

Mechanical Anchors in Early Strength Concrete (12 MPa)

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Reference	TDS03175

Description

Both the Australian Standard AS/NZS 1576.1:2019 Scaffolding Part 1: General requirements and the Queensland Scaffolding Code of Practice 2021 state that an important part of the design of post-installed anchors used in the tying of scaffold is to consider the concrete strength at the time of installation. The working load limit specified by the anchor supplier should be greater than or equal to 6 kN for horizontal tie anchors.

Points to consider for Australian scaffold

- Suppliers often aim to install the scaffold the day after the concrete has been poured when it has not reached its final cured strength
- Published technical data from anchor manufacturers' on post-installed anchors provide capacities based on a minimum concrete compressive strength of 20 MPa
 - This is governed by the parameters on testing requirements imposed by the European Assessment Documents
- Concrete typically reaches compressive strengths of 12 to 15 MPa the day after pouring
 - Special testing on post-installed anchors is needed to understand their performance in early age concrete with a minimum compressive strength of 12 MPa
 - This needs to align with testing requirements stipulated in national or international standards

Ramset™ in collaboration with the Scaffolding Association Queensland, have conducted testing of anchors commonly used in tying scaffold into 12 MPa early age strength concrete; BoaCoil™ BAC08100, BoaCoil™ BAC10090, and AnkaScrew™ Xtrem™ AS12110X.

The testing was carried out in Ramset's testing laboratory in Chirnside Park, Melbourne, using Australian concrete with an early age strength of 12 MPa.

The anchors were installed centrally in 200 mm wide slabs representing the worst case encountered on site and the results are detailed below. They were installed to manufacturer's instructions and the tightening torque used was as tabled. The concrete mix was in 32 MPa, 20mm aggregate, 80mm slump concrete and unreinforced.



Installation and Performance Details

Anchor type	Anchor size	Drilled hole diameter	Fixture hole diameter	Max. Fixture thickness	Effective depth	Depth of drill hole	Tightening torque	Concrete strength	Global safety factor (FoS)	Working load limit (Tension, N _s)*
BoaCoil™ BAC08100	13 mm x 100 mm	13 mm	14 mm	8 mm	76 mm	115 mm	50 Nm	12 MPa	3	6.3 kN
BoaCoil™ BAC10090	16 mm x 90 mm	16 mm	19 mm	10 mm	61 mm	109 mm	110 Nm	12 MPa	3	6.0 kN
AnkaScrew™ AS12110X	12 mm x 110 mm	12 mm	16 mm	10 mm	85 mm	115 mm	60 Nm	12 MPa	3	8.6 kN

* Working Load Limit (Tension, N_s) = N_u/FoS where N_u = Characteristic Ultimate Concrete Tensile Capacity derived from Test Results.

Note: This data is based on fixing to uncracked concrete, i.e. compressive or neutral zone. In addition the concrete strength and condition at the time of fixing should be assessed to ensure that it has completed its initial curing process and has reached a suitable strength.

Testing Apparatus



For further information, please contact Ramset™

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