

July 25, 2023

Titan Building Products

5390 Canotek Road, Unit 14
Ottawa, ON.
K1J 1H8

ATTENTION: Richard Bergman

SUBJECT: Titan Building Products – Deck Foot Anchor | Structural Review
Project Number: S333-23

As requested, Vriend Engineering Inc. has reviewed the deck foot anchor produced by Titan Building Products.

The Titan Deck Foot Anchor is used for free standing decks, walkways and shed platforms. It is composed of 3mm thick x 311mm x 311mm formed galvanized steel deck foot anchor plate complete with a 600mm long (or 900mm) x 19mm diameter galvanized steel anchor rod complete with formed and welded galvanized steel deck post bracket fabricated from 2mm (14 ga) sheet metal. The deck foot anchor can receive either a 4x4 post or a 6x6 post.

The purpose of this report is to confirm the structural suitability of the deck foot anchor for free standing light weight structures such as decks, walkways and shed platforms.

Test Reports:

We are in receipt of the following test reports:

- Intertek Testing Services NA Ltd. Test Report No. 102320204TOR-001, issue date November 16, 2015 for Titan Building Products. The report evaluated the compressive loading capacity of the Titan deck foot anchors.
- CTL Thompson Incorporated Product Testing Report No 1605 (Rev. 2) for Intertek dated October 29, 2021 for Titan Deck Foot Anchors TIGA600 and TIGA900. The report evaluated torsion, compression load bearing and tension load of the Titan deck foot anchors.
- Intertek Testing Services NA Ltd. Test Report No. L4912.01-106-31 R0, issue date 07/12/22 for Titan Building Products. The report evaluated the ASTM A370 / ASTM E8 tensile strength and ASTM F1575 bending yield of fasteners of the Titan deck foot anchors.
- Intertek Testing Services NA Ltd. Test Report No. L4175.01-119-16 R0, issue date 08/25/22 for Titan Building Products. The report evaluated the ASTM D7147 uplift and direct downward load testing of the Titan deck foot anchors.
- Intertek Testing Services NA Ltd. Test Report No. L4912.02-106-31 R1, revision date 05/09/23 for Titan Building Products. The report evaluated the ASTM D2395 specific gravity (method A) and ASTM D4442 Moisture content of treated SPF # 2 lumber for the Titan deck foot anchors.

Foundation Depth:

The 2012 Ontario Building Code, Section 9.12.2.2 (7) indicates that the foundation depths required in sentence (1) do not apply to foundations for decks and other accessible exterior platforms,

- (a) That are not more than one storey
- (b) That are not more than 55 square metres (592 sqft) in area
- (c) Where the distance from the finished ground to the underside of the floor joists is not more than 600 mm (23 5/8")
- (d) That are not supporting a roof
- (e) That are not attached to another structure, unless it can be demonstrated that differential movement will not adversely affect the performance of that structure.

Please note that different municipalities allow the deck structures to be built from 5' (1.5m) high to 5'-11" (1.8m) high. Consult the local municipality for deck height allowances.

Tested Deck Foot Anchor:

Based on the CTL Thompson Report Number 160 (Rev. 2), the Titan deck foot anchor was tested for compression load bearing and tension loading on clay and sand soils. The tested products included the following:

- TIGA600 – 19mm shaft diameter (600mm long) with an 83mm upper helix 60mm lower helix
- TIGA900 – 19mm shaft diameter (900mm long) with an 83mm upper helix 60mm lower helix

The following is a summary of the test results:

Test	Standard / Section	Result Summary
Torsion	AC358 / 4.2.2	Reported Torque Capacity = 128.3 ft-lbs
Compression Load Bearing	AC336 / 4.3.2 ASTM D1143 / 10.1.3	Clay (TIGA900) Reported Load Capacity (at 0.5" deflection) = 1,391 lbs Clay (TIGA600) Reported Load Capacity (at 0.5" deflection) = 1,146 lbs Sand Reported Load Capacity = 6,285 lbs
Tension Load Test TIGA 600	ASTM D3689 / 8.1.2	Clay Reported Maximum Load Capacity = 638 lbs Sand Reported Maximum Load Capacity = 3,762 lbs
Tension Load Test TIGA 900	ASTM D3689 / 8.1.2	Clay Reported Maximum Load Capacity = 1,244 lbs Sand Reported Maximum Load Capacity = 4,001 lbs

Please refer to the above noted report for the exact testing apparatus.

Based on the latest Intertek Report No. L4175.01-119-16 R0 the Titan deck foot anchor was tested for uplift and compression loading on a steel bearing plate. The following is a summary of test results:

Test	Result Summary
4x4 direct downward load resistance	Average Load 1/8 displacement = 14420 lbf. Average ultimate load = 15992 lbf
4x4 uplift load resistance	Average Load 1/8 displacement = 1476 lbf. Average ultimate load = 2858

	lbf
6x6 direct downward load resistance	Average Load 1/8 displacement = 17695 lbf. Average ultimate load = 19227 lbf
6x6 uplift load resistance	Average Load 1/8 displacement = 1345 lbf. Average ultimate load = 2197 lbf

Please refer to the above noted report for the exact testing apparatus.

Discussion and Recommendations:

Although the deck foot anchor has an auger, which is embedded into the soil, the deck foot anchor is not to be used the same as a helical pile. Helical piles are designed to be embedded beyond the frost line in which the structure can be designed to be anchored into an adjacent structure, such as a deck being anchored to a house with a ledger board. The deck foot anchor is to be used only for free-standing structures without any connection to another structure. The auger is primarily used to secure the plate to the ground and to provide the deck foot plate with tensile resistance for wind loading applications. The auger is not used to reach frost cover depth and, consequently, the deck foot anchor will be subject to potential freeze thaw cycle movements. The recommended use of the deck foot anchor would be the same applications as one might use a concrete deck block.

Based on the test results, the deck foot anchor is capable of carrying sufficient loads for small, light-weight, free-standing structures as noted above. The soil capacity and load on each deck foot anchor will vary for each project and will need to be determined by a professional structural engineer for each individual project application.

Based on our review, we confirm the deck foot anchors can be used for small free-standing structures in accordance with 2012 Ontario Building Code, Section 9.12.2.2 (7) and municipal allowances, when installed in strict accordance with Titan Building Products installation instructions. Other applications of the deck foot anchor are not permitted.

We trust the preceding is sufficiently clear and acceptable. If you have any questions, please contact the undersigned.

Yours Truly,

VRIEND ENGINEERING INC.



Jason Vriend, P. Eng.

