}	[kN]								
	Shear[2]	V_{Rd}	[kN]								
A4-70	Tensile	N_{Rd}	[kN]	7,2	11,4	16,8	25,4				
	Shear[2]	V_{Rd}	[kN]	8,3	12,8	19,2	35,3				
Cracked Concrete		**Da**		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel 5.8	Tensile	N_{Rd}	[kN]			10,9	16,5				
	Shear[2]	V_{Rd}	[kN]			16,8	31,2				
Steel 8.8	Tensile	N_{Rd}	[kN]			10,9	16,5				
	Shear[2]	V_{Rd}	[kN]			27,2	50,4				
A4-50	Tensile	N_{Rd}	[kN]								
	Shear[2]	V_{Rd}	[kN]								
A4-70	Tensile	N_{Rd}	[kN]			10,9	16,5				
	Shear[2]	V_{Rd}	[kN]			19,2	35,3				

Performance Data[1] for Hammer/Air Drilled Holes

Steel Failure

Recommended Loads Dry/Wet Holes

Non-Cracked Concrete		Da		M8	M10	M12	M16	M20	M24	M27	M30
Steel 5.8	Tensile	N_{rec}	[kN]	8,6	13,5	19,7	28,0	50,9	69,1	79,1	94,2
	Shear[2]	V_{rec}	[kN]	5,1	8,0	12,0	22,3	34,9	50,3	65,7	80,0
Steel 8.8	Tensile	N_{rec}	[kN]	9,6	13,5	19,7	28,0	50,9	69,1	79,1	94,2
	Shear[2]	V_{rec}	[kN]	8,6	13,1	19,4	36,0	56,0	80,6	105,1	128,0
A4-50	Tensile	N_{rec}	[kN]							57,2	69,9
	Shear[2]	V_{rec}	[kN]							34,5	42,0
A4-70	Tensile	N_{rec}	[kN]	9,6	13,5	19,7	28,0	50,9	69,1		
	Shear[2]	V_{rec}	[kN]	6,0	9,2	13,7	25,2	39,4	56,8		
Cracked Concrete		**Da**		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel 5.8	Tensile	N_{rec}	[kN]			9,1	13,7	23,3	34,6	54,7	66,9
	Shear[2]	V_{rec}	[kN]			12,0	22,3	34,9	50,3	65,7	80,0
Steel 8.8	Tensile	N_{rec}	[kN]			9,1	13,7	23,3	34,6	54,7	66,9
	Shear[2]	V_{rec}	[kN]			19,4	36,0	56,0	80,6	105,1	128,0
A4-50	Tensile	N_{rec}	[kN]							54,7	66,9
	Shear[2]	V_{rec}	[kN]							34,5	42,0
A4-70	Tensile	N_{rec}	[kN]			9,1	13,7	23,3	34,6		
	Shear[2]	V_{rec}	[kN]			13,7	25,2	39,4	56,8		

Recommended Loads Flooded Holes

Non-Cracked Concrete		Da		M8	M10	M12	M16	M20	M24	M27	M30
Steel 5.8	Tensile	N_{rec}	[kN]	5,1	8,2	12,0	18,2				
	Shear[2]	V_{rec}	[kN]	5,1	8,0	12,0	22,3				
Steel 8.8	Tensile	N_{rec}	[kN]	5,1	8,2	12,0	18,2				
	Shear[2]	V_{rec}	[kN]	8,6	13,1	19,4	36,0				
A4-50	Tensile	N_{rec}	[kN]								
	Shear[2]	V_{rec}	[kN]								
A4-70	Tensile	N_{rec}	[kN]	5,1	8,2	12,0	18,2				
	Shear[2]	V_{rec}	[kN]	6,0	9,2	13,7	25,2				
Cracked Concrete		**Da**		**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
Steel 5.8	Tensile	N_{rec}	[kN]			7,8	11,8				
	Shear[2]	V_{rec}	[kN]			12,0	22,3				
Steel 8.8	Tensile	N_{rec}	[kN]			7,8	11,8				
	Shear[2]	V_{rec}	[kN]			19,4	36,0				
A4-50	Tensile	N_{rec}	[kN]								
	Shear[2]	V_{rec}	[kN]								
A4-70	Tensile	N_{rec}	[kN]			7,8	11,8				
	Shear[2]	V_{rec}	[kN]			13,7	25,2				

ICCONS®
Serious Connections

Vinylester

INNOVATIVE SOFTWARE – ANCHOR DESIGN MADE EASY

- Innovative 3d visual user interface, EN 1992-4 & AS 5216:2018 compliant
- SEISMIC DESIGN under earthquake loads according to ETAG-001, Annex E, TR045
- Finite element analysis steel baseplate design

ICCONS® DesignFiX Software is simple, intuitive and FREE to DOWNLOAD anchor design program for Design Engineers, Project Managers, Site Engineers and End Users. Complex mechanical or chemical heavy duty anchor arrangements can be calculated in minutes. All designs are ETA based and qualify under the newly released AS 5216:2018 now directly referenced in the 2019 National Construction Code.

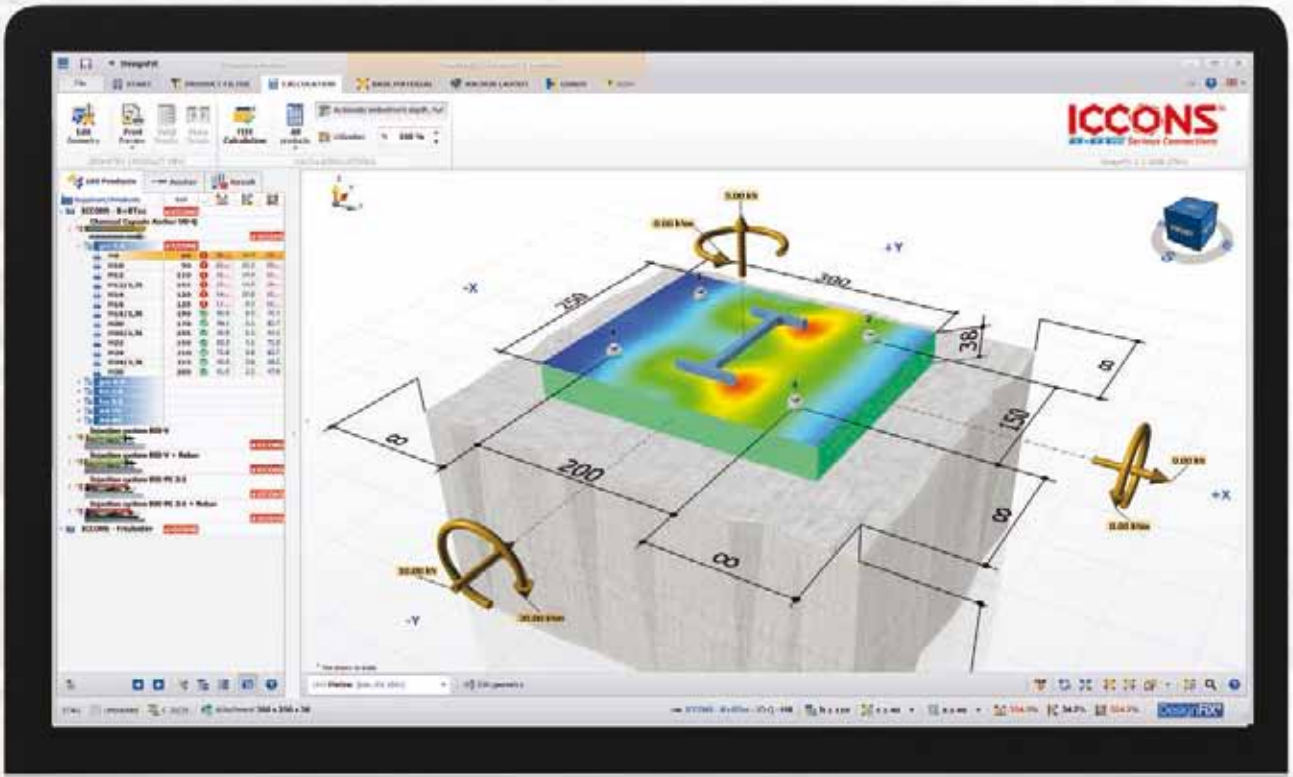
With input Freedom & 3D user Interface ICCONS® DesignFiX offers complete freedom to select an anchor pattern and base plate configuration, as well as the position and direction of load combinations. Changes are made directly into the 3D user interface.

Anchor Type Comparison

ICCONS® DesignFiX displays the usability of the various anchor types (according to ETAG-001, Annex C, TR029), including the values for each load type. This allows you to compare the calculation result of the different anchor types in a single easy to read panel.

Optimum BIS Injection System Anchorage Depth when selecting a BIS Injection Mortar.

ICCONS® DesignFiX allows for the automatic calculation of the most effective anchorage depth, taking in consideration the minimal and maximum values of the ETA.
The integrated FEM-Calculation Method (Finite Element Method) in ICCONS® DesignFiX allows you to calculate the base plate thickness based upon the stresses in the base plate combination with the base plate configuration.



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