

ChemSet™ Reo502™ Xtrem™

FIRE RATED CHEMICAL ANCHOR

AVAILABLE IN AUSTRALIA ONLY

(New Zealand refer to EPCON™ G5 Xtrem™ range)

GENERAL INFORMATION

Performance Related	Installation Related
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Product

ChemSet™ Reo 502™ Xtrem™ is a heavy duty pure Epoxy for anchoring threaded studs and reinforcing bar into cracked and uncracked concrete.

Compliance

European Technical Assessment ETA-25/0647 and ETA-25/1142

Design according to:

- AS 5216 (formerly TS101)
- EN 1992-4 (formerly ETAG001 Annex C, E & TR045)
- Fire Design according to EN 1992-1-1 and EN 1992-1-2.
- Use enclosed data for simplified calculation method

Use Ramset™ iExpert Anchor Software for optimised calculation or where a greater range of anchor layout detail is needed

Benefits, Advantages and Features

- 120 year working Life
- Fire tested to European Assessment Document

Greater productivity:

- Anchors in dry, damp, wet or flooded holes
- Easy dispensing even in cold weather

Greater security:

- Strong bond
- Rated for sustained loading

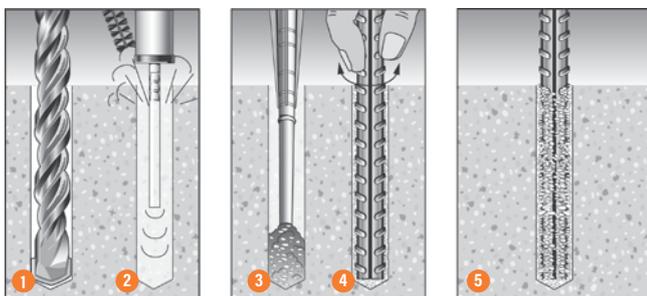
Versatile:

- Anchors in carbide drilled and diamond drilled holes
- Cold and temperate climates

Greater safety:

- Low odour
- VOC Compliant
- Suitable for contact with drinking water

Installation



- Drill recommended diameter and depth hole.
- Important:** For hammer drilling technique clean dust and debris from hole with stiff wire brush and blower in the following sequence: blow x 2, brush x 2, blow x 2, brush x 2, blow x 2.
- Screw mixing nozzle onto cartridge and dispense adhesive to waste until colour is orange. Insert mixing nozzle to bottom of hole. Fill hole to 2/3 the hole depth slowly, ensuring no air pockets form.
- Insert Ramset™ ChemSet™ Anchor Stud/rebar to bottom of hole while turning.
- Allow ChemSet™ Reo 502™ Xtrem™ to cure as per setting times.



Principal Applications

- Threaded Studs
- Starter Bars
- Threaded Inserts
- Over-head installation
- Steel Columns
- Hand Rails
- Road Stitching

Recommended Installation Temperatures

	Minimum	Maximum
Substrate	5°C	40°C
Adhesive	5°C	40°C

Service Temperature Limits

-40°C to +75°C

Setting Times

Temperature of base material	Gel Time	Curing time in dry concrete	Curing time in wet and flooded concrete
5°C	75 min	30h	60 h
10°C	45 min	22h	44 h
15°C	35 min	14h	28 h
20°C	22 min	7h	14 h
25°C	14 min	5h	10 h
30°C	8 min	4h	8 h
35°C	6 min	3h	6h
40°C	4 min	2h 45min	5h 30min

Fire Rated Anchoring Systems

Chemset™ Reo502™ Xtrem™

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Installation Details

ChemSet™ Reo 502™ Xtrem™ with Reinforcing Bar

Anchor size, d_b (mm)	Drilled hole diameter, d_h (mm)
10	12
12	15
16	20
20	25
24	30
25	30
28	35
32	40
36	45
40	50

DESCRIPTION AND PART NUMBERS

Description	Cartridge Size	Part No.
ChemSet™ Reo 502™ Xtrem™	600 ml	CRE0502X

Typical Engineering Properties of Grade 500 Reinforcing Bar

Rebar size	10	12	16	20	24	25	28	32	36	40
Drilled hole dia, d_h (mm)	12	15	20	25	30	30	35	40	45	50
Stress area, A_s (mm ²)	78.5	113	201	314	452	491	616	804	1020	1260
Yield stress, f_{sy} (MPa)	500	500	500	500	500	500	500	500	500	500
Tensile steel yield capacity, $N_{us} = N_{syr}$ (kN)	39.3	56.5	100.5	157.0	226.0	245.5	308.0	402.0	509.0	628.0
Design tensile steel resistance ϕN_{us} (kN)	31.4	45.2	80.4	125.6	180.8	196.4	246.4	321.6	407.2	502.4

For further information refer to reinforcing bar manufacturer's published information and current revision of AS/NZS 4671

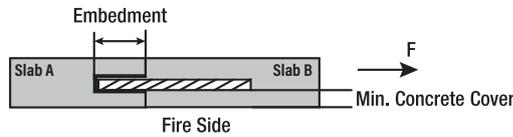
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Fire Rated Anchoring Systems

Reinforcing Bar Anchored with ChemSet™ Reo502™ Xtrem™



Design Case

1

Fire resistance duration = 30 minutes

For Reinforcing Bar Steel Grade - 500 MPa and Concrete cylinder compressive strength $f'_c = 20$ MPa

Rebar Size	Hole Diameter (mm)	*Min. Concrete Cover(mm)	**Design resistance in accordance with Eurocode 2 for fire duration 30 minutes - $R_{d,ff}$ (kN)															
			100	150	200	250	300	350	400	450	500	550	600	700	800	900		
10	12	50	3.32	4.98	6.64	8.30	9.96	11.62	13.28	14.94	16.59	18.25	19.91	23.23	26.55	29.87		
		70	7.63	11.45	15.26	19.08	22.89	26.71	30.52	31.42								
12	15	50	3.98	5.97	7.97	9.96	11.95	13.94	15.93	17.92	19.91	21.91	23.90	27.88	31.86	35.84		
		70	9.16	13.73	18.31	22.89	27.47	32.05	36.63	41.20	45.24	45.24	45.24	45.24	45.24	45.24		
16	20	50		7.97	10.62	13.28	15.93	18.59	21.24	23.90	26.55	29.21	31.86	37.17	42.48	47.79		
		70		18.31	24.42	30.52	36.63	42.73	48.83	54.94	61.04	67.15	73.25	80.42	80.42	80.42		
20	25	50			13.28	16.59	19.91	23.23	26.55	29.87	33.19	36.51	39.83	46.47	53.10	59.74		
		70			30.52	38.15	45.78	53.41	61.04	68.67	76.30	83.93	91.56	106.83	122.09	125.66		
24	30	50				19.91	23.90	27.88	31.86	35.84	39.83	43.81	47.79	55.76	63.72	71.69		
		70				45.78	54.94	64.10	73.25	82.41	91.56	100.72	109.88	128.19	146.50	164.82		
25	30	50				20.74	24.89	29.04	33.19	37.34	41.49	45.64	49.78	58.08	66.38	74.68		
		70				47.69	57.23	66.77	76.30	85.84	95.38	104.92	114.46	133.53	152.61	171.68		
28	35	50					27.88	32.53	37.17	41.82	46.47	51.11	55.76	65.05	74.34	83.64		
		70					64.10	74.78	85.46	96.14	106.83	117.51	128.19	149.56	170.92	192.29		
32	40	50						37.17	42.48	47.79	53.10	58.41	63.72	74.34	84.97	95.59		
		70						85.46	97.67	109.88	122.09	134.30	146.50	170.92	195.34	219.76		
36	45	50							41.82	47.79	53.77	59.74	65.72	71.69	83.64	95.59	107.53	
		70							96.14	109.88	123.61	137.35	151.08	164.82	192.29	219.76	247.23	
40	50	50							46.47	53.10	59.74	66.38	73.02	79.66	92.93	106.21	119.48	
		70							106.83	122.09	137.35	152.61	167.87	183.13	213.65	244.17	274.69	
Embedment (mm)			100	150	200	250	300	350	400	450	500	550	600	700	800	900		

*Note: Minimum concrete cover based on minimum slab thickness of 200mm according to Eurocode 2 Part 1.2 (EN 1992-1-2)

**Note: Performance data based on hammer drilling technique. For data using core drilling technique, please refer to Ramset Engineer. Bold values depicts design tensile steel resistance governs

Design Case

2

Fire resistance duration = 60 minutes

For Reinforcing Bar Steel Grade - 500 MPa and Concrete cylinder compressive strength $f'_c = 20$ MPa

Rebar Size	Hole Diameter (mm)	*Min. Concrete Cover(mm)	**Design resistance in accordance with Eurocode 2 for fire duration 60 minutes - $R_{d,ff}$ (kN)															
			100	150	200	250	300	350	400	450	500	550	600	700	800	900		
10	12	80	3.64	5.47	7.29	9.11	10.93	12.76	14.58	16.40	18.22	20.04	21.87	25.51	29.15	31.42		
		100	6.60	9.91	13.21	16.51	19.81	23.12	26.42	29.72	31.42							
12	15	80	4.37	6.56	8.75	10.93	13.12	15.31	17.49	19.68	21.87	24.05	26.24	30.61	34.99	39.36		
		100	7.93	11.89	15.85	19.81	23.78	27.74	31.70	35.67	39.63	43.59	45.24	45.24	45.24	45.24		
16	20	80		8.75	11.66	14.58	17.49	20.41	23.32	26.24	29.15	32.07	34.99	40.82	46.65	52.48		
		100		15.85	21.13	26.42	31.70	36.99	42.27	47.55	52.84	58.12	63.40	73.97	80.42	80.42		
20	25	80			14.58	18.22	21.87	25.51	29.15	32.80	36.44	40.09	43.73	51.02	58.31	65.60		
		100			26.42	33.02	39.63	46.23	52.84	59.44	66.05	72.65	79.26	92.46	105.67	118.88		
24	30	80				21.87	26.24	30.61	34.99	39.36	43.73	48.10	52.48	61.22	69.97	78.72		
		100				39.63	47.55	55.48	63.40	71.33	79.26	87.18	95.11	110.96	126.81	142.66		
25	30	80				22.78	27.33	31.89	36.44	41.00	45.55	50.11	54.66	63.78	72.89	82.00		
		100				41.28	49.53	57.79	66.05	74.30	82.56	90.81	99.07	115.58	132.09	148.60		
28	35	80					30.61	35.71	40.82	45.92	51.02	56.12	61.22	71.43	81.63	91.84		
		100					55.48	64.73	73.97	83.22	92.46	101.71	110.96	129.45	147.94	166.44		
32	40	80						40.82	46.65	52.48	58.31	64.14	69.97	81.63	93.29	104.96		
		100						73.97	84.54	95.11	105.67	116.24	126.81	147.94	169.08	190.21		
36	45	80						45.92	52.48	59.04	65.60	72.16	78.72	91.84	104.96	118.08		
		100						83.22	95.11	107.00	118.88	130.77	142.66	166.44	190.21	213.99		
40	50	80						51.02	58.31	65.60	72.89	80.17	87.46	102.04	116.62	131.19		
		100						92.46	105.67	118.88	132.09	145.30	158.51	184.93	211.35	237.77		
Embedment (mm)			100	150	200	250	300	350	400	450	500	550	600	700	800	900		

*Note: Minimum concrete cover based on minimum slab thickness of 200mm according to Eurocode 2 Part 1.2 (EN 1992-1-2)

**Note: Performance data based on hammer drilling technique. For data using core drilling technique, please refer to Ramset Engineer. Bold values depicts design tensile steel resistance governs

Note: Design resistance is based on 20 MPa concrete strength. For values in higher concrete strengths, and design optimisation, please refer to Ramset iExpert Anchor Software.

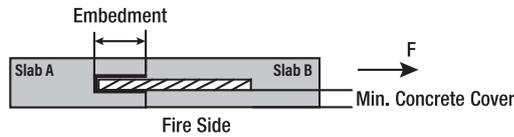
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Design Case 3

Fire resistance duration = 90 minutes

For Reinforcing Bar Steel Grade - 500 MPa and Concrete cylinder compressive strength $f'_c = 20$ MPa

Rebar Size	Hole Diameter (mm)	*Min. Concrete Cover(mm)	**Design resistance in accordance with Eurocode 2 for fire duration 90 minutes - $R_{d,fi}$ (kN)															
			150	200	250	300	350	400	450	500	550	600	700	800	900	1000		
10	12	90	4.05	5.39	6.74	8.09	9.44	10.79	12.14	13.49	14.84	16.18	18.88	21.58	24.28	26.97		
		100	5.28	7.03	8.79	10.55	12.31	14.07	15.83	17.59	19.34	21.10	24.62	28.14	31.42	31.42		
12	15	90	4.86	6.47	8.09	9.71	11.33	12.95	14.57	16.18	17.80	19.42	22.66	25.90	29.13	32.37		
		100	6.33	8.44	10.55	12.66	14.77	16.88	18.99	21.10	23.21	25.32	29.54	33.76	37.98	42.20		
16	20	90		8.63	10.79	12.95	15.11	17.26	19.42	21.58	23.74	25.90	30.21	34.53	38.84	43.16		
		100		11.25	14.07	16.88	19.70	22.51	25.32	28.14	30.95	33.76	39.39	45.02	50.65	56.27		
20	25	90			13.49	16.18	18.88	21.58	24.28	26.97	29.67	32.37	37.76	43.16	48.55	53.95		
		100			17.59	21.10	24.62	28.14	31.65	35.17	38.69	42.20	49.24	56.27	63.31	70.34		
24	30	90				19.42	22.66	25.90	29.13	32.37	35.61	38.84	45.32	51.79	58.27	64.74		
		100				25.32	29.54	33.76	37.98	42.20	46.42	50.65	59.09	67.53	75.97	84.41		
25	30	90				20.23	23.60	26.97	30.35	33.72	37.09	40.46	47.21	53.95	60.69	67.44		
		100				26.38	30.77	35.17	39.57	43.96	48.36	52.76	61.55	70.34	79.13	87.93		
28	35	90					26.44	30.21	33.99	37.76	41.54	45.32	52.87	60.42	67.98	75.53		
		100					34.47	39.39	44.31	49.24	54.16	59.09	68.93	78.78	88.63	98.48		
32	40	90						34.53	38.84	43.16	47.48	51.79	60.42	69.05	77.69	86.32		
		100						45.02	50.65	56.27	61.90	67.53	78.78	90.04	101.29	112.55		
36	45	90							38.84	43.70	48.55	53.41	58.27	67.98	77.69	87.40	97.11	
		100							50.65	56.98	63.31	69.64	75.97	88.63	101.29	113.95	126.61	
40	50	90								43.16	48.55	53.95	59.34	64.74	75.53	86.32	97.11	107.90
		100								56.27	63.31	70.34	77.37	84.41	98.48	112.55	126.61	140.68
Embedment (mm)			150	200	250	300	350	400	450	500	550	600	700	800	900	1000		

*Note: Minimum concrete cover based on minimum slab thickness of 200mm according to Eurocode 2 Part 1.2 (EN 1992-1-2)

**Note: Performance data based on hammer drilling technique. For data using core drilling technique, please refer to Ramset Engineer. Bold values depicts design tensile steel resistance governs

Design Case 4

Fire resistance duration = 120 minutes

For Reinforcing Bar Steel Grade - 500 MPa and Concrete cylinder compressive strength $f'_c = 20$ MPa

Rebar Size	Hole Diameter (mm)	*Min. Concrete Cover(mm)	**Design resistance in accordance with Eurocode 2 for fire duration 120 minutes - $R_{d,fi}$ (kN)															
			200	250	300	350	400	450	500	550	600	700	800	900	1000	1100		
10	12	90	3.64	4.55	5.47	6.38	7.29	8.20	9.11	10.02	10.93	12.75	14.57	16.40	18.22	20.04		
		100	4.64	5.80	6.96	8.12	9.28	10.44	11.60	12.76	13.92	16.24	18.56	20.88	23.20	25.52		
12	15	90	4.37	5.47	6.56	7.65	8.74	9.84	10.93	12.02	13.12	15.30	17.49	19.67	21.86	24.05		
		100	5.57	6.96	8.35	9.74	11.13	12.53	13.92	15.31	16.70	19.48	22.27	25.05	27.84	30.62		
16	20	90		7.29	8.74	10.20	11.66	13.12	14.57	16.03	17.49	20.40	23.32	26.23	29.15	32.06		
		100		9.28	11.13	12.99	14.85	16.70	18.56	20.41	22.27	25.98	29.69	33.40	37.11	40.83		
20	25	90			10.93	12.75	14.57	16.40	18.22	20.04	21.86	25.50	29.15	32.79	36.43	40.08		
		100			13.92	16.24	18.56	20.88	23.20	25.52	27.84	32.47	37.11	41.75	46.39	51.03		
24	30	90				15.30	17.49	19.67	21.86	24.05	26.23	30.60	34.98	39.35	43.72	48.09		
		100				19.48	22.27	25.05	27.84	30.62	33.40	38.97	44.54	50.10	55.67	61.24		
25	30	90				15.94	18.22	20.49	22.77	25.05	27.33	31.88	36.43	40.99	45.54	50.10		
		100				20.30	23.20	26.10	29.00	31.89	34.79	40.59	46.39	52.19	57.99	63.79		
28	35	90					20.40	22.95	25.50	28.05	30.60	35.71	40.81	45.91	51.01	56.11		
		100					25.98	29.23	32.47	35.72	38.97	45.46	51.96	58.45	64.95	71.44		
32	40	90						26.23	29.15	32.06	34.98	40.81	46.64	52.47	58.29	64.12		
		100						33.40	37.11	40.83	44.54	51.96	59.38	66.80	74.23	81.65		
36	45	90							29.51	32.79	36.07	39.35	45.91	52.47	59.02	65.58	72.14	
		100							37.58	41.75	45.93	50.10	58.45	66.80	75.16	83.51	91.86	
40	50	90								32.79	36.43	40.08	43.72	51.01	58.29	65.58	72.87	80.16
		100								41.75	46.39	51.03	55.67	64.95	74.23	83.51	92.78	102.06
Embedment (mm)			200	250	300	350	400	450	500	550	600	700	800	900	1000	1100		

*Note: Minimum concrete cover based on minimum slab thickness of 200mm according to Eurocode 2 Part 1.2 (EN 1992-1-2)

**Note: Performance data based on hammer drilling technique. For data using core drilling technique, please refer to Ramset Engineer.

Note: Design resistance is based on 20 MPa concrete strength. For values in higher concrete strengths, and design optimisation, please refer to Ramset iExpert Anchor Software.