



## Hybrid Injection System with ETA Assessment **Option 1** for Cracked & Non-Cracked Concrete **SA TS 101: 2015 compliant**

### Anchor Rods Suitable 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



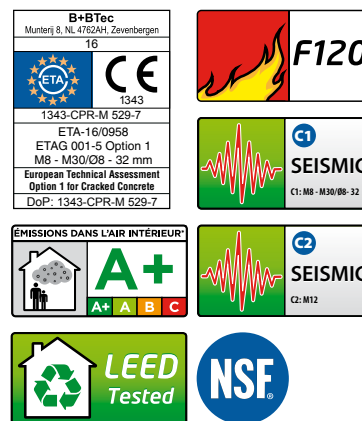
## Use Conditions

- Installation in Cracked & Non-Cracked Concrete C20/25 to C50/60. for Anchor Rods M8-M30, Rebar Ø8-32 mm and Threaded Sleeves M6-M20
- Seismic Action C1 M8-M30, Ø8-32 mm
- Seismic Action C2 M12
- For Hammer/Air drilled Holes
- Installation in Dry and Wet Holes
- Overhead Installation allowed.
- Fire Rated

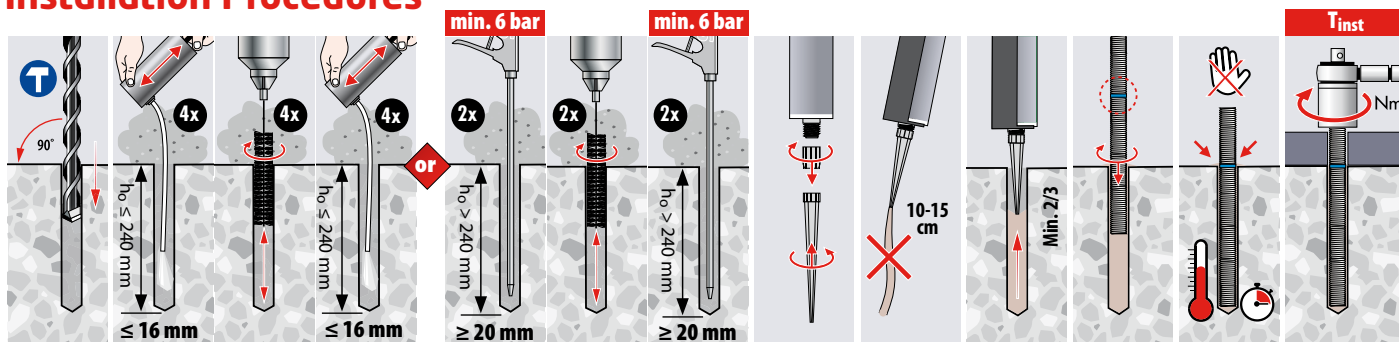
## Typical Applications

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

## Approvals & Test Reports



## Installation Procedures

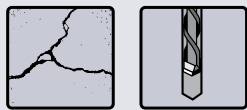


1) Blow out with Hand Pump for Anchor Rods ≤M16 and Non-Cracked Concrete only.

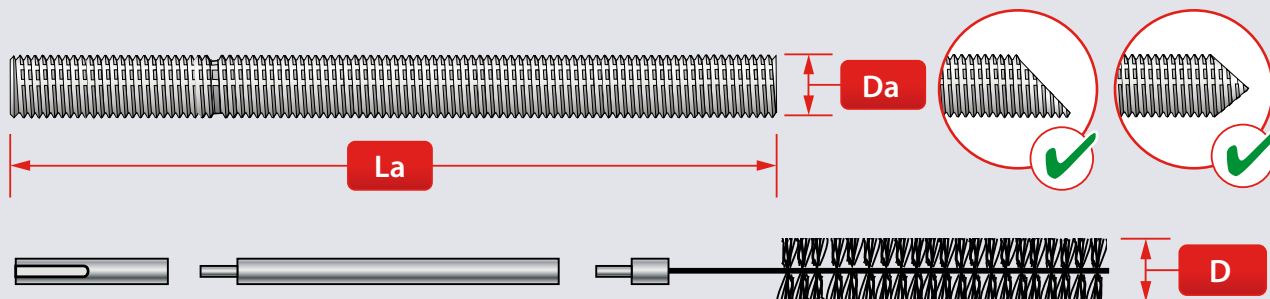
## Curing Times<sup>2)</sup>

Temperature <sup>3)</sup>	°C	-5 to -1	0 to +4	+5 to +9	+10 to +14	+15 to +19	+20 to +29	+30 to +40
Processing Time		50 min	25 min	15 min	10 min	6 min	3 min	2 min
Curing Time Dry Holes		5 h	3,5 h	2 h	1h	40 min	30 min	30 min
Curing Time Wet Holes		10 h	7 h	4h	2h	80 min	60 min	60 min

2) Cartridge Temperature must be between +5°C and +40°C. 3) Concrete Temperature



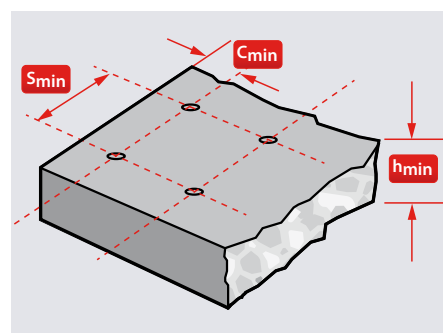
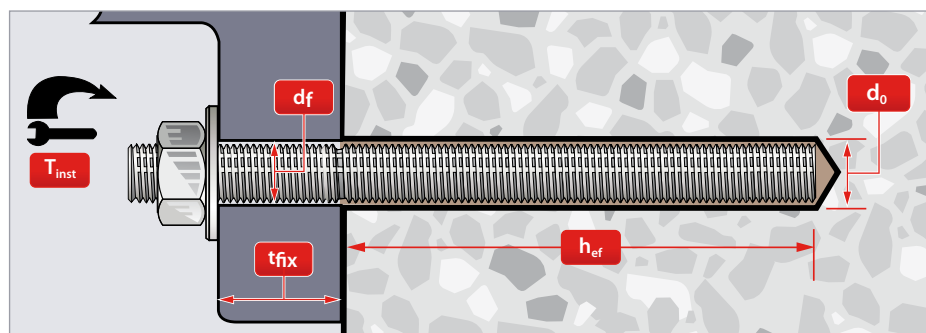
Specification Data for the use in Cracked & Uncracked Concrete and Hammer/Air Drilled Holes according to ETAG TR029 and CEN/TS 1992-4 and SA TS 101: 2015



## Installation Dimensions

Anchor Size	D <sub>a</sub>		M8	M10	M12	M16	M20	M24	M27	M30
Anchor Rod Length	L <sub>a</sub>	[mm]	110	130	160	190	260	300	340	360
Anchorage Depth	h <sub>0</sub> =h <sub>ef</sub>	[mm]	80	90	110	125	170	210	250	280
Hole Diameter	d <sub>0</sub>	[mm]	10	12	14	18	22	28	32	35
Diameter Fixture Hole	d <sub>f</sub>	[mm]	9	12	14	18	22	26	30	33
Recommended Torque	T <sub>inst</sub>	[Nm]	10	20	40	60	100	170	250	300
Required Volume per cm Embedment Depth	V <sub>s</sub>	[ml/cm]	0,44	0,59	0,75	1,09	2,25	2,87	3,72	4,37

2



## Member Thickness, Edge Distance & Spacing

Anchor Size	D <sub>a</sub>		M8	M10	M12	M16	M20	M24	M27	M30
Min. Member Thickness	h <sub>min</sub>	[mm]	h <sub>ef</sub> + 30 mm ≥ 100 mm				h <sub>ef</sub> + 2d <sub>0</sub>			
Min. Edge Distance	C <sub>min</sub>	[mm]	35	40	45	50	60	65	75	80
Min. Spacing	S <sub>min</sub>	[mm]	40	50	60	75	95	115	125	140

## Steel Brush Dimensions

Anchor Size	D <sub>a</sub>		M8	M10	M12	M16	M20	M24	M27	M30
Brush Diameter	D	[mm]	11,5	13,5	15,5	20	24	30	31,8	37
Min. Brush Diameter	D <sub>min</sub>	[mm]	10,5	12,5	14,5	18,5	22,5	28,5	30,5	35,5



## Performance Data<sup>1)</sup>

Steel Failure

- 1) **Performance Data:** Loads in kN for a single anchor installed at standard embedment depth in Compressed Air Cleaned Holes and Concrete C20/C25\*. Temperature 50°C/80°C for long/short term. No influence of Edge- or Center to Center Distances.
- 2) **Shear Loads:** Steel strength in kN without bending moment.
- 3) **Recommended Loads** incl. Safety factor  $\gamma_G = 1,4$ .

## Design Resistance Dry/Wet Holes

Non-Cracked Concrete		D <sub>a</sub>		M8	M10	M12	M16	M20	M24	M27	M30
Steel 5.8	Tensile	<b>N<sub>Rd</sub></b>	[kN]	12,0	19,3	28,0	47,1	62,2	85,4	110,9	131,4
	Shear <sup>2)</sup>	<b>V<sub>Rd</sub></b>	[kN]	7,2	11,2	16,8	31,2	48,8	70,4	92,0	112,0
Steel 8.8	Tensile	<b>N<sub>Rd</sub></b>	[kN]	19,3	28,7	38,8	47,1	62,2	85,4	110,9	131,4
	Shear <sup>2)</sup>	<b>V<sub>Rd</sub></b>	[kN]	12,0	18,4	27,2	50,4	78,4	112,8	147,2	179,2
A4-50	Tensile	<b>N<sub>Rd</sub></b>	[kN]							80,1	97,9
	Shear <sup>2)</sup>	<b>V<sub>Rd</sub></b>	[kN]							48,3	58,8
A4-70	Tensile	<b>N<sub>Rd</sub></b>	[kN]	13,9	21,9	31,6	47,1	62,2	85,4		
	Shear <sup>2)</sup>	<b>V<sub>Rd</sub></b>	[kN]	8,3	12,8	19,2	35,3	55,1	79,5		

Cracked Concrete		D <sub>a</sub>		M8	M10	M12	M16	M20	M24	M27	M30
Steel 5.8	Tensile	<b>N<sub>Rd</sub></b>	[kN]	7,3	11,0	17,3	28,0	44,3	60,9	79,1	93,7
	Shear <sup>2)</sup>	<b>V<sub>Rd</sub></b>	[kN]	7,2	11,2	16,8	31,2	48,8	70,4	92,0	112,0
Steel 8.8	Tensile	<b>N<sub>Rd</sub></b>	[kN]	7,3	11,0	17,3	28,0	44,3	60,9	79,1	93,7
	Shear <sup>2)</sup>	<b>V<sub>Rd</sub></b>	[kN]	12,0	18,4	27,2	50,4	78,4	112,8	147,2	179,2
A4-50	Tensile	<b>N<sub>Rd</sub></b>	[kN]							79,1	93,7
	Shear <sup>2)</sup>	<b>V<sub>Rd</sub></b>	[kN]							48,3	58,8
A4-70	Tensile	<b>N<sub>Rd</sub></b>	[kN]	7,3	11,0	17,3	28,0	44,3	60,9		
	Shear <sup>2)</sup>	<b>V<sub>Rd</sub></b>	[kN]	8,3	12,8	19,2	35,3	55,1	79,5		

3

## Recommended Loads Dry/Wet Holes

Non-Cracked Concrete		D <sub>a</sub>		M8	M10	M12	M16	M20	M24	M27	M30
Steel 5.8	Tensile	<b>N<sub>rec</sub></b>	[kN]	8,6	13,8	20,0	33,6	44,4	61,0	79,2	93,9
	Shear <sup>2)</sup>	<b>V<sub>rec</sub></b>	[kN]	5,1	8,0	12,0	22,3	34,9	50,3	65,7	80,0
Steel 8.8	Tensile	<b>N<sub>rec</sub></b>	[kN]	13,8	20,5	27,7	33,6	44,4	61,0	79,2	93,9
	Shear <sup>2)</sup>	<b>V<sub>rec</sub></b>	[kN]	8,6	13,1	19,4	36,0	56,0	80,6	105,1	128,0
A4-50	Tensile	<b>N<sub>rec</sub></b>	[kN]							57,2	69,9
	Shear <sup>2)</sup>	<b>V<sub>rec</sub></b>	[kN]							34,5	42,0
A4-70	Tensile	<b>N<sub>rec</sub></b>	[kN]	9,9	15,3	22,5	33,6	44,4	61,0		
	Shear <sup>2)</sup>	<b>V<sub>rec</sub></b>	[kN]	6,0	9,2	13,7	25,2	39,4	56,8		

Cracked Concrete		D <sub>a</sub>		M8	M10	M12	M16	M20	M24	M27	M30
Steel 5.8	Tensile	<b>N<sub>rec</sub></b>	[kN]	5,2	7,9	12,3	20,0	31,7	43,5	56,5	66,9
	Shear <sup>2)</sup>	<b>V<sub>rec</sub></b>	[kN]	5,1	8,0	12,0	22,3	34,9	50,3	65,7	80,0
Steel 8.8	Tensile	<b>N<sub>rec</sub></b>	[kN]	5,2	7,9	12,3	20,0	31,7	43,5	56,5	66,9
	Shear <sup>2)</sup>	<b>V<sub>rec</sub></b>	[kN]	8,6	13,1	19,4	36,0	56,0	80,6	105,1	128,0
A4-50	Tensile	<b>N<sub>rec</sub></b>	[kN]							56,5	66,9
	Shear <sup>2)</sup>	<b>V<sub>rec</sub></b>	[kN]							34,5	42,0
A4-70	Tensile	<b>N<sub>rec</sub></b>	[kN]	5,2	7,9	12,3	20,0	31,7	43,5		
	Shear <sup>2)</sup>	<b>V<sub>rec</sub></b>	[kN]	6,0	9,2	13,7	25,2	39,4	56,8		



## INNOVATIVE SOFTWARE - ANCHOR DESIGN MADE EASY

- Innovative 3d visual user interface, ETAG-001 & SA TS 101:2015 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 SA TS 101:2015 now directly referenced in the 2016 National Construction Code.

With input Freedom & 3D user Interface ICCONS® DesignFiX offers complete

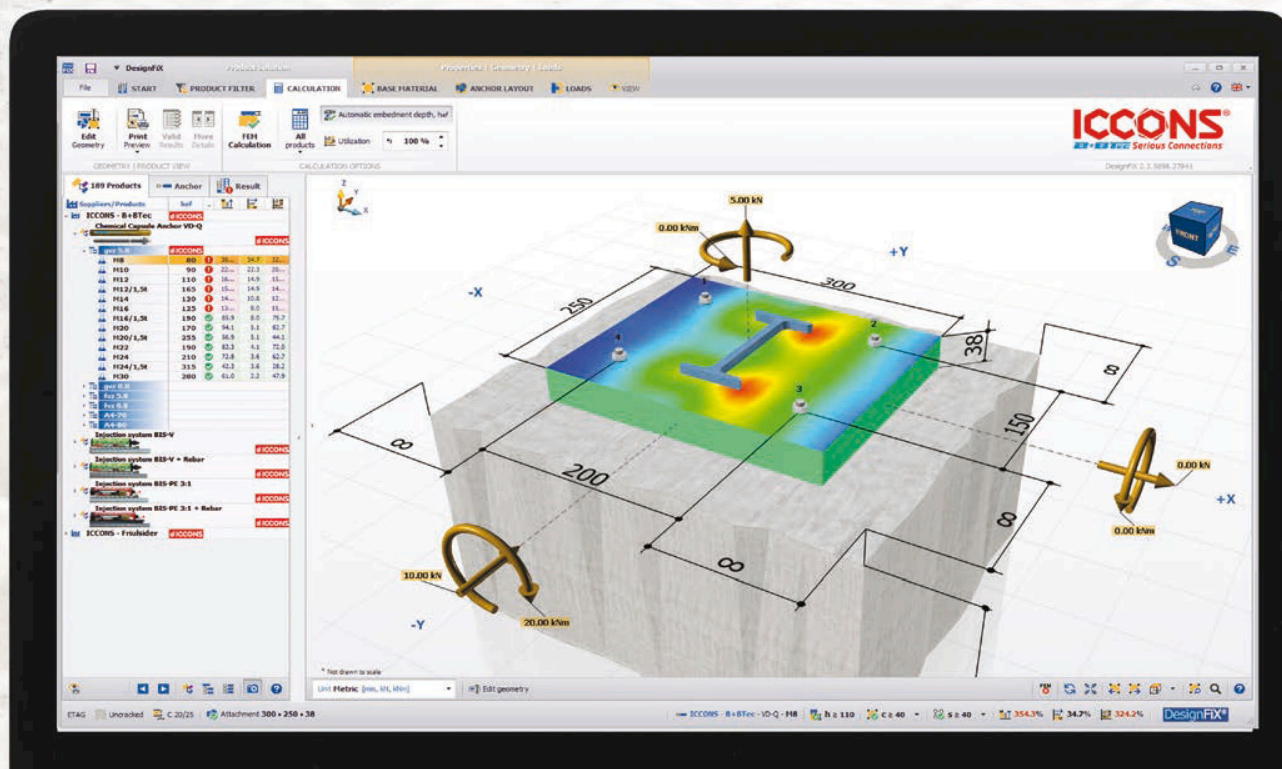
freedom to select an anchor pattern and base plate configuration, as well as the position and direction of load combinations. Changes are made directly into the 3D user interface.

### 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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