

Helifix DryFix, ResiTie, RetroTie and BowTie

Building Product Information Sheet

Helifix remedial wall ties are made from stainless steel helical bar and are intended for use as retrofit replacement or supplementary wall ties in cavity, veneer and solid multi-leaf construction.

Helifix ties are identified by a Hi-Fin helical, one-piece design with “Helifix” printed at regular intervals along their length. They are manufactured from Grade 304 or (as standard) Grade 316 austenitic stainless steel and are available in two sizes: nominal (measured fin edge to fin edge) 8mm or 10mm diameter. Helifix 8mm and 10mm ties have nominal cross-sectional areas of 10.0mm² and 15.0mm² respectively. Ties are available in different lengths, 155mm to 350mm as standard, and are specified by reference to product code, size and length (eg. HDF 8 x 350). Helifix ties may be used with ancillary DryLink stainless steel connectors to connect to bed-joint reinforcing or for side-fix connection to timber or steel studs. Depending on the installation method (see below), Helifix ties may be used to provide a mechanical connection, or utilise a resin-based connection formed with epoxy resin (e.g. EpoxyPlus or CrackBond thixotropic resin).

Helifix remedial wall ties are identified by the method of installation and intended use as follows:

- DryFix — installation provides a dry mechanical connection at both ends of the tie;
- ResiTie — requires a resin-based fix to be formed at both ends of the tie;
- RetroTie — incorporates a dry/resin combination fix; and,
- BowTie — utilises a dry/resin combination fix and applies when the tie is used to connect a (possibly bowed) masonry wall to a timber floor or ceiling joist.

Composition

- Helifix ties are manufactured from stainless steel helical bar.

Supporting documentation

- Product details and recommended installation procedures for a variety of indicative remedial situations are presented in supporting technical documentation. Refer to DF01 DryFix, RT01 RetroTie, RS01 ResiTie and BowTie product information sheets, and indicative repair details marked ANZ RB04, and ANZ-RT01 to ANZ-RT09, available from: <https://helifix.co.nz/downloads>
- Product details and data sheets for the safe handling of Helifix epoxy resin are presented in supporting technical documentation. Refer to EpoxyPlus and CrackBond, available from: <https://www.helifix.co.nz/downloads/safety-datasheets>

Product Identifier

- DryFix, ResiTie, RetroTie, BowTie

Manufacturer and Importer Details:

Place of Manufacture:	Overseas
Manufacturer:	Leviat Limited, The Mille, 1000 Great West Road, Brentford, TW8 9DW, United Kingdom
Manufacturer Email:	sales.helifix.uk @leviat.com
Importer Name:	Leviat New Zealand Limited
Importer Address:	246D James Fletcher Drive, Otahuhu, Auckland, 2024
Importer Website:	www.leviat.com/en-nz
Importer Email:	info.nz@leviat.com
Importer Phone:	+64 9 276 2236
Importer NZBN:	9429031339056

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Relevant Building Code clauses:

- Clause B1 Structure — B1.3.1, B1.3.2, B1.3.3, B1.3.4
- Clause B2 Durability — B2.3.1 (a)
- Clause E2 External Moisture — E2.3.2
- Clause F2 Hazardous Building Materials — F2.3.1

Contributions to Compliance:

Clause B1 Structure

- Helifix remedial wall ties will contribute to compliance subject to the specific engineering design of a Certified Practising Engineer and their assessment of the suitability of remedial wall tie use in an existing structure as an alternative solution.

Clause B2 Durability

- Helifix remedial wall ties manufactured from Grade 316 stainless steel comply with AS/NZS2699.1: 2000, Clause 2.4.4 with a durability classification of R4 assessed against Table 4.
- The durability of connections formed in materials present in existing building structures, and using either dry or resin-based fixing methods, will require the site-specific assessment of the designer.

Clause E2 External Moisture

- **E2.3.2.** Helifix wall ties utilise a helical, one-piece design that supports multiple drip points to resist the cross-cavity transfer of water.

Clause F2 Hazardous Building Materials

- **F2.3.1.** Helifix remedial wall ties meet the performance requirements under Clause F2.3.1. Refer to the material safety data sheets listed in the supporting documentation for the safe handling of epoxy resin.

Limitations on the use of the building product:

- Published capacities and classifications (see Appendix 1, Table 1) for Helifix remedial wall ties derive from laboratory testing and are to be used as guide values only.
- Helifix tie performance and observable pull-out load capacity can be expected to vary with each application, and will depend on the exact situation and type and condition of the substrate materials involved.
- Installation of Helifix remedial ties requires penetration of the external veneer and internal wall of the building, along with any building paper or water-proofing materials that might be contained within the wall or cavity.
- The resistance to water transfer of Helifix ties has not been tested to AS/NZS 2699.1:2000, Appendix E. Comparable testing, however, using 4.5mm diameter Helifix ties (i.e. ties most vulnerable to transfer) and water flowing down the face of brick couplets was conducted during initial product development. The results demonstrate that, when not first wetted, the Helifix 4.5mm tie will not visibly transfer water unless inclined at 26° to the horizontal. Helifix wall ties in 8mm and 10mm sizes are expected to exceed this demonstrated performance due to the larger Hi-Fin helical profile. **Note:** Helifix ties installed following standard procedures will sit at a right-angle to the plane of the masonry.

Design requirements to support appropriate use:

- Helifix remedial wall ties shall be used in accordance with the specific engineering design of a Chartered Professional Engineer.
- The designer shall consider the site conditions and location, building materials and structural conditions present at site, and the engineering objective.
- Load-testing shall be used to assess attainable pull-out load capacity and to inform the specific engineering design.
- Testing of attainable pull-out loads can be conducted on site using a Helifix Load Test Unit. The unit allows static tensile proof loading to a maximum of 3kN.
- Proof-testing of attainable loads may be conducted during the project to the satisfaction of the designer and to encourage a consistent result.
- Wall ties are load sharing devices and specifications demanding high point loads are to be avoided.
- AS/NZS 2699.1:2000 provides guidance for wall tie usage and informs NZS 4210 and NZS 4230.

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- Helifix 8mm ties have been tested using selected materials and example applications to AS/NZS 2699.1:2000, Appendix A. Testing involved connections formed between brick and timber frame, brick and steel frame and cavity brick. Specimens were organised to demonstrate performance formed through new build mortar-based connection, DryFix mechanical connection, RetroTie dry/resin combination fixing and ResiTie full resin-based connection. Collectively, the installation methods tested included: drive-in tie connection to masonry; drive-in tie connection to timber; resin-based tie bonding into brick, mortar and DryLink connectors. All specimens tested incorporated a 75mm cavity, the maximum allowable under NZS 4210 and in keeping with a conservative testing regime.
- The results are summarised in Appendix 1, Table 1. The results demonstrate variable performance depending on the combination of materials involved and the installation method. Results may be used as guide values only

Installation requirements:

- Helifix remedial wall ties shall be installed by a competent contractor in accordance with LeviaT installation guidelines and the specific engineering design and guidance of the designer.
- Light-weight, hand-held tooling shall be used during construction to minimise aesthetic and structural damage to the existing structure, and to ensure efficacy of the remedial wall tie.
- Installation guidelines, including drilling and load-testing guidelines, are available in the supporting technical documentation.

Maintenance requirements:

- Maintenance of the system will not normally be required during the expected life of the system.

Warnings or ban:

- This product is not subject to any warning or ban under section 26 of the Building Act 2004.

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Appendix 1:

Table 1. Testing in accordance with Table A/NZS 2699.1:2000, Appendix A, Method for determining the stiffness and strength of type B veneer ties.^{1,5}

Test Type	Outer Leaf ⁵ and Connection Type	Cavity Width	Inner Leaf ⁵ and Connection Type	Axial Stiffness (kN/mm)	Axial Strength (kN)	Residual Strength (kN)	Classification ⁶
Type B non-flexible veneer tie ² Example New Build Application	Brick Couplet – Ties set in mortar joint	75mm	90mm Timber stud -- Drive-in connection	0.684	1.444	1.576	EM
Type B non-flexible veneer tie ² Example New Build Application	Brick Couplet – Ties set in mortar joint	75mm	90mm Metal stud -- DryLink side fix (no resin) connection	0.258	1.067	0.379	EL
Type B remedial tie ³ Example ResiTie Installation	Brick – Resin connection in brick	75mm	90mm Metal stud -- DryLink side fix with resin connection	0.758	0.813	1.026	EM
Type B remedial tie ³ Example RetroTie Application	Brick Couplet – Resin connection in mortar joint	75mm	90mm Timber stud -- Drive-in connection	0.859	1.317	1.353	EM
Type B remedial tie ^{3,4} Example DryFix Application	Brick – Drive-in connection	75mm	Brick – Drive-in connection	0.610	1.902	2.321	EM ³

Table Notes:

- AS/NZS 2699.1:2000 provides two methods for testing wall tie capacity. Appendix A to the standard details a cyclic dynamic loading test program and procedures for measuring wall tie strength and stiffness. By this method tie strength is measured as the tension load resisted following cyclic displacement along the axis of the tie, and stiffness as the average of the tensile and compressive forces resisted at defined deflection limits. The standard refers to ties tested to these conditions as Type B seismic-resistant veneer ties and allows for their classification as either earthquake light (EL), earthquake medium (EM) or earthquake heavy (EH) duty. The method also provides for the classification of Type B remedial ties.
- Type B non-flexible veneer tie – “a tie, including its fixings or anchorages, used to transfer face loads between a masonry veneer and a structural backing, while being capable of accommodating differential in-plane horizontal and vertical movements between the attached elements, during which time the cavity width may vary” (AS/NZS2699.1:2000, pg.7).
- Type B remedial tie – “a tie with specific seismic design characteristics manufactured for installation after a masonry leaf has been erected. Remedial ties are usually used to replace defective ties or where ties have been omitted” (AS/NZS2699.1:2000, pg.7).
- Classification does not strictly apply as test specimen is cavity brick. Structural upgrading of the (typically internal) load-bearing leaf may be required to reach even a proportion of the new build standard for a strong backing wall or load-bearing structural frame.
- Testing conducted at the University of Newcastle (Project reports A/520 March 2011, and A/559 March 2012). Specimens were prepared variously using radiata pine No.1 framing grade timber, 450mm lengths of steel studs, solid clay bricks supplied by Austral bricks (Product Code and Name: 8240-1, Dry Press Common, (l) 230mm x (w) 110mm x (h) 75mm).
- Actual performance will be determined by the material to which the tie is fixed, the cavity width and the depth of embedment. Indicative pull-out values for each tie may be check by in-situ testing.