

42.1 GENERAL INFORMATION

PERFORMANCE RELATED	INSTALLATION RELATED

Product

Designed for use in significant concrete structures & connections requiring protection under fire conditions. Epcon C8 is a High Performance pure epoxy anchoring adhesive for use in cracked & non cracked concrete.

Benefits, Advantages and Features

Fire tested to European Fire Standards

- CSTB Fire test Report no 26007642/b
- For Wall to Slab connection with reinforcement bar
- For Beam frame reinforcement

European Technical Approval option1 for use in cracked and non cracked concrete – ETA-10/0309:

- Highest level of European approval for chemical anchors
- 100 year design life
- Approved for flooded holes
- Approved for floor, wall & overhead applications
- Data on Sustained Loading

Greater productivity:

- Anchors in dry, damp, wet or flooded holes
- No Damage or Leaks – less wastage
- Fast, easy dispensing with high flow (pneumatic) dispenser
- Jumbo dispensing cartridge 900ml

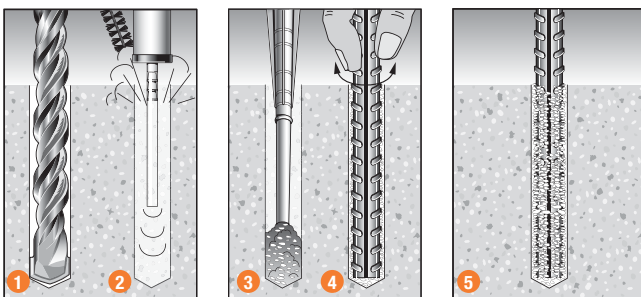
Versatile

- Anchors all stud & bar diameters in all directions
- Suits variable concrete strengths
- Anchors in carbide drilled and diamond cored holes
- For tropical & cold weather conditions

Greater safety:

- Low odour
- Non-flammable

Installation



1. Drill recommended diameter and depth hole.
2. **Important:** Use Ramset™ Dustless Drilling System to ensure holes are clean. Alternatively, clean dust and debris from hole with stiff wire or nylon brush and blower in the following sequence: blow x 4, brush x 3, blow x 4, brush x 3, blow x 4.
3. Insert mixing nozzle to bottom of hole.
Fill hole to 3/4 the hole depth slowly, ensuring no air pockets form.
4. Insert rebar to bottom of hole while turning.
5. Allow Ramset EPCON C8 to cure as per setting times.



Principal Applications

- Complies to European Fire test Standards
- Anchoring into cracked & non cracked concrete
- Road barrier rebar anchors
- Bridge refurbishment
- Road & Rail tunnel construction
- Reinforcing bar from 8 to 32mm
- Starter Bars

Installation temperature limits:

- Substrate: 5°C to 40°C
- Adhesive: 5°C to 40°C

Load should not be applied to anchor until the chemical has sufficiently cured as specified.

Service temperature limits:

-40°C to 80°C

Setting Times Epcon C8

Temperature of base material	Gel Time	Curing time in dry concrete	Curing time in wet concrete
5°C - 9°C	20 min	30 h	60 h
10°C - 19°C	14 min	23 h	46 h
20°C - 24°C	11 min	16 h	32 h
25°C - 29°C	8 min	12 h	24 h
30°C - 39°C	5 min	8 h	16 h
40°C	5 min	6 h	12 h

Installation Details

EPCON™ C8 with Reinforcing Bar

Anchor size, d _a (mm)	Drilled hole diameter, d _h (mm)
10	12
12	16
16	20
20	25
24	30
25	30
32	40
40	50

42.2 DESCRIPTION AND PART NUMBERS

Description	Cartridge Size	Part No.
EPCON™ C8	450 ml	C8-450

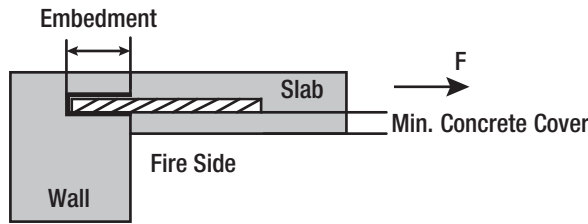
42.3 ENGINEERING PROPERTIES

Typical Engineering Properties of Grade 500 Reinforcing Bar

Rebar Size	10	12	16	20	24	25	32	40
Drilled Hole Dia, d _h (mm)	12	15	20	25	30	30	40	50
Stress Area, A _s (mm ²)	78.5	113	201	314	452	491	804	1260
Yield Stress, f _{sy} (MPa)	500	500	500	500	500	500	500	500
Tensile Steel Yield Capacity, N _{sy} (kN)	39.3	56.5	100.5	157.0	226.0	245.5	402.0	630

For further information refer to reinforcing bar manufacturer's published information and AS/NZS 4671:2001

Reinforcing Bar Anchored with EPCON™ C8



Design Case 1 Fire resistance duration = 30 minutes

For Reinforcing Bar Steel Grade - 500 MPa and Concrete cylinder compressive strength - 20 MPa

Rebar Size	Hole Diameter	*Min. Concrete Cover	Design resistance in accordance with Eurocode 2 for fire duration 30 minutes (kN)													Rebar Max. Load (kN) in case of fire		
			120	160	180	190	200	220	240	250	290	315	320	340	360		400	
10	12	10	6.1	8.1	-	9.6												25.3
12	16	12	7.3	9.7	10.9	-	12.1											36.4
16	20	16		13.0	14.6	-	-	17.8	19.4									64.8
20	25	20		16.2	18.2	-	20.2	22.3	24.3	25.3								101.2
24	30	25								31.6	36.7	39.8						145.8
25	30	25								31.6	36.7	39.8						158.1
32	40	32											51.8	55.0	58.2			259
40	50	40															80.9	404.7
Embedment (mm)			120	160	180	190	200	220	240	250	290	315	320	340	360	400		

* Note: Minimum concrete cover according to Eurocode 2 part 1.2

Design Case 2 Fire resistance duration = 60 minutes

For Reinforcing Bar Steel Grade - 500 MPa and Concrete cylinder compressive strength - 20 MPa

Rebar Size	Hole Diameter	*Min. Concrete Cover	Design resistance in accordance with Eurocode 2 for fire duration 60 minutes (kN)														Rebar Max. Load (kN) in case of fire	
			120	160	180	220	240	250	300	305	320	360**	395	400	445	495		
10	12	20	3.0	8.1	-	11.1												25.3
12	16	20	3.2	9.4	10.9	13.4	14.6											36.4
16	20	20		10.5	14.6	17.8	19.4	-	24.3									64.8
20	25	20		16.2	18.2	22.3	24.3	25.3	-	30.9								101.2
24	30	25						31.6	-	-	-	44.2	50.0					145.8
25	30	25						31.6	-	-	-	44.2	50.0					158.1
32	40	32										51.8	58.2	-	-	72.0		259
40	50	40												80.9	-	100.2		404.7
Embedment (mm)			120	160	180	220	240	250	300	305	320	360**	395	400	445	495		

* Note: Minimum concrete cover according to Eurocode 2 part 1.2

** Note: Values for Rebar Size 24 are based on Embedment = 350 mm

Design method for resistance to fire according to Eurocode 2: Fire proof using design resistance: $R_{d,fi} \leq E_{d,fi}$

$R_{d,fi}$ Design resistance in the fire situation

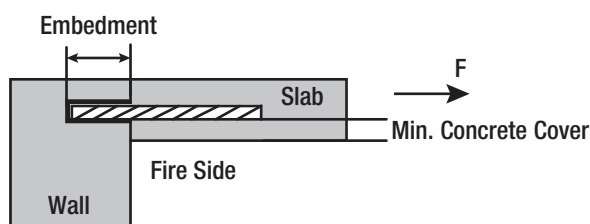
$E_{d,fi}$ Design effect of actions in the fire situation. This value could be calculated from the calculation at normal temperature:

$$E_{d,fi} = \eta_{fi} \times F_{Rdu}$$

F_{Rdu} Design ultimate limit load at normal temperature for one rebar sealing at the anchorage depth (mm)

η_{fi} Reduction factor for design load level in the fire situation η_{fi} is equal to 0.7.

Reinforcing Bar Anchored with EPCON™ C8



Design Case 3 Fire resistance duration = 90 minutes

For Reinforcing Bar Steel Grade - 500 MPa and Concrete cylinder compressive strength - 20 MPa

Rebar Size	Hole Diameter	*Min. Concrete Cover	Design resistance in accordance with Eurocode 2 for fire duration 90 minutes (kN)													Rebar Max. Load (kN) in case of fire	
			120	160	180	220	250	265	290**	320	335	340	400	440	500		555
10	12	25	1.7	5.4	-	11.1	-	13.4									25.3
12	16	25	2.1	5.5	8.6	13.4	-	-	17.0								36.4
16	20	25		5.8	8.9	17.8	-	-	22.7	25.9	27.1						64.8
20	25	25		13.4	18.2	22.3	25.3	-	28.4	-	-	34.4					101.2
24	30	25					30.6	-	36.7	-	-	-	-	55.7			145.8
25	30	25					30.6	-	36.7	-	-	-	-	55.7			158.1
32	40	32								51.8	-	55.0	-	71.2	81.1		259
40	50	40											80.9	-	-	112.3	404.7
Embedment (mm)			120	160	180	220	250	265	290**	320	335	340	400	440	500	555	

* Note: Minimum concrete cover according to Eurocode 2 part 1.2

** Note: Values for Rebar Sizes 12, 16 and 20 are based on Embedment = 280 mm

Design Case 4 Fire resistance duration = 120 minutes

For Reinforcing Bar Steel Grade - 500 MPa and Concrete cylinder compressive strength - 20 MPa

Rebar Size	Hole Diameter	*Min. Concrete Cover	Design resistance in accordance with Eurocode 2 for fire duration 120 minutes (kN)													Rebar Max. Load (kN) in case of fire	
			120	160	240	250	290	300	320	355	360	400	440**	460	500		605
10	12	35	1.2	3.6	12.1	-	14.7										25.3
12	16	35	1.7	3.5	14.6	-	-	18.2									36.4
16	20	35		4.8	19.4	-	-	24.3	25.9	28.7							64.8
20	25	35		10.7	24.3	25.3	-	-	-	-	36.4						101.2
24	30	35				24.5	36.7	-	-	-	-	55.7	58.2				145.8
25	30	35				24.5	36.7	-	-	-	-	55.7	58.2				158.1
32	40	35								51.8	-	58.2	-	71.2	-	81.1	259
40	50	40										80.9	87.0	-	-	122.4	404.7
Embedment (mm)			120	160	240	250	290	300	320	355	360	400	440**	460	500	605	

* Note: Minimum concrete cover according to Eurocode 2 part 1.2

** Note: Values for Rebar Size 40 are based on Embedment = 430 mm

Design method for resistance to fire according to Eurocode 2: Fire proof using design resistance: $R_{d,fi} \leq E_{d,fi}$

$R_{d,fi}$ Design resistance in the fire situation

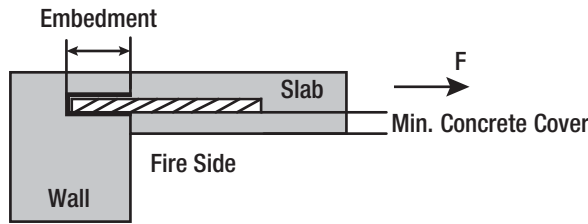
$E_{d,fi}$ Design effect of actions in the fire situation. This value could be calculated from the calculation at normal temperature:

$$E_{d,fi} = \eta_{fi} \times F_{Rdu}$$

F_{Rdu} Design ultimate limit load at normal temperature for one rebar sealing at the anchorage depth (mm)

η_{fi} Reduction factor for design load level in the fire situation η_{fi} is equal to 0.7.

Reinforcing Bar Anchored with EPCON™ C8



Design Case 5 Fire resistance duration = 180 minutes

For Reinforcing Bar Steel Grade - 500 MPa and Concrete cylinder compressive strength - 20 MPa

Rebar Size	Hole Diameter	*Min. Concrete Cover	Design resistance in accordance with Eurocode 2 for fire duration 180 minutes (kN)													Rebar Max. Load (kN) in case of fire		
			120	160	240	250	300	320	350	395	400	430	500	555	575		655	
10	12	50	1.0	1.9	9.6	-	15.2											25.3
12	16	50	1.5	2.4	10.8	-	18.2	19.4	21.2									36.4
16	20	50		3.6	12.8	-	24.3	25.9	-	32.0								64.8
20	25	50		7.9	24.3	25.3	-	-	-	-	40.5							101.2
24	30	50				17.7	-	-	44.2	50.0	-	-	63.2					145.8
25	30	50				17.7	-	-	44.2	50.0	-	-	63.2					158.1
32	40	50						44.5	-	-	-	-	81.1	-	93.1			259
40	50	50								80.9	87.0	-	112.3	-	132.5			404.7
Embedment (mm)			120	160	240	250	300	320	350	395	400	430	500	555	575	655		

* Note: Minimum concrete cover according to Eurocode 2 part 1.2

Design Case 6 Fire resistance duration = 240 minutes

For Reinforcing Bar Steel Grade - 500 MPa and Concrete cylinder compressive strength - 20 MPa

Rebar Size	Hole Diameter	*Min. Concrete Cover	Design resistance in accordance with Eurocode 2 for fire duration 240 minutes (kN)													Rebar Max. Load (kN) in case of fire			
			120	160	240	250	320	350	375	400	425	500	530	555	605		685		
10	12	70	0.9	1.7	7.8	-	-	17.7											25.3
12	16	70	1.4	2.0	8.0	-	19.4	21.2	22.8										36.4
16	20	70		13.0	9.7	-	25.9	-	-	-	34.4								64.8
20	25	70		6.9	20.1	21.4	-	-	-	40.5	43.0								101.2
24	30	70				15.1	-	44.2	-	-	-	63.2	67.0						145.8
25	30	70				15.1	-	44.2	-	-	-	63.2	67.0						158.1
32	40	70						37.3	-	-	-	-	81.1	-	-	97.9			259
40	50	70								80.9	-	-	-	112.3	122.4	138.6			404.7
Embedment (mm)			120	160	240	250	320	350	375	400	425	500	530	555	605	685			

* Note: Minimum concrete cover according to Eurocode 2 part 1.2

Design method for resistance to fire according to Eurocode 2: Fire proof using design resistance: $R_{d,fi} \leq E_{d,fi}$

$R_{d,fi}$ Design resistance in the fire situation

$E_{d,fi}$ Design effect of actions in the fire situation. This value could be calculated from the calculation at normal temperature:

$$E_{d,fi} = \eta_{fi} \times F_{Rdu}$$

F_{Rdu} Design ultimate limit load at normal temperature for one rebar sealing at the anchorage depth (mm)

η_{fi} Reduction factor for design load level in the fire situation η_{fi} is equal to 0.7.