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**100 YEARS**



CHEMICAL MORTAR  
**CM360SH**  
SEISMIC HYBRID INJECTION RESIN

# Chemical Mortar CM360SH



## Description

CM360SH is a top-performance 'New Generation Polymer' anchoring system with very low VOC content offering very high performance in both cracked & uncracked concrete, along with a very good performance under seismic conditions (C1&C2). CM360SH together with its variations is one of the most versatile anchoring systems in our range.

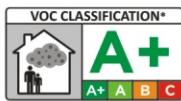
Available in Sizes : 360ml Cartridge

## Features

- Suitable for use with close edge distance and small anchor spacings
- Suitable for dry, wet & flooded holes
- Reduced drilling diameters, 22mm for M20 and 26mm for M24; results in significant material and labour savings.
- Variable embedment depths 8d to 20d

## Approvals

- ETA Option 1 ETAG 001 for cracked concrete with studs and rebar TR029
- ETA Option 1 ETAG 001 for rebar TR023 : Approved for Seismic Loads C2
- F120 Fire Test report • ICC-ES Approval ESR 3853
- BS6920 for use with potable water WRAS Approved 1309522
- ETA approved in flooded holes, wet and dry concrete
- Tested according to LEED 2009 EQ c4.1, SCAQMD rule 1168 (2005).



## GEL & CURE TIME TABLE

Cartridge Temperature 5°C	T Work	Base Material Temperature	T Load
5°C	10 Minutes	5°C to 10°C	145 Minutes
	8 Minutes	10°C to 15°C	85 Minutes
	6 Minutes	15°C to 20°C	75 Minutes
	5 Minutes	20°C to 25°C	50 Minutes
	4 Minutes	25°C to 30°C	40 Minutes

### Note :

T Work is typical gel time at highest base material temperature in the range.

T Load is minimum set time required until load can be applied at the lowest base material temperature in the range.



### Threaded Rods - Characteristic Values for Steel Failure (Tension)

Size			M8	M10	M12	M16	M20	M24	M27	M30
Steel Grade 4.6	$N_{Rk,S}$	kN	15	23	34	63	98	141	184	224
Partial Safety Factor	$\gamma_{Ms}$	[-]	2							
Steel Grade 5.8	$N_{Rk,S}$	kN	18	29	42	79	123	177	230	281
Partial Safety Factor	$\gamma_{Ms}$	[-]	1.50							
Steel Grade 8.8	$N_{Rk,S}$	kN	29	46	67	126	196	282	367	449
Partial Safety Factor	$\gamma_{Ms}$	[-]	1.50							
Steel Grade 10.9*	$N_{Rk,S}$	kN	37	58	84	157	245	353	459	561
Partial Safety Factor	$\gamma_{Ms}$	[-]	1.33							
Stainless Steel Grade A4 - 70	$N_{Rk,S}$	kN	26	41	59	110	172	247	321	393
Partial Safety Factor	$\gamma_{Ms}$	[-]	1.87							
Stainless Steel Grade A4 - 80	$N_{Rk,S}$	kN	29	46	67	126	196	282	367	449
Partial Safety Factor	$\gamma_{Ms}$	[-]	1.60							
Stainless Steel Grade 1.4529	$N_{Rk,S}$	kN	26	41	59	110	172	247	321	393
Partial Safety Factor	$\gamma_{Ms}$	[-]	1.50							

### Threaded Rods - Characteristic values for Steel Failure (Shear – without lever arm)

Size			M8	M10	M12	M16	M20	M24	M27	M30
Steel Grade 4.6	$V_{Rk,S}$	kN	7	12	17	31	49	71	92	112
Partial Safety Factor	$\gamma_{Ms}$	[-]	1.67							
Steel Grade 5.8	$V_{Rk,S}$	kN	9	15	21	39	61	88	115	140
Partial Safety Factor	$\gamma_{Ms}$	[-]	1.25							
Steel Grade 8.8	$V_{Rk,S}$	kN	15	23	34	63	98	141	184	224
Partial Safety Factor	$\gamma_{Ms}$	[-]	1.25							
Steel Grade 8.8	$V_{Rk,S}$	kN	15	23	34	63	98	141	184	224
Partial Safety Factor	$\gamma_{Ms}$	[-]	1.25							
Steel Grade 10.9*	$V_{Rk,S}$	kN	18	29	42	79	123	177	230	281
Partial Safety Factor	$\gamma_{Ms}$	[-]	1.50							
Stainless Steel Grade A4-70	$V_{Rk,S}$	kN	13	20	30	55	86	124	161	196
Partial Safety Factor	$\gamma_{Ms}$	[-]	1.56							
Stainless Steel Grade A4-80	$V_{Rk,S}$	kN	15	23	34	63	98	141	184	224
Partial Safety Factor	$\gamma_{Ms}$	[-]	1.33							
Stainless Steel Grade 1.4529	$V_{Rk,S}$	kN	13	20	30	55	86	124	161	196
Partial Safety Factor	$\gamma_{Ms}$	[-]	1.25							

### Installation Parameters - Rebar

Size			8	10	12	16	20	25	32	
Nominal Drill Hole Diameter	$d_o$	mm	12	14	16	20	25	32	40	
Diameter of Cleaning Brush	$d_b$	mm	14	14	19	22	29	40	42	
Minimum Embedment Depth	$h_{ef}$	mm	64	80	96	128	160	200	256	
Maximum Embedment Depth	$h_{ef}$	mm	160	200	240	320	400	500	640	
Minimum Edge Distance	$c_{min}$	mm	35	40	50	65	80	100	130	
Minimum Spacing	$s_{min}$	mm	35	40	50	65	80	100	130	
Minimum Member Thickness	$h_{min}$	mm	$h_{ef} + 30 \text{ mm} \geq 100 \text{ mm}$				$h_{ef} + 2d_o$			



## Seismic Category C1

Characteristic Resistance - Combined Pull out & Concrete Cone Failure Using Threaded Rods

Size			M10	M12	M16	M20	M24
Characteristic Bond Resistance Category C1 for 50 years working life -40°C to 80°C	$\tau_{Rk,uncr}$	N/mm <sup>2</sup>	5.5	5.5	5.5	4.2	5.0
Characteristic Bond Resistance Category C1 for 100 years working life -40°C to 80°C	$\tau_{Rk,uncr}$	N/mm <sup>2</sup>	3.8	3.8	4.0	2.6	3.8
Installation Factor	Dry Concrete Flooded Holes	$\gamma_{inst}$	[-]	1.2			
				1.4			
Factor for Concrete Grade	$\psi_c$	C30/37	1.12				
		C40/50	1.23				
		C50/60	1.30				

## Resistance Values for Threaded Rod in Seismic Category C1 - 100 years working life

Combined Pullout & Concrete Cone Failure and Concrete Cone Failure

Temperature Range : -40°C to 80°C

Property	Unit		Anchor Diameter				
			M10	M12	M16	M20	M24
Effective Embedment Depth = MIN = 8d	$h_{ef}$	mm	80	96	128	160	200
Design Resistance	$N_{Rd}$	kN	5.0	7.5	14.0	14.5	31.5
Effective Embedment Depth = 12d	$h_{ef}$	mm	120	144	192	240	288
Design Resistance	$N_{Rd}$	kN	7.5	11.0	21.0	21.5	45.5
Effective Embedment Depth = MAX = 20d	$h_{ef}$	mm	200	240	320	400	480
Design Resistance	$N_{Rd}$	kN	13.0	19.0	35.5	36.0	76.0

## Characteristic Resistance - Combined Pullout & Concrete Cone Failure for Rebar

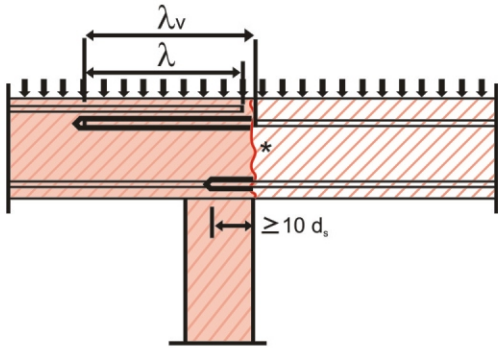
Rebar Diameter (mm)			8	10	12	16	20	25	32
Characteristic Bond Resistance in Uncracked Concrete For a Working Life of 50 and 100 Years Dry/Wet Concrete and Flooded Holes -40 to 80	$\tau_{Rk,uncr}$	N/mm <sup>2</sup>	12.0	10.0	10.0	9.0	9.0	9.0	5.5
Installation Factor	Dry/saturated Concrete Flooded Holes	$\gamma_{inst}$	[-]	1.2					
				1.4					
Factor for Concrete	$\psi_c$	C 50/60	1.00						
Factor for Influence of Sustained Load with working life of 50 years	$\psi_{sus}$	T2 : 50/80	0.73						



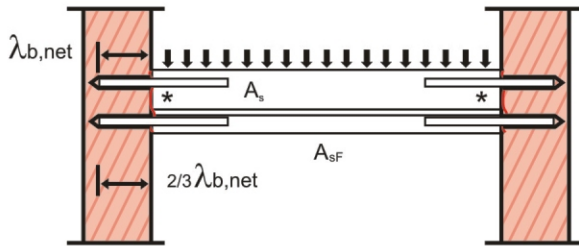
# Post installed Rebar schematics

## Application examples of Post-installed Rebar

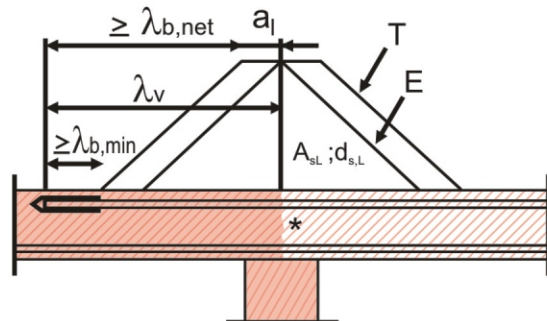
**Figure 1 :** Overlap joints in slabs and beams.



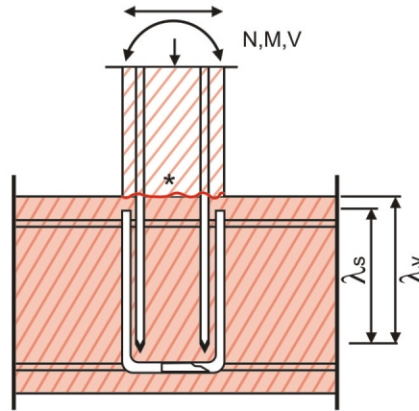
**Figure 3 :** End anchoring of slabs or beams, designed as simply supported.



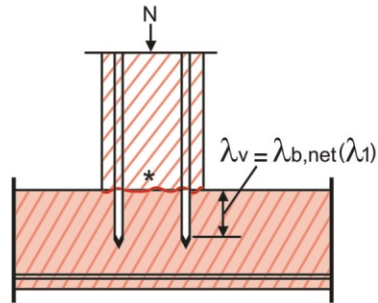
**Figure 5 :** Anchoring of reinforcement to cover the line of acting tensile force.



**Figure 2 :** Overlap joint in foundation of a column or wall where the rebars are stressed in tension.



**Figure 4 :** Rebar connection of components stressed primarily in compression. The rebar are stressed in compression.



### Key to Figure A5

- T acting tensile force
- E envelope of  $M_{ed}/z + N_{ed}$  (see EN 1992-1-1, Figure 9.2)
- x distance between the theoretical point of support and concrete joint

### Note to Figure A1 to A5:

In the Figures no transverse reinforcement is plotted, the transverse reinforcement as required by EN 1992-1-1 shall be present.

The shear transfer between old and new concrete shall be designed according to EN 1992-1-1.



# Chemical Anchor Stud CAS

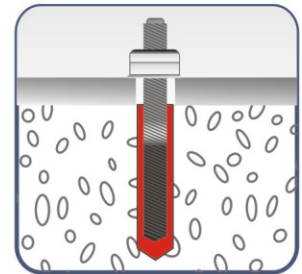
Steel, zinc plated/stainless steel A4-316



Chemical anchor CAS-E

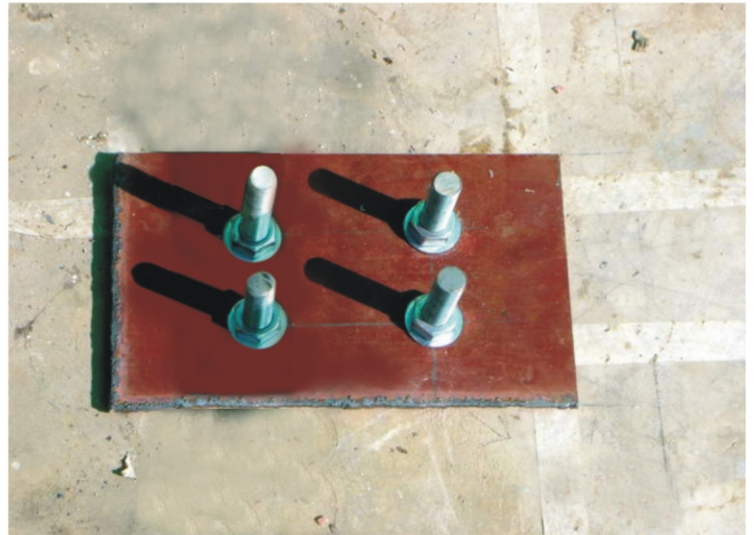
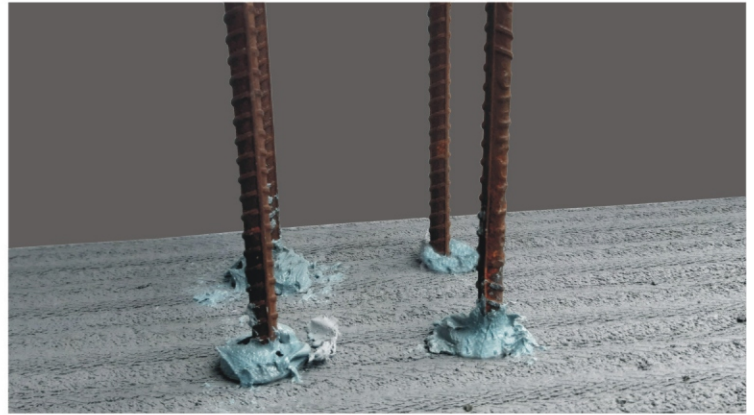
## Description

The chemical anchor CAS is a chisel ended anchor for use with any of our injection systems and glass capsules in masonry and concrete. On installation the stud becomes chemically bonded to the base material. Notably the fixing method imposes no expansion stress on the base material and is ideal for shock or vibratory loading and for softer or low density building materials where expansion stresses would normally result in failure. The method also gives exceptional performance for close to center and close to edge fixing. The nut may be removed and replaced without affecting the anchorage. The chemical anchor CAS is supplied complete with high tensile hex nut and plain washer in addition to one external hex drive adapter in each box.



Product code Zinc plated 5.8 Grade	Anchor thread size(mm)	Anchor Length ( mm )	Hole Diameter ( mm )	Effective anchoring depth (mm)	Max.usable Length ( mm )	Width across nut (mm)	Hex nut (mm) SW	Washer in dia (mm)	Washer outer dia (mm)	Washer thickness (mm)	Package content pcs per Box
CAS08110E	M 08	110	10	80	13	5	13	9	15	1	25
CAS10130E	M 10	130	12	90	20	7	17	11	19	2	25
CAS10165E	M 10	165	12	90	52	7	17	11	19	2	25
CAS12160E	M 12	160	14	110	25	8	19	13	19.5	3	20
CAS12220E	M 12	220	14	110	90	8	19	13	19.5	3	20
CAS12250E	M 12	250	14	110	120	8	19	13	19.5	3	20
CAS16165E	M 16	165	18	125	13	12	24	17	29	4	10
CAS16190E	M 16	190	18	125	35	12	24	17	29	4	10
CAS16250E	M 16	250	18	125	98	12	24	17	29	4	10
CAS16300E	M 16	300	18	125	148	12	24	17	29	4	10
CAS16380E	M 16	380	18	125	235	12	24	17	29	4	10
CAS16500E	M 16	500	18	125	355	12	24	17	29	4	10
CAS20260E	M 20	260	25	170	65	12	30	21	36	4	10
CAS20350E	M 20	350	25	170	155	12	30	21	36	4	10
CAS20500E	M 20	500	25	170	305	12	30	21	36	4	10
CAS24300E	M 24	300	28	210	65	16	36	26	43	5	5
CAS24400E	M 24	400	28	210	165	16	36	26	43	5	5
CAS24600E	M 24	600	28	210	365	16	36	26	43	5	5
CAS27340E	M 27	340	32	210	165	18	41	28	49	5	5
CAS30380E	M 30	380	35	280	65	25	46	33	55	5	5
CAS30500E	M 30	500	35	280	185	25	46	33	55	5	5







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