RapidBrace™

Cast-in Brace Anchor System

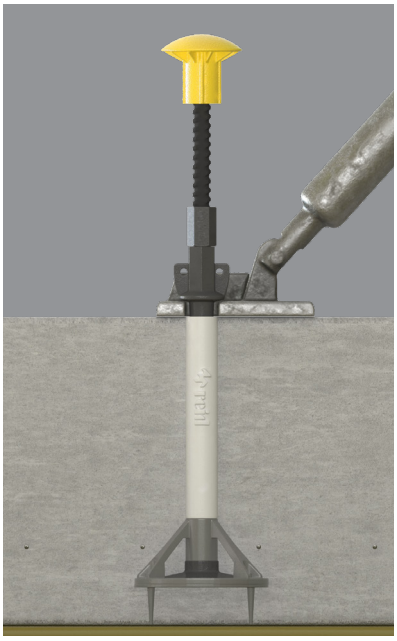
Fast, secure brace anchoring in low strength concrete

AS 3850.1:2015 COMPLIANT*

RapidBrace Brace Anchor System Key Features:

- Ductile Brace Anchor System *(see Reference no. 5 found at the end of this document, Worksafe Victoria Alert on Precautions in using high tensile formwork bar. ReidBar™ is not a high tensile formwork tie or 'Z-tie')*
- High strength brace anchoring in low strength concrete
- Improved floor cycle times from earlier panel / steel erection
- Achieves nominal 500N grade ReidBar steel strength in low strength concrete
- Full conformance to AS3850.1:2015
- Tested to AS3850.1:2015 Appendix A in concrete < 12MPa
- Compliance testing for installation in composite slab (steel tray decking)
- Guidance for post tensioned slab installations

Figure 1: RapidBrace set into concrete floor slab



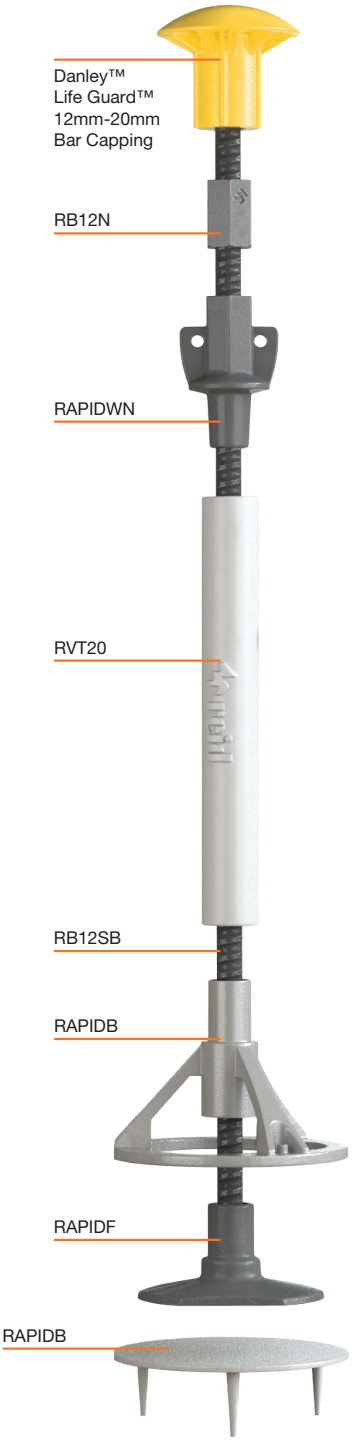


Figure 2: RapidBrace Components

Table 1: Compliance details

Clause number	Requirement	Compliant
2.2	The Working Load Limit has been determined by using the testing method in accordance with Appendix A, using a FOS per Table 2.1.	✓
2.5.1	All lifting inserts, brace inserts and ferrules shall be manufactured from ductile materials.	✓
2.5.4	Inserts when used in tension shall be designed with a steel capacity that exceeds that of the class of the matching bolt and at a minimum, that of class 4.6 bolt in accordance with AS 1111.1. Torque limits for cast in components shall be provided in the erection documentation.	✓
Appendix A	Design & Product Validation through testing to confirm compliance of critical specification requirements (dimensions, material properties and load bearing capacity where appropriate).	✓

Installation and Pre-Design Checklist

Given the many considerations required on a construction project with prefabricated building elements, an Erection Design Engineer in accordance with the NCOP(3) and AS3850.2:2015 (2), must be engaged to assess and certify the global stability of the structure during the construction phase. This includes considering slab behaviour when assessing the overall load capacity of cast-in anchors for bracing pre-cast concrete elements.

- Mean Concrete Compressive Strength at age of loading f_{cm}:
  - $f_{cm} \geq 12$ MPa (in scope of AS3850.1:2015)
  - $8 \leq f_{cm} < 12$ MPa (outside scope of AS3850.1:2015)
- Minimum Installation Depth (h_m) : 125mm
- Effective Depth (h_{ef}): 120mm
- Minimum Edge Distance: $3h_{ef}$
- Minimum Anchor Spacing: $6h_{ef}$
- Post Tensioning Duct Clearance: min 100mm (Refer to figures 2 & 4)
- Minimum Slab Depth (D): 150mm
- Rapid wing nut (RAPIDWN) Tightening Torque 120 Nm using part turn method - refer to RapidBrace Installation Guide for further details
- Minimum ReidBar RB12 bar thread engagement into RapidBrace Foot is 43mm
- Installed along centreline of Steel profiled decking trough section (b/w ribs) - refer to RapidBrace Installation Guide for further detail (Refer to figures 3 & 5)

Design Process Table 2: Performance data

Load	Working Load Limit WLL (kN)
Tension (N_a)	24kN
Shear (V_a)	16.8kN*

* 16.8kN Shear WLL is based on RB12 ReidBar mechanical properties. Working Load Limit Factor FoS = 2.25

The Installation and Pre-Design checklist must be satisified for the RapidBrace simplified 3 step design check to apply:

Step 1
Tensile Design
tensile WLL (N_a) = 24 kN
$N_{applied} / N_a \leq 1.0$

Step 2
Shear Design
Shear WLL (V_a) = 16.8 kN
$V_{applied} / V_a \leq 1.0$

Step 3
Combined load cases**
Check the interaction equation is satisfied
$(N_{applied} / N_a) + (V_{applied} / V_a) < 1.2$

**ReidBar 500N grade, unlike High Tensile Formwork bar 'Z-tie', can resist combined tension and shear actions. For further information refer to Worksafe VIC Alert reference no. 5 found at the end of this dcoument.

Slab types and compliant setout

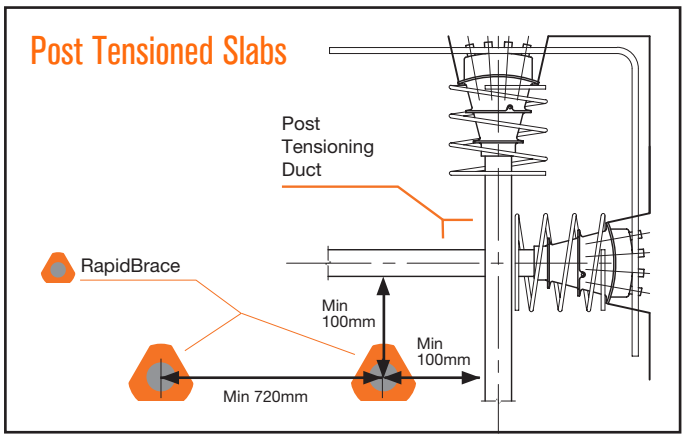


Figure 2:
RapidBrace clearances to post tensioning ducts.

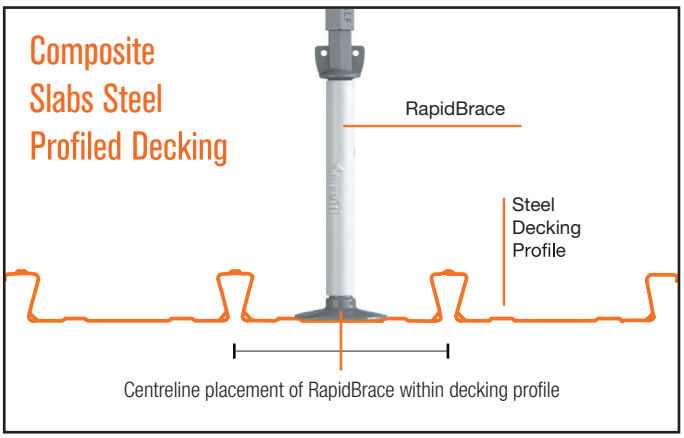


Figure 3:
Centreline placement of RapidBrace within trough of steel decking profile, equidistant from each rib.

Figure 4:
Testing to ensure performance of RapidBrace undertaken in worst case post tensioning duct configuration.

Figure 5:
Composite Slab Steel profile decking effects on anchorage were investigated. WLL of RapidBrace System is maintained subject to installation as shown in figure 3.

RapidBrace load performance data fully complies to the requirements of AS3850.1:2015 when installed in concrete with a compressive mean strength of at least 12MPa.

RapidBrace load performance data was determined from the test results obtained from a full testing program in accordance with AS3850.1:2015 Appendix A in concrete with a mean compressive strength < 8 MPa. Therefore RapidBrace load data is applicable for installations in concrete slabs achieving a mean compressive strength of at least 8 MPa. The AS3850.1:2015 testing regime is a minimum requirement that ensures in-scope compliance for mean concrete compressive strengths above 12 MPa and out of scope performance below 12 MPa, subject to the review and approval of the Erection Design Engineer.

Recommended Reading:

1. Australian Standard AS3850.1:2015, Prefabricated concrete elements – General Requirements
2. Australian Standard AS3850.2:2015, Prefabricated concrete elements – Building Construction
3. Safework Australia, National Code of Practice for Precast, Tilt-Up and Concrete Elements in Building Construction, Feb 2008
4. Worksafe Victoria, Information about Erection of Concrete panels on early age low-strength concrete, August 2017
5. Worksafe Victoria, Alert, Formwork - Precautions in using high tensile Z-tie bars, First published 18 Feb 2002 and re-published on June 8 2005

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