

On-Site Test of Anchors	Date: 28/01/2022
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Client		Engineer	
Company:	Quickset	Company:	Hilti NZ Ltd
Address:	20 Highgate parkway Silverdale	Address:	600 great south road, Auckland
Name:	Nicola Hall	Name:	Bob Zhang and Saab Wouts
Job Title:	General Manager	Job Title:	Field Engineer and technical marketing manager
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Project	
Project Name:	n/a
Address:	Unit 6, 20 Highgate Parkway, Silverdale, Auckland 1010

Tested Product	
Product type:	HIT HY-170
Rod Type:	HAS-U HDG M12

Base Material	
Type:	Concrete
Compressive Strength [MPa]:	20Mpa

Test Purpose and Type (refer to test request)	
Purpose:	Pullout tests
Type:	Unconfined destructive pull-out test

Test Equipment Information			
Test Equipment Type:	Equipment Calibration date:	Gauge type:	Gauge Last Calibration:
Hydraulic jack	10/06/2020	Digital (reading in KN)	10/06/2020
Steel bridge for unconfined test setup	n/a	n/a	n/a

Test Results			
Test no.:	Load ⁽¹⁾ [kN]:	Failure mode:	Comments:
1	37.03	Concrete Cone	Tests conducted with one concrete edge at 35mm from Anchor, 110mm h_ef and installed as per ETA-19/0161
2	29.16	Concrete Cone	
3	30.16	Concrete Cone	
4	31.7	Concrete Cone	
5	31.05	Concrete Cone	
¹⁾ <u>Failure Load</u> in case of tests to determine the resistance.			

Persons present		
Company:	Full Name:	Function:
Quickset	Carl van Vlerken	Head of Product Development, Manufacturing and Design
Quickset	Nicola Hall	General manager
Hilti	Saab Wouts	Technical marketing manager
Hilti	Bob Zhang	Field engineer

Test carried out by			
Company:	Full Name:	Test date	Function:
Hilti New Zealand Limited	Saab Wouts	28/01/2022	Technical Marketing Manager
	Bob Zhang		Field Engineer

Important Information
<p align="center">General</p> <p>On-site tests do not: evaluate suitability or adequacy of the fastener/anchor design; verify proper installation or compliance with approval requirements; establish ultimate capacity of tested items (unless tested to failure); or address performance of untested fasteners/anchors. Testing is performed as a service by Hilti in support of its products, and is intended solely to provide information on the general suitability of the base material and/or assist in identification of gross installation errors of tested fasteners/anchors – it does not imply any agreement in or endorsement of the suitability or propriety of the test or the application, and is not intended for use in satisfying any project or regulatory requirements for on-site inspection.</p> <p>Refer to the Hilti Technology Manual for information on fasteners/anchors design and performance. Proper installation of fasteners/anchors is critical – training is available on request – contact Hilti for information.</p> <p align="center">Execution of on-site tests</p> <p>In case the tested fastener/anchors does not fail, the test results indicate that the fasteners/anchors held the stated load for the time applied.</p> <p align="center">In case of fastener/anchor failure, the test results indicate the failure load values.</p>

The location and number of tests as well as the loading parameters and the fasteners/anchors to be tested have been carried out according to the test conditions determined by Customer in the relevant Request Form. Hilti does not assess whether these test conditions are suitable for evaluation. Due to the possible variability of the base material and the various loading situations, the test results may not be representative of the entire construction project. On-site tests may damage the structure - Hilti is not responsible for the damage, or its restoration.

Appendix A: INTERPRETATION OF THE TEST RESULTS AS PER NZS1170.0:2002

According to NZS1170.0:2002, Appendix B3 (Prototype Testing), clause B3.2, *“the design capacity of a specific product or a specific assembly may be established by prototype testing of that product or assembly. The design capacity should not exceed the minimum value of the test results divided by the appropriate value of k_t as given in Paragraph B3.4.”* The minimum capacity obtained during this test was 29.16 kN (Test number 2), and the values of k_t are included in Table B1 of the code and is dependent on the number of units tested and the coefficient of variation of structural characteristics.

The coefficient of variation can be calculated by dividing the standard deviation by the average results from the tests. The calculations are presented below and result in a coefficient of variation of 8.62%.

Data Analysis		
Test Results	37.03	kN
	29.16	kN
	30.16	kN
	31.7	kN
	31.05	kN
Failure Mode	Combined cone/pull-out	All
Average	31.82	kN
S.D	2.74	
CoV	8.62	%
k_t	1.24	

Hence, as per clause B3.2 of NZS1170.0:2002, the design capacity of the anchor shall not exceed **29.16 / 1.24 = 23.5 kN** for this tested product in a 20MPa concrete base material.

Appendix B: PHOTOS OF TEST SETUP

