



Direct Fasteners Chemical Anchors Abrasives



CHEMICAL ANCHORS

CS - EM 1000



Product Description

CS - EM 1000 is a chemical anchoring injection system consisting of two components in a 3:1 ratio. It is made from pure epoxy with exceptional bond strength and is primarily designed to anchor threaded rods and reinforcing bars into concrete. It is commonly used in high-performance structural applications where the load is critical.

Features:

- Dry, wet and flooded holes
- Temperature range: from -40°C to +72°C (long term maximum temperature +50°C).
- For very high loads
- High chemical resistance
- Usable in percussion drilled and diamond drilled holes
- Cures down to -5°C
- 100 years working life
- Styrene free formulation (SF)
- For heavy anchoring - doweling and post-installed rebar connection
- Odourless and VOC content (A+)
- Suitable for seismic actions of requirement levels C1 & C2
- Low shrinkage: suitable for larger annular gaps
- Fixings in concrete, wood, or other high strength materials.

Working and loading time

Working time is typical gel time at the highest temperature of the given range.
Loading time is setting time at the lowest temperature of the given range.

Packaging

Cartridge	Pices in a Box	Pices in a Wooden Pallet
385ml	12	840
585ml	12	672

For each cartridge, there are two static mixers in the box.



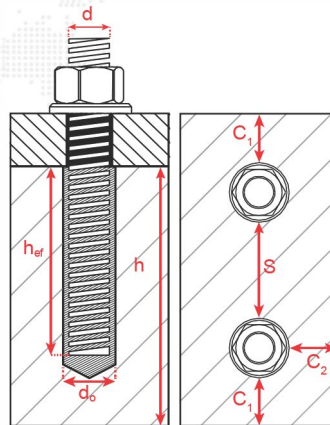
Temperature of base material	Temperature of Cartridge	Maximum Working Time (Minutes) t_{work}	Minimum Curing time ¹ (Hours) t_{load} or t_{cure}
-5°C to -1°C	+5°C	120	168
0°C to +4°C	+5°C	120	48
+5°C to +9°C	+5°C to +9°C	120	24
+10°C to +14°C	+10°C to +14°C	90	16
+15°C to +19°C	+15°C to +19°C	60	12
+20°C to +24°C	+20°C to +24°C	30	7
+25°C to +29°C	+25°C to +29°C	20	6
+30°C to +34°C	+30°C to +34°C	15	5
+35°C to +40°C	+35°C to +40°C	12	4.5



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Installation Parameters



Installation Parameter - Threaded Rod

Anchor size			M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
d	Diameter of anchor	mm	8	10	12	16	20	24	27	30	33	36	39
d _o	Nominal diameter of drill bit	mm	10	12	14	18	22	28	30	35	37	40	42
d _f	Diameter of clearance hole in the fixture (≥)	mm	9	12	14	18	22	26	30	33	36	39	42
d _b	Diameter of steel brush (≥)	mm	12	14	16	20	24	30	32	37	40	44	47
h _{ef,min}	Minimum effective anchorage depth	mm	60	60	70	80	90	96	108	120	132	144	156
h _{ef}	Standard effective anchorage depth	mm	80	90	110	125	170	210	240	270	300	330	360
h _{ef,max}	Maximum effective anchorage depth	mm	160	200	240	320	400	480	540	600	660	720	780
h _{min}	Minimum thickness of the concrete member	mm	h _{ef} +30mm ≥100mm			h _{ef} +2d _o							
T _{inst}	Nominal torque moment	Nm	10	20	40	80	150	200	270	300	330	360	390
S _{min}	Minimum spacing	mm	40	50	60	75	90	115	120	140	165	180	195
C _{min}	Minimum edge distance (5*d)	mm	40	45	45	50	55	60	75	80	165	180	195

Installation Parameter - Reinforcing Bar

Anchor size			Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø36	Ø40
d	Diameter of anchor	mm	8	10	12	14	16	20	25	25	28	30	32	36	40
d _o	Nominal diameter of drill bit	mm	10 12	12 14	14 16	18	20	25	30 32	30 32	35	37	40	45	50
d _b	Diameter of steel brush (≥)	mm	10 12	12 14	14 16	18	20	25	32	32	35	37	40 42	45	50
h _{ef,min}	Minimum effective anchorage depth	mm	60	60	70	75	80	90	96	100	112	120	128	144	240
h _{ef}	Effective anchorage depth	mm	80	90	110	125	125	170	190	210	270	270	300	330	360
h _{ef,max}	Maximum effective anchorage depth	mm	160	200	240	280	320	400	480	500	560	600	640	720	800
h _{min}	Minimum thickness of the concrete member	mm	h _{ef} +30mm ≥100mm			h _{ef} +2d _o									
S _{min}	Minimum spacing	mm	40	50	60	70	80	100	125	125	140	150	160	180	200
C _{min}	Minimum edge distance (5*d)	mm	40	45	45	50	50	65	70	70	75	80	80	180	200

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Static and Quasi Static Load Values -
Threaded Bar (Working life of 50 years)



Recommended Tension and Shear Load - Threaded Rod ⁽¹⁾

Recommended Loads in Non-cracked Concrete C20/25

	Material	Size		M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Tension	5.8	N _{Rec}	[kN]	8,7	13,8	20,1	32,7	51,9	71,3	87,1	103,9	101,4	117,0	133,3
	8.8	N _{Rec}	[kN]	13,9	20,0	27,0	32,7	51,9	71,3	87,1	103,9	101,4	117,0	133,3
	A4	N _{Rec}	[kN]	9,8	15,5	22,5	32,7	51,9	71,3	57,3	70,1	86,7	102,0	121,9
	HCR	N _{Rec}	[kN]	13,9	20,0	27,0	32,7	51,9	71,3	87,1	103,9	101,4	117,0	133,3
Shear	5.8	V _{Rec}	[kN]	6,3	9,9	14,5	26,9	42,0	60,5	78,7	96,2	119,0	140,1	167,3
	8,4	V _{Rec}	[kN]	8,4	13,3	19,3	35,9	56,0	80,7	104,9	128,2	158,6	186,7	223,1
	5,9	V _{Rec}	[kN]	5,9	9,3	13,5	25,2	39,3	56,6	34,4	42,1	52,1	61,3	73,2
	8,4	V _{Rec}	[kN]	8,4	13,3	19,3	35,9	56,0	50,4	65,6	80,1	62,1	72,9	87,1

Recommended Loads in Cracked Concrete C20/25

	Material	Size		M8	M10	M12	M16	M20	M24	M27	M30	M33	M36	M39
Tension	5.8	N _{Rec}	[kN]	7,2	12,1	18,9	22,9	36,3	49,9	61,0	72,7	-	-	-
	8.8	N _{Rec}	[kN]	7,2	12,1	18,9	22,9	36,3	49,9	61,0	72,7	-	-	-
	A4	N _{Rec}	[kN]	7,2	12,1	18,9	22,9	36,3	49,9	61,0	72,7	-	-	-
	HCR	N _{Rec}	[kN]	7,2	12,1	18,9	22,9	36,3	49,9	61,0	72,7	-	-	-
Shear	5.8	V _{Rec}	[kN]	6,3	9,9	14,5	26,9	42,0	60,5	78,7	96,2	-	-	-
	8,8	V _{Rec}	[kN]	8,4	13,3	19,3	35,9	56,0	80,7	104,9	128,2	-	-	-
	A4	V _{Rec}	[kN]	5,9	9,3	13,5	25,2	39,3	56,6	34,4	42,1	-	-	-
	HCR	V _{Rec}	[kN]	8,4	13,3	19,3	35,9	56,0	50,4	65,6	80,1	-	-	-

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Static and Quasi Static Load Values -
Threaded Bar (Working life of 100 years)



Recommended Tension and Shear Load - Threaded Rod ⁽¹⁾

Recommended Loads in Non-cracked Concrete C20/25

	Material	Size		M8	M10	M12	M16	M20	M24	M27	M30
Tension	5.8	N _{Rec}	[kN]	8,7	13,8	20,1	32,7	51,9	71,3	87,1	103,9
	8.8	N _{Rec}	[kN]	13,9	20,0	27,0	32,7	51,9	71,3	87,1	103,9
	A4	N _{Rec}	[kN]	9,8	15,5	22,5	32,7	51,9	71,3	57,3	70,1
	HCR	N _{Rec}	[kN]	13,9	20,0	27,0	32,7	51,9	71,3	87,1	103,9
Tension	5.8	V _{Rec}	[kN]	6,3	9,9	14,5	26,9	42,0	60,5	78,7	96,2
	8.8	V _{Rec}	[kN]	8,4	13,3	19,3	35,9	56,0	80,7	104,9	128,2
	A4	V _{Rec}	[kN]	5,9	9,3	13,5	25,2	39,3	56,6	34,4	42,1
	HCR	V _{Rec}	[kN]	8,4	13,3	19,3	35,9	56,0	50,4	65,6	80,1

Recommended Loads in Cracked Concrete C20/25

	Material	Size		M8	M10	M12	M16	M20	M24	M27	M30
Tension	5.8	N _{Rec}	[kN]	6,7	10,8	17,8	22,9	36,3	49,9	61,0	72,7
	8.8	N _{Rec}	[kN]	6,7	10,8	17,8	22,9	36,3	49,9	61,0	72,7
	A4	N _{Rec}	[kN]	6,7	10,8	17,8	22,9	36,3	49,9	57,3	70,1
	HCR	N _{Rec}	[kN]	6,7	10,8	17,8	22,9	36,3	49,9	61,0	72,7
Tension	5.8	V _{Rec}	[kN]	6,3	9,9	14,5	26,9	42,0	60,5	78,7	96,2
	8.8	V _{Rec}	[kN]	8,4	13,3	19,3	35,9	56,0	80,7	104,9	128,2
	A4	V _{Rec}	[kN]	5,9	9,3	13,5	25,2	39,3	56,6	34,4	42,1
	HCR	V _{Rec}	[kN]	8,4	13,3	19,3	35,9	56,0	50,4	65,6	80,1

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Static and Quasi Static Load Values - Rebar (Working life of 50 years)

Recommended Tension and Shear Load - Rebar															
Recommended Loads in Non-cracked Concrete C20/25															
	Material	Size		Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø24	Ø25	Ø28	Ø30	Ø32	Ø40
Tension	Rebar B500B	N _{Rec}	[kN]	9,6	20,0	27,0	32,7	32,7	51,9	61,4	71,3	103,9	103,9	121,7	133,3
Shear	Rebar B500B	V	[kN]	6,7	10,5	14,8	20,0	26,2	41,0	59,0	64,3	80,5	92,4	105,2	164,8
Recommended Loads in Cracked Concrete C20/25															
Tension	Rebar B500B	N _{Rec}	[kN]	9,6	20,0	27,0	32,7	32,7	51,9	61,4	71,3	103,9	103,9	121,7	133,3
Shear	Rebar B500B	V _{Rec}	[kN]	6,7	10,5	14,8	20,0	26,2	41,0	59,0	64,3	80,5	92,4	105,2	164,8

Static and Quasi Static Load Values - Rebar (Working life of 100 years)

Recommended Tension and Shear Load - Rebar													
Recommended Loads in Non-cracked Concrete C20/25													
	Material	Size		Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø24	Ø25	Ø28	Ø32
Tension	Rebar B500B	N _{Rec}	[kN]	9,6	20,0	27,0	32,7	32,7	51,9	61,4	71,3	103,9	121,7
Shear	Rebar B500B	V _{Rec}	[kN]	6,7	10,5	14,8	20,0	26,2	41,0	59,0	64,3	80,5	105,2
Recommended Loads in Cracked Concrete C20/25													
Tension	Rebar B500B	N _{Rec}	[kN]	4,8	12,1	18,9	22,9	22,9	36,3	42,9	49,9	72,7	85,2
Shear	Rebar B500B	V _{Rec}	[kN]	6,7	10,5	14,8	20,0	26,2	41,0	59,0	64,3	80,5	105,2

Seismic Load Values - Rebar (Working life of 50)

Characteristic Resistance to Tension and Shear Load in Case of Seismic Performance Category C1 - Rebar													
	Material	Size		Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø24	Ø25	Ø28	Ø32
Tension	Rebar B500B	N _{Rk,seis}	[kN]	-	25,0	33,8	40,9	40,9	64,9	76,7	89,1	129,9	152,1
Shear	Rebar B500B	V _{Rk,seis}	[kN]	-	15,0	22,0	29,0	39,0	60,0	87,0	95,0	118,0	155,0
Design Resistance to Tension and Shear Load in Case of Seismic Performance Category C1 - Rebar													
Tension	Rebar B500B	N _{Rk,seis}	[kN]	-	16,7	22,5	27,3	27,3	43,3	51,1	59,4	86,6	101,4
Shear	Rebar B500B	V _{Rk,seis}	[kN]	-	10,0	14,7	20,0	26,0	40,0	58,0	63,3	78,7	103,3