



**BRANZ Appraised**  
Appraisal No. 983 [2018]

## **SIMPSON STRONG-TIE BOTTOM PLATE ANCHOR SOLUTIONS**

**Appraisal No. 983 [2018]**

### **BRANZ Appraisals**

Technical Assessments of  
products for building and  
construction.



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## **Product**

- 1.1 Simpson Strong-Tie Bottom Plate Anchors are a range of structural fastenings for use in timber framed building construction for fixing bottom plates to concrete slabs. Simpson Strong-Tie Bottom Plate Anchors are used to resist earthquake and wind loads on the bottom plates of timber framed buildings designed and constructed in accordance with NZS 3604. The range consists of screw-type fasteners, an acrylic injection system and an epoxy injection system, both used with a threaded rod. Simpson Strong-Tie Bottom Plate Anchors are suitable to be used as proprietary bracing system hold downs to concrete slab-on-ground construction. They are also for fixing non-bracing internal and external walls to concrete slabs-on-ground.

## **Scope**

- 2.1 Simpson Strong-Tie Bottom Plate Anchors have been appraised for use as wall bracing system hold downs and bottom plate fixings to concrete slab-on-ground in buildings designed and constructed in accordance with NZS 3604. Simpson Strong-Tie Bottom Plate Anchors are suitable for use with concrete slabs where the concrete strength at 28 days is not less than 20 mPa. They are for use in internal, dry, protected environments.

## **Building Regulations**

### **New Zealand Building Code (NZBC)**

- 3.1 In the opinion of BRANZ, Simpson Strong-Tie Bottom Plate Anchors, if designed, used, installed and maintained in accordance with the statements and conditions of this Appraisal, will meet the following provisions of the NZBC:

**Clause B1 STRUCTURE:** Performance B1.3.1, B1.3.2 and B1.3.4. Simpson Strong-Tie Bottom Plate Anchors meet these requirements for loads from imposed gravity loads arising from use, earthquake and wind [i.e. B1.3.3 (b), (f), and (h)]. See Paragraphs 8.1 and 8.2.

**Clause B2 DURABILITY:** Performance B2.3.1 (a) not less than 50 years. Simpson Strong-Tie Bottom Plate Anchors meet this requirement. See Paragraphs 9.1 and 9.2.

**Clause F2 HAZARDOUS BUILDING MATERIALS:** Performance F2.3.1. Simpson Strong-Tie Bottom Plate Anchors meet this requirement and will not present a health hazard to people.

## Technical Specification

### Description

The following Bottom Plate Anchors are covered by this Appraisal:

- 4.1 Simpson Strong-Tie Screw Anchors are steel screw-type bolts with a serrated coarse thread and are coated with a mechanical galvanised layer of  $\geq 12$  microns. The Screw Anchors have a hexagonal head and a nominal shank diameter of 10 or 12 mm. They are identified with 'THD' stamped on the bolt head along with the diameter and length and the Simpson Strong-Tie sign "≠".

Product code	Anchor Type
Titen HD® THD10120MG 10 x 120 mm Concrete Screw	10 x 120 mm Concrete screw
Titen HD® THD10160MG 10 x 160 mm Concrete Screw	10 x 160 mm Concrete screw
Titen HD® THD12190MG 12 x 190 mm Concrete Screw	12 x 190 mm Concrete screw

- 4.2 The Simpson Strong-Tie AT-HP® Blue Acrylic Injection System is a styrene-free methacrylate acrylic resin used in conjunction with M12 or M16, grade 4.6 threaded rod, supplied and cut to length by the building contractor.

Product code	Anchor Type
AT-HP® with 12 mm ATR	Acrylic Anchoring Adhesive with M12, grade 4.6 threaded rod in a 14 mm diameter hole embedded 120 mm into concrete.
AT-HP® with 16 mm ATR	Acrylic Anchoring Adhesive with M16, grade 4.6 threaded rod in an 18 mm diameter hole embedded 120 mm into concrete.

- 4.3 The Simpson Strong-Tie ET-HP® Epoxy Adhesive is a two-part, epoxy-based anchor-grouting material used in conjunction with M12 or M16, grade 4.6 threaded rod, supplied and cut to length by the building contractor.

Product code	Anchor Type
ET-HP® with 12 mm ATR	Epoxy Anchoring Adhesive with M12, grade 4.6 threaded rod in a 14 mm diameter hole embedded 120 mm into concrete.
ET-HP® with 16 mm ATR	Epoxy Anchoring Adhesive with M16, grade 4.6 threaded rod in an 18 mm diameter hole embedded 120 mm into concrete.

- 4.4 Accessories available from Simpson Strong-Tie include:

- Mixing nozzle suitable for use with AT-HP® [Simpson Strong-Tie code 'MN1'];
- Mixing nozzle suitable for use with ET-HP® [Simpson Strong-Tie code 'EMN22i'];
- Hole Cleaning Brush for holes up to 18mm diameter [Simpson Strong-Tie code 'ETB6'];
- Blow-Out Pump for Hole Cleaning [Simpson Strong-Tie code 'PUMP']
- Acrylic Dispensing Tools as listed below:

Dispensing Tool:	Compatible Cartridge Model Number:	Cartridge Capacity [ml]
Simpson Strong-Tie CDT10 or Standard Caulking Gun	AT-HP280BLUE-AU	280 ml
Simpson Strong-Tie DT380	AT-HP380BLUE-AU	380 ml
Simpson Strong-Tie ADT30S	AT-HP825BLUE-AU	825 ml



- Epoxy Dispensing Tools as listed below:

Dispensing Tool:	Compatible Cartridge Model Number:	Cartridge Capacity (ml)
Simpson Strong-Tie EDT22S or EDT22AP	ET-HP	650 ml

- 4.5 Accessories used with Simpson Strong-Tie Bottom Plate Anchors, which are supplied by the building contractor:
- M12 or M16 Threaded Rod, Grade 4.6 Steel, cut to length by the contractor;
  - 50 x 50 x 3 mm galvanised washers with either a 12 or 16 mm hole as required;
  - Concrete masonry drill bits capable of forming the required hole size and depth;
  - Oil-free compressed air supply of a minimum of 550 kPa pressure can be used as an alternative to the Blow-Out Pump for the purposes of cleaning holes.
  - Impact Driver capable of achieving an installation torque of 200 Nm for M10 Titen HD® Anchors and 515 Nm for M12 Titen HD® Anchors.

## Handling and Storage

- 5.1 Simpson Strong-Tie Bottom Plate Anchors should be stored in a clean, dry area until they are used. Their exposure to the elements after installation should be kept to a minimum. Closing the building in within the required time to protect the framing timber from the environment will be suitable.

## Technical Literature

- 6.1 Refer to the Appraisals listing on the BRANZ website for details of the current Technical Literature for Simpson Strong-Tie Bottom Plate Anchors. The Technical Literature must be read in conjunction with this Appraisal. All aspects of design, use, installation and maintenance contained in the Technical Literature and within the scope of this Appraisal must be followed.

## Design Information

### General

- 7.1 Simpson Strong-Tie Bottom Plate Anchors are a range of structural fastenings used to resist earthquake and wind loads on timber framed buildings designed and constructed in accordance with NZS 3604. They are for fixing the bottom plates of walls to concrete slab-on-ground construction. They include fasteners for in situ concrete foundation edge detail and internal slab detail.
- 7.2 Simpson Strong-Tie Bottom Plate Anchors are suitable for use with concrete slabs where the concrete strength at 28 days is not less than 20 mPa.

### Structure

#### Bottom Plate Fasteners

- 8.1 Simpson Strong-Tie Bottom Plate Anchors may be used for fastening timber bottom plates to slabs in concrete slab-on-ground construction, in line with the requirements of NZS 3604, clauses 7.5.12.3 and 7.5.12.4. The fasteners suitable for this purpose are given in Table 1. Fasteners listed in Table 2 are also suitable, however they achieve characteristic strengths far exceeding the minimum requirements for bottom plate fasteners.



**Table 1: Bottom Plate Fasteners**

Fastener	Minimum Edge Distance*	Minimum Embedment Depth
Titen HD® THD10120MG 10 x 120 mm Concrete Screw	45 mm	70 mm
Titen HD® THD10160MG 10 x 160 mm Concrete Screw	50 mm	110 mm
AT-HP® with 12 mm Threaded Rod	45 mm	120 mm

\*The edge distance is to the centre of the drilled hole. Refer to Paragraph 8.2 for further information regarding protection of fastenings.

**Bracing system hold downs**

8.2 The range of Simpson Strong-Tie Bottom Plate Anchors includes fasteners that may be used for proprietary bracing system hold down bolts to concrete slab-on-ground construction and are given in Table 2. The Technical Literature of the proprietary bracing system must be referenced to determine the required hold down characteristic strength for the bracing elements.

**Table 2: Bracing hold-downs**

Fastener	Wall Type	Characteristic Strength	Minimum Edge Distance*	Minimum Embedment Depth
Titen HD® THD10160MG 10 x 160 mm Concrete Screw	Internal wall/ External wall - formed concrete foundation	15.5 kN	50 mm	70 mm
Titen HD® THD12190MG 12 x 190 mm Concrete Screw	External wall - formed concrete foundation	20.9 kN	55 mm	135 mm
AT-HP® with 12 mm Threaded Rod		17.3 kN	45 mm	120 mm
AT-HP® with 16 mm Threaded Rod		22.9 kN	55 mm	120 mm
ET-HP® with 12 mm Threaded Rod		34.5 kN	45 mm	120 mm
ET-HP® with 16 mm Threaded Rod		30.7 kN	55 mm	120 mm

\*The edge distance is to the centre of the drilled hole. Refer to Paragraph 8.2 for further information regarding protection of fastenings.

**Durability**

**Serviceable Life**

- 9.1 Simpson Strong-Tie Bottom Plate Anchors are expected to have a serviceable life of at least 50 years, provided they are designed, used, installed and maintained in accordance with this Appraisal and the Technical Literature.
- 9.2 In situations where the distance between the concrete slab edge and bottom plate fasteners is proposed to be less than 50 mm, a suitable form of protection must be provided to the slab edge to prevent any ingress of moisture and airborne salts that would otherwise contribute to the corrosion of the fastener. Selection and detailing of such protection is the responsibility of the designer and is outside the scope of this Appraisal.



## Maintenance

- 10.1 Simpson Strong-Tie Bottom Plate Anchors will not normally require maintenance. However, if damage occurs to claddings or linings covering the fastenings, then repairs or replacement of the cladding or lining must be carried out to ensure the ongoing structural integrity of the fastenings.
- 10.2 In instances where a form of protection is provided to the slab edge to provide protection to the fasteners, the protection must be maintained throughout the life of the building to ensure the ongoing structural integrity of the fastenings.

## External and Internal Moisture

- 11.1 Simpson Strong-Tie Bottom Plate Anchors are protected from moisture by the exterior cladding and internal lining systems of the building, which must meet the provisions of NZBC Clause E2 and Clause E3.

## Installation Information

### Installation Skill Level Requirement

- 12.1 Installation must be carried out in accordance with the Simpson Strong-Tie Bottom Plate Anchors Technical Literature and this Appraisal by, or under the supervision of, a Licensed Building Practitioner [LBP] with the relevant Licence Class.

### Fastener Installation

- 13.1 Installation instructions are included with Simpson Strong-Tie Bottom Plate Anchors. All Simpson Strong-Tie Bottom Plate Anchors must be installed in accordance with the Technical Literature.
- 13.2 Simpson Strong-Tie Screw Anchors are installed by drilling a 10 or 12 mm diameter hole [corresponding with the bolt diameter] into the concrete to the depth specified in the Technical Literature. Simpson Strong-Tie Screw Anchors shall be tightened with an impact driver until they are snug against the bottom plate.
- 13.3 The Simpson Strong-Tie AT-HP® Blue Acrylic Injection System and ET-HP® Epoxy Adhesive fastenings are installed by drilling a 14 mm diameter hole for a M12 threaded rod, or an 18 mm diameter hole for a M16 threaded rod into the concrete to the depths specified in the Technical Literature. The hole shall then be cleaned using a hole cleaning brush and the Simpson Strong-Tie Blow-Out Pump as described in the Technical Literature. Oil-free compressed air supply of a minimum of 550 kPa pressure can be used as an alternative to the Blow-Out Pump for the purposes of cleaning holes. Following the cleaning process, the Simpson Strong-Tie AT-HP® Blue Acrylic or ET-HP® Epoxy Adhesive is injected to fill the hole to between  $\frac{1}{2}$  and  $\frac{3}{4}$  full, starting at the bottom and slowly withdrawing the nozzle as the hole fills to avoid air pockets. A clean, oil free length of threaded rod in the appropriate diameter must then be promptly inserted into the hole, rotating the rod slowly by hand until it contacts the bottom of the hole. Following this, the rod must remain undisturbed for the duration of the curing time, as scheduled in the Technical manual. The Simpson Strong-Tie AT-HP® Blue Acrylic changes in colour from blue to grey when cured, which gives a visual indication that the anchor is ready to be loaded. A nut and a 50 x 50 x 3 mm square washer are then placed onto the exposed thread and tightened until snug.
- 13.4 Prior to wall lining application, when all timber framing moisture content is at 20% or less as specified by the wall lining manufacturer, fasteners must be checked for tightness.

## Inspections

- 14.1 The Technical Literature of Simpson Strong-Tie Bottom Plate Anchors and the bracing system proprietor must be referred to during the inspection of installations.
- 14.2 Critical areas of inspection for wall bracing systems are:
  - The bracing schedule; and,
  - Bracing rating and fastener strength; and
  - Hold down fastener type, and
  - Edge detail and distance.



### Health and Safety

- 15.1 Suitable precautions should be taken when drilling concrete to prevent the inhalation of concrete dust. Care should also be taken when using power tools.

### Basis of Appraisal

The following is a summary of the technical investigations carried out:

#### Tests

- 16.1 Testing of the Simpson Strong-Tie Bottom Plate Anchors was carried out by BRANZ in accordance with BRANZ Evaluation Method EM1 [1999], as required by NZS 3604.

#### Other Investigations

- 17.1 Structural and durability assessments have been provided by BRANZ technical experts.  
17.2 Observations have been made by BRANZ to assess the practicability of installation, and to examine completed installations.  
17.3 The Technical Literature has been examined by BRANZ and found to be satisfactory.

#### Quality

- 18.1 The manufacture of Simpson Strong-Tie Bottom Plate Anchors has not been examined by BRANZ, but details regarding the quality and composition of the materials used were obtained by BRANZ and found to be satisfactory.  
18.2 The quality of Simpson Strong-Tie Bottom Plate Anchors supplied is the responsibility of Simpson Strong-Tie NZ Ltd.  
18.3 Designers are responsible for the design of buildings incorporating the Simpson Strong-Tie Bottom Plate Anchors and the proprietary bracing systems.  
18.4 The building contractors are responsible for the quality of construction of the building structure in accordance with the Technical Literature.  
18.5 Building owners are responsible for the maintenance of wall claddings and linings as applicable so that the Simpson Strong-Tie Bottom Plate Anchors remain protected during their service life.

#### Sources of Information

- BRANZ Evaluation Method EM1: Method for Evaluating the Strength and Stiffness of Structural Joints, 1999.
- NZS 3604: 2011 Timber framed buildings.
- Ministry of Business, Innovation and Employment Record of amendments - Acceptable Solutions, Verification Methods and handbooks.
- The Building Regulations 1992.



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27 March 2018

SIMPSON STRONG-TIE BOTTOM  
PLATE ANCHOR SOLUTIONS



In the opinion of BRANZ, **Simpson Strong-Tie Bottom Plate Anchors** are fit for purpose and will comply with the Building Code to the extent specified in this Appraisal provided they are used, designed, installed and maintained as set out in this Appraisal.

The Appraisal is issued only to **Simpson Strong-Tie New Zealand Ltd**, and is valid until further notice, subject to the Conditions of Appraisal.

### Conditions of Appraisal

1. This Appraisal:
  - a) relates only to the product as described herein;
  - b) must be read, considered and used in full together with the Technical Literature;
  - c) does not address any Legislation, Regulations, Codes or Standards, not specifically named herein;
  - d) is copyright of BRANZ.
2. **Simpson Strong-Tie New Zealand Ltd:**
  - a) continues to have the product reviewed by BRANZ;
  - b) shall notify BRANZ of any changes in product specification or quality assurance measures prior to the product being marketed;
  - c) abides by the BRANZ Appraisals Services Terms and Conditions;
  - d) warrants that the product and the manufacturing process for the product are maintained at or above the standards, levels and quality assessed and found satisfactory by BRANZ pursuant to BRANZ's Appraisal of the product.
3. BRANZ makes no representation or warranty as to:
  - a) the nature of individual examples of, batches of, or individual installations of the product, including methods and workmanship;
  - b) the presence or absence of any patent or similar rights subsisting in the product or any other product;
  - c) any guarantee or warranty offered by **Simpson Strong-Tie New Zealand Ltd**.
4. Any reference in this Appraisal to any other publication shall be read as a reference to the version of the publication specified in this Appraisal.
5. BRANZ provides no certification, guarantee, indemnity or warranty, to **Simpson Strong-Tie New Zealand Ltd** or any third party.

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For BRANZ

**Chelydra Percy**

Chief Executive

Date of Issue:

27 March 2018