SpaTec™ Xtrem™ M12x120mm Bracing Anchor

Date	23/07/2025
Reference	TDS03184

Performance Related | Material | Installation Related

Product

A high security, high performance, through fixing, torque controlled expansion anchor which has approval for use in cracked and non-cracked concrete.

Compliance

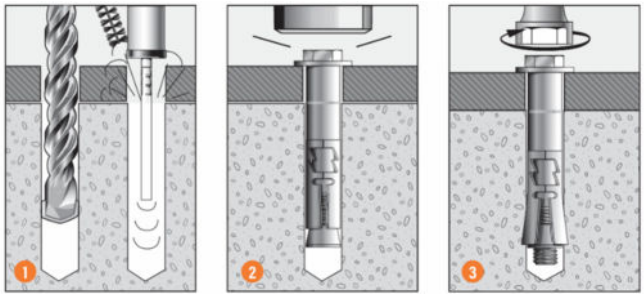
European Technical Assessment (option1) - ETA-10/0276
Design According to current standards:

- AS 5216
- AS 1170.4 - Earthquake Actions
- EN 1992-4 (formerly ETAG001 Annex C, E & TR045)
- NZS 3101 (A3) Section 17 - Seismic Design C1 & C2

M12 x 120 tested and qualified for 150mm thick concrete substrate thickness as per *Swinburne University Report April 2025*

- Qualified for Cracked Concrete and Seismic C1 & C2

Installation



1. Drill or core hole to the recommended diameter and depth using the fixture as a template. Clean the hole thoroughly with a hole cleaning brush. Remove the debris with a hand pump, compressed air, or vacuum. pump, compressed air etc.
2. After ensuring that the anchor is assembled correctly, insert the anchor through the fixture and drive with a hammer until the washer contacts the fixture.
3. Tighten the bolt with a torque wrench to the specified assembly torque.

Benefits, Advantages and Features

Highest level of European approval for mechanical expansion anchors

Suitable for structural loads:

- Safety critical loads
- High tensile capacity of Grade 8.8 Steel Bolts
- Heavy duty, heat-treated washer
- Heavy duty, thick expansion sleeve that provides secure grip to concrete

Improved security:

- Large expansion reserve that ensures retention in concrete if overloaded
- Torque induced pull down closes gaps and induces preload

Resistance to cyclic loading:

- Heavy duty sleeve with integrated pull-down section works to retain 65% of initial preload

Fire Rated

- Refer to Specifiers Anchoring Resource Book ANZ Ed3

Principal Applications

- **Bracing Precast Concrete Panels**
- **Concrete substrate thickness ≥ 150 mm**
- **Seismic Anchoring to Category C1/C2**
- **Anchoring into cracked & non-cracked concrete**
- **Safety critical loads**

Description and Part Numbers

Drilled hole diameter, d_h (mm)	Effective Length, L_e	Maximum Fixture Thickness, $t_{fix,max}$ (mm)	SpaTec™ Xtrem™ Description	ETA Designation Number	Part No
18	105	25	M12 x 120mm zinc	V12-18/25	SP12120

Effective Depth, h_{ef} (mm)

h_{ef} = Le – t

t = total thickness of material(s) being fixed

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Installation and Static and Seismic Performance details – per anchor

Cracked and Non-Cracked Concrete

Non-Cracked Concrete (static & quasi-static loading)

Part No.	Drilled hole diameter, d_h (mm)	Fixture hole diameter,d_f (mm)	Anchor effective depth, h_{ef} (mm)	Depth of drill hole, h_1 (mm)	Tightening torque, T_r (Nm)	Static Shear Resistance Steel, ϕV_{us} (kN)*	Non-Cracked Concrete Tension, $\phi N_{ur,ucr}$ (kN)**				
							Concrete Compressive Strength, f'c (MPa)				
							20	25	32	40	50
SP12120	18	20	80	105	80	44.7	21.5	23.9	27.1	30.3	33.4

Cracked Concrete (static & quasi-static loading)

Part No.	Drilled hole diameter, d_h (mm)	Fixture hole diameter, d_f (mm)	Anchor effective depth, h_{ef} (mm)	Depth of drill hole, h_1 (mm)	Tightening torque, T_r (Nm)	Static Shear Resistance Steel, ϕV_{us} (kN)*	Cracked Concrete Tension, $\phi N_{ur,cr}$ (kN)**				
							Concrete Compressive Strength, f'c (MPa)				
							20	25	32	40	50
SP12120	18	20	80	105	80	44.7	15.3	17.0	19.3	21.6	23.8

Data is based on the use of one anchor. **The MINIMUM edge distance to ensure no concrete splitting occurs must be $e_{cr,sp}$ = 250 mm**
For shear loads acting towards an edge where minimum dimensions are not achievable, please use the simplified strength limit state design process to verify capacity or contact Ramset™ Engineer.
Minimum concrete substrate thickness is b_m = 150 mm.
*Note: Shear Resistance is based on steel resistance of one anchor with no influencing edge.
**Note: Reduced characteristic ultimate tensile capacity = φN_{ur} where φ=0.67 and N_{ur} is based on characteristic ultimate pull-out tensile capacity.

Seismic – Category C1

Part No.	Drilled hole diameter, d_h (mm)	Fixture hole diameter,d_f (mm)	Anchor effective depth, h_{ef} (mm)	Depth of drill hole, h_1 (mm)	Tightening torque, T_r (Nm)	C1 Seismic Shear Resistance Steel, $V_{Rd,s,seis}$ (kN)*	C1 Seismic Cracked Concrete Tension, $N_{Rd,seis,C1}$ (kN)**				
							Concrete Compressive Strength, f'c (MPa)				
							20	25	30	40	50
SP12120	18	20	80	105	80	11.3	13.0	14.5	15.9	18.4	20.2

Data is based on the use of one anchor. **The MINIMUM edge distance to ensure no concrete splitting occurs must be $e_{cr,sp}$ = 250 mm**
For shear loads acting towards an edge where minimum dimensions are not achievable, please use the simplified strength limit state design process to verify capacity or contact Ramset™ Engineer.
Minimum concrete substrate thickness is b_m = 150 mm.
*Note: Shear Resistance is based on steel resistance of one anchor with no influencing edge.
Data includes annular gap reduction factor of 0.5
**Note: Reduced characteristic ultimate tensile capacity is governed by concrete cone resistance.

For further information, please contact Ramset™
AU - PHONE: 1300 780 063 www.ramset.com.au
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Seismic – Category C2

Part No.	Drilled hole diameter, d_h (mm)	Fixture hole diameter, d_f (mm)	Anchor effective depth, h_{ef} (mm)	Depth of drill hole, h_1 (mm)	Tightening torque, T_r (Nm)	C2 Seismic Shear Resistance Steel, $V_{Rd,s,seis}$ (kN)*	C2 Seismic Cracked Concrete Tension, $N_{Rd,seis,C2}$ (kN)**				
							Concrete Compressive Strength, f'c (MPa)				
							20	25	30	40	50
SP12120	18	20	80	105	80	11.3	4.3	4.8	5.2	6.1	6.7

Data is based on the use of one anchor. **The MINIMUM edge distance to ensure no concrete splitting occurs must be $e_{cr,sp}$ = 250 mm**
For shear loads acting towards an edge where minimum dimensions are not achievable, please use the simplified strength limit state design process to verify capacity or contact Ramset™ Engineer.
Minimum concrete substrate thickness is b_m = 150 mm.
*Note: Shear Resistance is based on steel resistance of the anchor with no influencing edge or anchor spacing.
Data includes annular gap reduction factor of 0.5
**Note: Reduced characteristic ultimate tensile capacity is governed by pull-out resistance.

Installation and Fire Performance details – per anchor

Part No.	Drilled hole diameter, d_h (mm)	Fixture hole diameter, d_f (mm)	Anchor effective depth, h_{ef} (mm)	Depth of drill hole, h_1 (mm)	Tightening torque, T_r (Nm)	Minimum Concrete substrate thickness, b_m (mm) ***	Minimum dimensions* (Fire Performance)	
							Anchor spacing, a_c (mm)	Edge** distance, e_c (mm)
SP12120	18	20	80	105	80	150	N/A	250

*Note: For edge distance less than the minimum dimensions, please contact your local Ramset Engineer.
**Note: If the fire attack is from more than one side and to avoid concrete splitting the edge distance of the anchor shall be ≥ 300 mm.
***Note: For performance based on smaller concrete substrate thickness, refer to iExpert Anchor Software or Ramset™ Engineer.

Tension – Fire Performance

Part No.	Drilled hole diameter, d_h (mm)	Anchor effective depth, h_{ef} (mm)	Characteristic Resistance Mode of Failure	Characteristic values of resistance to tension loads in 20 MPa to 50 MPa concrete strength			
				Fire resistance duration (minutes)			
				30	60	90	120
SP12120	18	80	Steel Failure - $N_{Rk,s,fi}$ (kN)	17.6	11.4	**5.3**	**2.2**
			Pull-out failure concrete - $N_{Rk,p,fi}$ (kN)	-	-	-	-
			Concrete cone failure - $N_{Rk,c,fi}$ (kN)	**10.3**	**10.3**	10.3	8.2

Note: Bold values indicate limiting load. Data in table lists all possible failure mechanisms due to fire.

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Shear – Fire Performance

Part No.	Drilled hole diameter, d_h (mm)	Anchor effective depth, h_{ef} (mm)	Characteristic Resistance Mode of Failure	Characteristic values of resistance to shear loads in 20 MPa concrete strength			
				Fire resistance duration (minutes)			
				30	60	90	120
SP12120	18	80	*Steel Failure - $V_{Rk,s,fi}$ (kN)	17.6	11.4	**5.3**	**2.2**
			Steel Failure with lever arm - $M^0_{Rk,p,fi}$ (kNm)	27.3	17.8	8.2	3.4
			**Concrete edge failure - $V_{Rk,c,fi}$ (kN)	**6.5**	**6.5**	6.5	5.2
			Concrete Pry-out failure - $V_{Rk,cp,fi}$ (kN)	10.3	10.3	10.3	8.2

*Note 1: Bold values indicate limiting load for conditions without lever arm. Data in table lists all possible failure mechanisms due to fire.

Note 2: Concrete edge failure based on optimal concrete edge distance for fire performance $e_c = 2xh_{ef}$ = 160 mm. However, **The MINIMUM edge distance to ensure no concrete splitting occurs must be $e_{cr,sp}$ = 250 mm and if the **fire attack is from more than one side the MINIMUM edge distance of the anchor shall be ≥ 300 mm**.

For further information, please contact Ramset™

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