

0181P HILTI IN ADHESIVES, SEALANTS AND FASTENERS**Branded worksection**

This branded worksection *Template* has been developed by NATSPEC in conjunction with **HILTI Pty Ltd** (the Product Partner) and may be used whilst the Product Partner is licensed to distribute it. The copyright remains with NATSPEC. As with all NATSPEC worksections, it is the responsibility of the user to make sure it is completed appropriately for the project. The user should also review its applicability for local conditions and regulations. Check www.natspec.com.au for the latest updated version.

Worksection abstract

This branded worksection *Template* is applicable to the commonly used adhesives, sealants and fasteners, including HILTI anchors, and provides basic defaults for projects requiring adhesives, sealants and fasteners, as part of general construction. It is not applicable to the fire-stopping requirements of the NCC Deemed-to-Satisfy provisions of BCA C3.15 and BCA C3.16.

Background

Additional particular worksection applications may also be specified here, if they are considered integral to the performance of a building system. Those worksections may then cross reference this worksection for that particular building system in addition to the default cross referencing in *0171 General requirements*.

Alternatively, for some applications, it may be preferable to incorporate the particular adhesive, sealant or fasteners within the relevant worksection, for example adhesives for ceramic, stone and terrazzo tiling or fasteners for profiled sheet metal roofing and cladding. In such cases, the selection may be made within the relevant worksection.

How to use this worksection

This worksection *Template* must be customised for each project. See *A guide to NATSPEC worksections* (www.natspec.com.au) for information on *Template* structure, word styles, and completing a worksection.

Related material located elsewhere in NATSPEC

If a listed worksection is not part of your subscription package and you wish to purchase it, contact NATSPEC.

Related material may be found in other worksections:

- *0182p HILTI in fire-stopping*.

See **Application schedule** for relevant worksection references for the following requirements:

- Adhesives.
- Sealing, pointing and bedding.
- Sealing structural designed control joints.

Material not provided by HILTI

This branded worksection *Template* includes generic material which may not be provided by the Product Partner including:

- Adhesives.
- Sealants.
- Fasteners, other than HILTI anchors.

Documenting this and related work

You may document this and related work as follows:

- Location and details of joints are best shown on the drawings.
- For guidance on sealant selection, refer to NATSPEC TECHnote DES 017.
- For guidance on ceramic tiling adhesive selection, refer to NATSPEC TECHnote PRO 004.
- For sealants for construction control joints in wall, floor and ceiling elements, and service penetrations that are required to have a fire-resistance level, document requirements in *0182 Fire-stopping* or in the relevant services worksection.

The *Normal* style text of this worksection may refer to items as being documented elsewhere in the contract documentation. Make sure they are documented.

Specifying ESD

The following may be specified by retaining default text:

- Fasteners: Corrosion resistance for durability to improve material life cycle.

The following may be specified using included options:

- Adhesives: Limiting VOC levels.
- Architectural sealants: Limiting VOC levels.

Refer to NATSPEC TECHreport TR 01 on specifying ESD.

1 GENERAL

HILTI is a world leader in the design and manufacture of cutting-edge technologies, software and services for the professional construction industry. Every day our technologies support awe-inspiring feats of engineering around the world – from the famous bullet train in Japan, the new built Perth stadium or Sydney iconic Barangaroo just to list a few. We offer a 360 degrees service for construction – acting as a true partner for our customers.

1.1 RESPONSIBILITIES

General

Requirement: Provide adhesives, sealants and fasteners, including HILTI anchors, as documented.

Documented is defined in 0171 General requirements as meaning contained in the contract documents.

Performance

Requirements: Conform to the following:

- Fitness for purpose: Suitable for particular use, capable of transmitting imposed loads, sufficient to maintain the rigidity of the assembly, or integrity of the joint.
- Finished surface: That will not cause discolouration.
- Compatibility: Compatible with the products to which they are applied.
- Sealant replacement: Capable of safe removal without compromising the application of the replacement sealant for future refurbishment.
- Movement: If an adhered or sealed joint is subject to movement, select a system certified to accommodate the projected movement under the conditions of service.

1.2 COMPANY CONTACTS

HILTI technical contacts

Website: www.hilti.com.au/content/hilti/A2/AU/en/engineering/engineering-services/technical-advise.html

1.3 CROSS REFERENCES

General

Requirement: Conform to the following:

- *0171 General requirements.*

0171 General requirements contains umbrella requirements for all building and services worksections.

List the worksections cross referenced by this worksection. 0171 General requirements references the 018 Common requirements subgroup of worksections. It is not necessary to repeat them here. However, you may also wish to direct the contractor to other worksections where there may be work that is closely associated with this work.

NATSPEC uses generic worksection titles, whether or not there are branded equivalents. If you use a branded worksection, change the cross reference here.

1.4 MANUFACTURER'S DOCUMENTS

Technical manuals

Product information: www.hilti.com.au/c/CLS_FASTENER_7135.

1.5 SUBMISSIONS

Products and materials

Adhesives and sealants: Submit product data sheets.

Fasteners: Submit type test reports as evidence of the mechanical properties for each application including details of the test completed.

If the submission of type tests are required include this Optional style text by changing to Normal style text.

Contact HILTI for copies of type test reports and drawings of tested details.

Samples

Visible joint sealants: Submit colour samples.

Tests

Detail the tests required in PRODUCTS or EXECUTION, as appropriate, and list the submissions required here.

Site tests: Submit results as follows:

- Installed sealant tests: [complete/delete]

Refer to the *Optional* style **TESTING** clause in EXECUTION.

- Installed fastener tests: [complete/delete]

Compatibility testing: Submit adhesion and compatibility testing data demonstrating that adhesive, sealant or fastener is compatible with materials to be fixed and is suitable for the project conditions.

Warranties

Manufacturer's warranty: Submit the manufacturer's published product warranties.

If specifying warranties, the following may be included:

- Form of warranty. (e.g. European Technical Assessments (ETA's) are third party performance certification). HILTI only guarantee performance of the manufactured product when correctly installed to the manufacturers installation instructions.
- Minimum period.
- Installer/applicator's warranty.

Describe the requirements of the warranties in PRODUCTS or EXECUTION, as appropriate, and list the submissions required here.

INSPECTION

Notice

Inspection: Give notice so that inspection may be made of prepared joints and penetrations for each sealant application included in **TESTING, Installed sealant tests schedule**.

Include this *Optional* style text by changing to *Normal* style text if the *Optional* **TESTING, Installed sealant tests schedule** is included in EXECUTION.

Delete this subclause if installed sealant tests are not included.

2 PRODUCTS

2.1 GENERAL

Product substitution

Other products: Conform to **SUBSTITUTIONS** in *0171 General requirements*.

SUBSTITUTIONS in *0171 General requirements* sets out the submissions required if the contractor proposes alternative products. Refer also to NATSPEC TECHnote GEN 006 for more information on proprietary specification.

Product identification

General: Marked to show the following:

- Manufacturer's identification.
- Product brand name.
- Product type.
- Quantity.
- Product reference code and batch number.
- Date of manufacture.

Edit the list to suit the project or delete if not required.

2.2 ADHESIVES

Standards

Most types of adhesives in widespread use are not covered by Australian standards. There is some overlap between adhesives and sealants. For example, silicone sealants are widely used as construction adhesives.

Gypsum plaster adhesive: To AS 2753.

High strength adhesive tape

General description: A foam of cross linked polyethylene or closed cell acrylic coated both sides with a high performance acrylic adhesive system, encased in release liners of paper or polyester.

Product classification: Select tape to suit substrate as follows:

- Firm high strength foam tapes: For high energy surfaces including most bare metals such as stainless steel and aluminium.
- Conformable high strength foam: For the following:

- . Medium energy surfaces including many plastics, paints and bare metals.
- . Lower energy surfaces including many plastics, most paints and powder coatings, and bare metals.

Thickness: Select the tape to make sure a mismatch between surfaces does not exceed half the tape thickness under the applied lamination pressure.

Total VOC limits

Requirement: Conform to the following maximum limits:

- General purpose adhesives: 50 g/L.
- Structural glazing adhesive, timber flooring and laminate adhesives: 100g/L.

Limiting VOC levels improves indoor air quality. Edit to more stringent values if required.

Compliance with these requirements targets the Adhesives requirement within the Minimum Expectation level of the Exposure to Toxins credit in Green Star Buildings.

Conformance testing: To South Coast Air Quality Management District Rule 1168.

The purpose of this rule is to reduce emissions of volatile organic compounds (VOCs) and to eliminate emissions of chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene from the application of adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers, and other primers.

Consider editing and including this *Optional* style text if required as a general quality standard.

2.3 SEALANTS

Standards

General: To ISO 11600.

NATSPEC TECHnote DES 017 offers selection guidance.

Alternatively, consult with a manufacturer and select a product to suit the application.

External masonry joints

General: Provide sealant and bond breaking materials which are non-staining to masonry. Do not use bituminous materials with absorbent masonry units.

Bond breaking backing:

- Bond breaking materials: Non-adhesive to sealant, or faced with a non-adhering material.
- Foamed materials: Closed cell or impregnated, not water-absorbing.

Consult manufacturers for joint fillers, e.g. compressible closed cell polyethylene foam for compatibility with the sealant. Rigid fillers such as pulp board, cork or semi-rigid foam should not be specified.

Lightweight building element joints

Joints subject to rapid changes of movement: Provide sealants that accommodate the movement of the contact materials.

Also referred to as fast moving joints.

Floor control joints

General: Provide trafficable sealants.

Bond breaking backing:

- Bond breaking materials: Non-adhesive to sealant, or faced with a non-adhering material.
- Foamed materials: Closed cell or impregnated, not water-absorbing.

Total VOC limits

Requirement: Conform to the following maximum limits:

- General purpose sealants: 50 g/L.
- Acoustic sealants, architectural sealants, waterproofing sealants: 250 g/L.
- Wood flooring and laminate sealant: 100 g/L.

Limiting VOC levels improves indoor air quality. Edit to more stringent values if required.

Compliance with these requirements targets the Sealants requirement within the Minimum Expectation level of the Exposure to Toxins credit in Green Star Buildings.

Conformance testing: To South Coast Air Quality Management District Rule 1168.

Consider editing and changing this *Optional* style text to *Normal* style text if required as a general quality standard.

2.4 FASTENERS - GENERAL

Standards

Safety-critical fastening applications: The prequalification of post-installed fasteners for suitability and admissible service conditions to AS 5216 Appendix A.

Guidance on acceptable evidence for prequalification, including European Technical Assessments (ETA's), is provided in AS 5216 Appendix B.

General

For further information, refer to the Australian Engineered Fasteners and Anchors Council (AEFAC) sample specifications. www.aefac.org.au/resources.php

HILTI filling washer set: Provide for mechanical and chemical anchors, as documented.

HILTI supply a filling washer set for seismic and fatigue applications and applications where shear loads need to be taken up directly by the anchor.

Plain washers: To AS 1237.1.

- Provide washers to the heads and nuts of bolts, and the nuts of coach bolts.

Plugs: Proprietary purpose-made plastic.

Stainless steel fasteners: To ASTM A240/A240M.

Steel nails: To AS 2334.

- Length: At least 2.5 times the thickness of the member being secured, and at least 4 times the thickness if the member is plywood or building board less than 10 mm thick.

Unified hexagon bolts, screws and nuts: To AS/NZS 2465.

Fasteners in CCA treated timber: Epoxy coated or stainless steel.

Conformance to these standards is particularly important for structural applications and where durability is an issue (e.g. exposed coastal sites). A number of these standards exist partly to make sure dimensional compatibility, e.g. between nuts and bolts, and are based on international standards.

Mild steel, aluminium and zinc-plated fasteners should not be used in CCA treated timbers. Refer to NATSPEC TECHnote PRO 001 CCA Treated Timber. Epoxy coated or stainless steel are the preferred alternatives.

Bolts

Coach bolts: To AS/NZS 1390.

Hexagon bolts Grades A and B: To AS 1110.1.

Hexagon bolts Grade C: To AS 1111.1.

The product grade in the **Bolts**, **Nuts** and **Screws** cited standards refers to the quality of the product and to the size of the tolerances where grade A is the most precise and grade C is the least precise.

Corrosion resistance

Atmospheric corrosivity category: To 0171 General requirements.

Steel products: Conform to the **Corrosion resistance table** or provide proprietary products with metallic and/or organic coatings of equivalent corrosion-resistance.

Corrosion resistance table

The **Corrosion resistance table** contains default values based on the corrosion rates detailed in AS 4312. NCC Volume 2 also has coating requirements for metal sheet roofing in four environmental corrosivity categories which are aligned with AS 4312. Edit the table to suit the project and coordinate with other worksections.

The internal and external project atmospheric corrosivity categories are nominated in 0171 General requirements from the following categories: C1 (very low), C2 (low), C3 (medium), C4 (high), C5 (very high) and CX (extreme). These are described in AS 4312.

An additional corrosivity category of T (inland tropical), exists in the AS/NZS 2312 series for structural steelwork. If nominating category T (inland tropical) for structural steel, do so in the relevant worksection.

Note that where categories C5, CX or T to the AS/NZS 2312 series, have been nominated, specialist advice on corrosion resistance requirements will be required.

See the various parts of AS 2699 where there are duplex protective coatings systems in addition to those given here. If internal elements are being painted, lower levels of zinc-coating may be considered. See also AS 3700 for corrosion resistance ratings.

For self-drilling screws in severe marine environments, indoor swimming pools or buildings with corrosive industrial processes, consult the roofing/cladding manufacturer on the requirements for shank corrosion protection.

See NATSPEC TECHnote DES 010 for further information on atmospheric corrosivity categories.

Atmospheric corrosivity category to AS 4312	Threaded fasteners and anchors		Powder actuated fasteners
	Material	Minimum local metallic coating thickness (µm)	Material
C1 and C2	Electroplated zinc or Hot-dip galvanized	30	Stainless steel Type 316
C3	Hot-dip galvanized	45	Stainless steel Type 316
C4	Stainless steel Type 316	-	Stainless steel Type 316

Note: For categories C5, CX and T to the AS/NZS 2312 series, seek specialist advice.

Finishes

Electroplating:

- Metric thread: To AS 1897.
- Imperial thread: To AS 4397.

Galvanizing:

- Threaded fasteners: To AS/NZS 1214.
- Other fasteners: To AS/NZS 4680.

Mild steel fasteners: Galvanize if:

- Embedded in masonry.
- In external timbers.
- Exposed to or in air spaces behind the external leaf of masonry walls.
- In contact with chemically treated timber other than CCA treated timber.

Electroplated anchors are also approved in concrete and masonry.

Epoxy coated: CCA treated timber.

Nuts

Hexagon chamfered thin nuts Grades A and B: To AS 1112.4.

Hexagon nuts Grade C: To AS 1112.3.

Hexagon nuts Style 1 Grades A and B: To AS 1112.1.

Hexagon nuts Style 2 Grades A and B: To AS 1112.2.

Screws

Coach screws: To AS/NZS 1393.

Hexagon screws Grades A and B: To AS 1110.2.

Hexagon screws Grade C: To AS 1111.2.

Hexagon socket screws: To AS 1420.

Self-drilling screws: To AS 3566.1.

Self-tapping screws:

- Cross-recessed countersunk (flat – common head style): To AS/NZS 4407.
- Cross-recessed pan: To AS/NZS 4406.
- Cross-recessed raised countersunk (oval): To AS/NZS 4408.
- Hexagon: To AS/NZS 4402.
- Hexagon flange: To AS/NZS 4410.
- Hexagon washer: To AS/NZS 4409.
- Slotted countersunk (flat – common head style): To AS/NZS 4404.
- Slotted pan: To AS/NZS 4403.
- Slotted raised countersunk (oval – common head style): To AS/NZS 4405.

Blind rivets

Description: Expanding end type with snap mandrel.

Type: Closed end for external application, open end for internal application.

End material:

- Aluminium base alloy for metallic-coated or prepainted steel.
- Stainless steel for stainless steel sheet.
- Copper for copper sheet.

Size:

- For sheet metal to sheet metal: 3 mm.
- For sheet metal to supports, brackets and rolled steel angles: 4.8 mm.

2.5 HILTI CHEMICAL ANCHORS

Injectable adhesive anchors

Chemical injection fastening systems with flexible setting depths. For use with various anchor rods, internally threaded sleeves or reinforcing bar.

Refer to HILTI technical data sheets for detailed application, resistance and load tables.

HIT-RE 100: Premium class, heavy-duty odourless epoxy mortar for anchoring in concrete.

Suitable base materials: Concrete (cracked), concrete (uncracked).

Allowable base material condition: Dry, submerged, water-filled, wet.

SAFEset technology: Yes.

Seismic loading: No.

Curing time: Slow.

Holes: Hammer drilled, diamond cored.

HIT-HY 170: Premium class, heavy duty hybrid mortar for anchoring in concrete and masonry.

Suitable base materials: Concrete (cracked), concrete (uncracked), masonry (hollow), masonry (solid).

Allowable base material condition: Dry, wet.

SAFEset technology: Yes.

Seismic loading: Yes, C2 in concrete.

Curing time: Fast.

Holes: Hammer drilled.

HIT-HY 200-R V3: Ultimate class, high performance hybrid mortar with 100 year design life, for anchoring in concrete, with seismic performance C1 and C2 to AS 5216.

Suitable base materials: Concrete (cracked).

Allowable base material condition: Dry, wet (not submerged).

SAFEset technology: Yes.

Seismic loading: Yes,

Curing time: Fast.

Holes: Hammer drilled, diamond cored.

HIT-HY 270: Ultimate class, high performance hybrid mortar for anchoring in masonry.

Suitable base materials: Concrete (aerated), concrete (lightweight), masonry (hollow), masonry (solid).

Allowable base material condition: Dry, wet.

SAFEset technology: No.

Seismic loading: No.

Curing time: Fast.

Holes: Hammer drilled.

HIT-RE 500 V3: Ultimate class, high performance epoxy mortar with 100 year design life, for anchoring in concrete and some types of natural stone, with seismic performance C1 and C2 to AS 5216.

Suitable base materials: Concrete (cracked), concrete (uncracked), some types of natural stone.

Allowable base material condition: Dry, submerged, water-filled, wet.

SAFEset technology: Yes.

Seismic loading: Yes.

Curing time: Slow.

Holes: Hammer drilled, diamond cored.

Capsule adhesive anchors

Chemical capsule fastening systems. For use with various anchor rods and internally threaded sleeves.

Refer to HILTI technical data sheets for detailed application, resistance and load tables.

HIT-HVU 2: Ultimate class, heavy-duty hybrid foil adhesive capsule for anchoring in concrete, with seismic performance C1 and C2 to AS 5216.

Suitable base materials: Concrete (cracked), concrete (uncracked).

Allowable base material condition: Dry, wet (not submerged).

SAFEset technology: Yes.

Seismic loading: Yes.

Curing time: Fast.

Holes: Hammer drilled, diamond cored.

2.6 HILTI MECHANICAL ANCHORS

Expansion anchors

Expansion type anchors including stud anchors and sleeved anchors.

Refer to HILTI technical data sheets for detailed application, resistance and load tables.

HSA: Premium class, medium-duty zinc plated carbon steel anchor with an externally threaded head for anchoring in concrete. Material and configuration as follows:

- HSA-F: Galvanized carbon steel, with stainless steel sleeve.
- HSA-R: Stainless steel.

Suitable base materials: Concrete (uncracked).

SAFEset technology: No.

Seismic loading: No.

HSL-3-R: Ultimate class, heavy-duty zinc plated carbon steel anchor with a hex head for anchoring in concrete. Suitable for dynamic loading including seismic, fatigue and shock, with seismic performance C1 and C2 to AS 5216.

Suitable base materials: Concrete (cracked), concrete (uncracked).

SAFEset technology: No.

Seismic loading: Yes. (HSL-3-R stainless steel version not approved for C2).

Load capacity during fire: Refer to ETA assessment.

HSL4: Ultimate class, heavy-duty zinc plated carbon steel anchor with a hex head for anchoring in concrete. Suitable for dynamic loading including seismic, fatigue and shock, with seismic performance C1 and C2 to AS 5216.

Suitable base materials: Concrete (cracked), concrete (uncracked).

SAFEset technology: No.

Seismic loading: Yes.

Load capacity during fire: Refer to ETA assessment.

HST3: Ultimate class, medium-duty zinc plated carbon steel anchor with an externally threaded head for anchoring in concrete, with seismic performance C1 and C2 to AS 5216.

Material and configuration as follows:

- HST3: Zinc plated carbon steel.
- HST3-R: Stainless steel.

Suitable base materials: Concrete (cracked), concrete (uncracked).

SAFEset technology: Yes.

Seismic loading: Yes.

Load capacity during fire: Refer to ETA assessment.

Undercut anchors

Mechanical interlock type anchors for extreme performance and reliability.

Refer to HILTI technical data sheets for detailed application, resistance and load tables.

HDA: Ultimate class, heavy-duty self-undercutting anchor with externally threaded head for anchoring in concrete. Suitable for dynamic loading including seismic, fatigue, and shock, with seismic performance C1 and C2 to AS 5216. Material and configuration as follows:

- HDA-P: Zinc-plated carbon steel, pre-set.
- HDA-PR: Hot-dipped galvanized/Sherardised carbon steel, pre-set.
- HDA-PF: Stainless steel, pre-set.
- HDA-T: Zinc-plated carbon steel, through-set.
- HDA-TR: Hot-dipped galvanized/Sherardised carbon steel, through-set.
- HDA-TF: Stainless steel, through-set.

Suitable base materials: Concrete (cracked), concrete (uncracked).

SAFEset technology: No.

Seismic loading: Yes.

HMU: Ultimate class, heavy-duty self-undercutting anchor with externally threaded head for anchoring in concrete. Suitable for dynamic loading, including seismic performance C1 and C2 to AS 5216.

Material and configuration as follows:

- HMU-P: Zinc-plated carbon steel (special order).
- HMU-PF: Hot-dipped galvanized/Sherardised carbon steel.

Suitable base materials: Concrete (cracked), concrete (uncracked).

SAFEset technology: Yes.

Seismic loading: Yes.

Load capacity during fire: Refer to ETA assessment.

HSC: Ultimate class, heavy-duty, shallow undercutting anchor for anchoring in concrete. Suitable for dynamic loading including seismic and shock, with seismic performance C2 to AS 5216. Material and configuration as follows:

- HSC-A: Zinc-plated carbon steel, externally threaded head.
- HSC-AR: Stainless steel, externally threaded head.
- HSC-I: Zinc-plated carbon steel, inner thread.
- HSC-IR: Stainless steel, inner thread.

Suitable base materials: Concrete (cracked), concrete (uncracked).

SAFEset technology: No.

Seismic loading: Yes, C2.

Load capacity during fire: Refer to ETA assessment.

Screw anchors

Screw type anchors for temporary and permanent applications.

Refer to HILTI technical data sheets for detailed application, resistance and load tables.

HUS3: Ultimate class, medium duty, screw anchors for anchoring in concrete and masonry, with seismic performance C1 and C2 to AS 5216. Material and configuration as follows:

- HUS3-H: Zinc-plated carbon steel.
- HUS3-HF: Carbon steel with multi-layer coating.
- HUS3-HR: Stainless steel.
- HUS3-C: Zinc-plated carbon steel.
- HUS3-CR: Stainless steel.
- HUS3-P: Zinc-plated carbon steel.
- HUS3-I: Zinc-plated carbon steel, with internally threaded head.
- HUS3-I Flex: Zinc-plated carbon steel, with internally threaded head.
- HUS3-A: Zinc-plated carbon steel, with externally threaded head.

Suitable base materials: Concrete (cracked), concrete (uncracked), masonry.

SAFEset technology: No.

Seismic loading: Yes.

Load capacity during fire: Refer to ETA assessment.

HUS-HR: Ultimate class, stainless steel, medium duty, screw anchor with a hex head for anchoring in concrete and masonry, with seismic performance C1 to AS 5216.

Suitable base materials: Concrete (cracked), concrete (uncracked), masonry.

SAFEset technology: No.

Seismic loading: Yes, C1.

Load capacity during fire: Refer to ETA assessment.

HUS-CR: Ultimate class, stainless steel, medium duty, screw anchor with a countersunk head for anchoring in concrete and masonry, with seismic performance C1 to AS 5216.

Suitable base materials: Concrete (cracked), concrete (uncracked), masonry.

SAFEset technology: No.

Seismic loading: Yes, C1.

Load capacity during fire: Refer to ETA assessment.

Other anchors

Refer to HILTI technical data sheets for detailed application, resistance and load tables.

HBI panel brace anchor: Standard class, heavy-duty, carbon steel expanding anchor bolt for panel bracing during construction.

Suitable base materials: Concrete (uncracked).

SAFEset technology: No.

Seismic loading: No.

HFB nail anchor: Premium class, light-duty, carbon steel fastener, with seismic performance assessment.

Suitable base materials: Concrete (cracked), concrete (uncracked).

SAFEset technology: No.

Seismic loading: Please contact HILTI's technical support for more details.

HKD flush anchor: Standard class, medium-duty, flush anchor with internal thread for bolts or threaded rods. Material and configuration as follows:

- HKD: Zinc-plated carbon steel, tool-set.
- HKD-D: Zinc-plated carbon steel, manual-set.
- HKD-SR: Stainless steel, tool set.

Suitable base materials: Concrete (uncracked).

SAFEset technology: No.

Seismic loading: No.

HRD plastic frame anchor: Premium class, plastic anchor with screw fixing. Material and configuration as follows:

- HRD-H: Carbon steel, hex head.
- HRD-HF: Hot-dipped galvanized, hex head.
- HRD-HR: Stainless steel, hex head.
- HRD-C: Carbon steel, countersunk head.
- HRD-CR: Stainless steel, countersunk head.

Suitable base materials: Concrete (cracked), concrete (uncracked), masonry.

SAFEset technology: No.

Seismic loading: No.

3 EXECUTION

3.1 ADHESIVES

General

Requirement: Install to the manufacturer's recommendations.

Preparation

Substrates: Conform to the following:

- Remove any deposit or finish which may impair adhesion.
- If framed or discontinuous, provide support members in full lengths without splicing.
- If solid or continuous, remove excessive projections.
- If previously painted, remove cracked or flaking paint and lightly sand the surface.

Contact adhesive

Wall and floor adhesive is also referred to as mastic adhesive.

Precautions: Do not use contact adhesive if:

- A substrate is polystyrene foam.
- A PVC substrate may allow plasticiser migration.
- The adhesive solvent can discolour the finished surface.
- Dispersal of the adhesive solvent is impaired.

Two-way method: Immediately after application, press firmly to transfer adhesive and then pull both surfaces apart. Allow to tack off and then reposition and press firmly together. Tap areas in contact with a hammer and padded block.

The two way method is recommended for locating non-loadbearing items.

One-way method: Immediately after application, bring substrates together and maintain maximum surface contact for 24 hours by clamps, nails or screws as appropriate. If highly stressed, employ permanent mechanical fasteners.

The one way method is recommended for heavier panels.

High strength adhesive tape

Preparation:

- Non-porous surfaces: Clean with surface cleaning solvents such as isopropyl alcohol/water, wash down and allow to dry.
- Porous surfaces: Prime the surface with a contact adhesive compatible with the tape adhesive system.

Application to copper, brass, plasticised vinyl and hydrophilic surfaces such as glass and ceramics in a high humidity environment: Conform to manufacturer's recommendations.

Applied lamination pressure: Make sure the tape experiences 100 kPa.

Application temperature: Generally above 10°C and to the manufacturer's recommendations.

Completion: Do not apply loads to the assembly for 72 hours at 21°C.

3.2 JOINT SEALING

General

Requirement: Install to the manufacturer's recommendations.

Joint preparation

Cleaning: Cut flush joint surface protrusions and rectify if required. Mechanically clean joint surfaces free of any deposit or finish which may impair adhesion of the sealant. Immediately before sealant application, remove loose particles from the joint, using oil-free compressed air.

Bond breaking: Install bond breaking backing material.

Taping: Protect the surface on each side of the joint using 50 mm wide masking tape or equivalent means. On completion of sealant application, remove the tape and remove any stains or marks from adjacent surfaces.

Primer: Apply the recommended primer to the surfaces in contact with sealant materials.

Sealant joint proportions

General weatherproofing joints (width:depth):

- 1:1 for joint widths less than 12 mm.
- 2:1 for joint widths greater than 12 mm.

Often detailed on drawings.

Sealant application

General: Apply the sealant to dry joint surfaces using a pneumatic applicator gun. Make sure the sealant completely fills the joint to the required depth, provides good contact with the full depth of the sides of the joint and traps no air in the joint. Do not apply the sealant outside the recommended working time for the material or the primer.

Weather conditions

Two pack polyurethanes: Do not apply the sealant if ambient conditions are outside the following:

- Temperature: Less than 5°C or greater than 40°C.
- Humidity: To the manufacturer's recommendations.

Joint finish

General: Force the sealant into the joint and finish with a smooth, slightly concave surface using a tool designed for the purpose.

Excess sealant: Remove from adjoining surfaces using cleaning material nominated by the sealant manufacturer.

Protection

General: Protect the joint from inclement weather during the setting or curing period of the material.

Rectification

General: Cut out and remove damaged portion of joint sealant and reinstall so repaired area is indistinguishable from undamaged portion.

3.3 FASTENERS - GENERAL**General**

Requirement: Install to the manufacturer's installation instructions (MII).

Fastening to wood and steel

Timber substrates: To AS 1720.1 Section 4.

Self-drilling screws: To AS 3566.1 for timber and steel substrates.

Fastening into concrete and masonry

Concrete substrate: To AS 5216 Appendix B.

Masonry substrate: To AEFAC TN 09.

3.4 HILTI CHEMICAL ANCHORS**General**

Installation: Install chemical anchors to HILTI installation instructions detailed in HILTI Technical Datasheets. Conform to the following for correct performance of the fixing:

- Minimum distances from edges of substrates.
- Preparation of holes for fixings.
- Injection method.
- Do not load anchors until the curing time has elapsed.

3.5 HILTI MECHANICAL ANCHORS**General**

Installation: Install mechanical anchors to HILTI installation instructions detailed in HILTI Technical Datasheets. Conform to the following for correct performance of the fixing:

- Minimum distances from edges of substrates.
- Preparation of holes for fixings.
- Setting depths.
- Installation of anchors and fixings.

TESTING

Include this *Optional* style text by changing to *Normal* style text if Installed sealant tests are required and are not nominated in other worksections.

Installed sealant tests

Sampling: For each sealant test, take 3 samples of installed and cured sealant, each at least 50 mm long, from completed joints.

Reinstatement: Repair-as-new the joints from which the samples were taken.

Installed sealant tests schedule

Item to be tested	Property to be tested	Applicable standard

See ISO 11600 Table 4 for elongation, amplitude and compression tests for glazing (Type 6) and Contraction (Type F) sealants.

4 SELECTIONS

Schedules are a tool to specify properties required for products or systems. If the principal permits documentation of the product or system by proprietary name, some of the properties may be unnecessary and can be deleted. Document the product or system's location or application here and/or on the drawings with a matching project code. Refer to NATSPEC TECHnote GEN 024 for guidance on using and editing schedules.

Cross references

If adhesives or sealants are selected and specified here for particular applications, provide cross references in the relevant worksections directing the reader to this schedule and delete text that may be redundant or contradictory.

Delete items from these Schedules if they are to be selected by the contractor as part of general construction.

4.1 ADHESIVES**Application schedule**

Application	Product	Relevant worksections
Adhesive fixed timber strip flooring and parquet systems		0655 Timber flooring
Colourback glass faced wall panels or splashbacks		0551 Joinery, 0641 Applied wall finishes
Drywall lining/wall panels		0463 Glass blockwork, 0511 Lining, 0522 Partitions – framed and lined
Multilayered board floors		0654 Multilayered board flooring
Joinery doors		0453 Doors and access panels
Mirrors		0467 Glass components
Stainless steel faced wall panels or splashbacks		0551 Joinery, 0553 Stainless steel benching
Timber joinery fitments		0551 Joinery
Trim, mouldings, skirtings and architraves		0511 Lining

Describe the location and details or refer to the drawings.

Product: Select a product or give a generic description as follows:

- Adhesive fixed timber strip flooring and parquet systems: High strength contact adhesive.
- Colourback glass faced wall panels or splashbacks: 1 part polyurethane sealant/adhesive with permanent elasticity.
- Drywall lining/wall panels: High strength contact adhesive.

- Multilayered board floors: High strength contact adhesive.
- Joinery doors: PVA or 1 part polyurethane.
- Mirrors: 1 part polyurethane sealant/adhesive with permanent elasticity.
- Stainless steel faced wall panels or splashbacks: 1 part polyurethane sealant/adhesive with permanent elasticity.
- Timber joinery fitments: PVA or 1 part polyurethane.
- Trims, mouldings, skirtings and architraves: High strength contact adhesive.

Relevant worksection: Coordinate the selection with related default text.

4.2 HILTI ANCHORS

HILTI chemical anchor schedule

	HIT-RE 500 V3	HIT-RE 100	HIT-HY 200 V3	HIT-HY 170	HIT-HY 270
Location					
Chemical: Part number					
Anchor rod: Part number					
Approved base material					
Anchoring element (threaded rod, threaded sleeve, rebar)					
Anchor rod: Diameter (mm)					
Anchor rod: Length (mm)					
Anchor rod: Embedment (mm)					
Drill hole: Diameter (mm)					
Drill hole: Depth (mm)					
Curing time					
Cracked/uncracked concrete					
Drilling method					
Automatic hole cleaning					
Wet borehole					
Design life					
Seismic approval					
Low VOC					

The codes in the header row of the schedule designate each product type.

Location: Schedule, or match codes to drawings.

Chemical: Part number: Insert the HILTI part number.

Anchor rod: Part number: Insert the HILTI part number.

Approved base material: e.g. Concrete, masonry.

Curing time: Check with HILTI technical data sheets.

Cracked/uncracked concrete: Schedule condition of substrate.

Drilling method: e.g. Hammer drill, diamond core.
 Automatic hole cleaning: e.g. Hammer drilling with hollow drill bit (safe set).
 Wet borehole: Specify location conditions.
 Design life: Insert if applicable. Check with HILTI technical data sheets.
 Seismic approval: Specify if required. Check with HILTI technical data sheets.

HILTI mechanical anchor schedule

	HSA	HSL 3	HSL 4	HST 3	HDA	HMU	HSC
Location							
Anchor: Part number							
Approved base material							
Anchor: Material/coating							
Anchor: Diameter (mm)							
Anchor: Length (mm)							
Anchor: Embedment (mm)							
Threaded sleeve: Diameter							
Drill hole: Diameter (mm)							
Drill hole: Depth (mm)							
Cracked/uncracked concrete							
Drilling method							
Automatic hole cleaning							
Tightening torque (Nm)							
Seismic approval							
Filler washer set							

The codes in the header row of the schedule designate each product type.
 Location: Schedule, or match codes to drawings.
 Anchor: Part number: Insert the HILTI part number.
 Approved base material: e.g. Concrete, masonry.
 Anchor: Material/coating e.g. Zinc plated carbon steel.
 Anchor: Embedment (mm): Check with HILTI technical data sheets.
 Cracked/uncracked concrete: Schedule condition of substrate.
 Drilling method: e.g. Hammer drill, diamond core.
 Automatic hole cleaning: e.g. Hammer drilling with hollow drill bit (safe set).
 Tightening torque: Check with HILTI technical data sheets.
 Seismic approval: Specify if required. Check with HILTI technical data sheets.
 Filler washer set: Specify if required.

4.3 SEALING, POINTING AND BEDDING

Application schedule

Application	Product	Relevant worksections
Metal flashings and rainwater goods		0421 Roofing – combined, 0423 Roofing – profiled sheet metal, 0424 Roofing – seamed sheet metal, 0425 Roofing – shingles and shakes, 0426 Roofing – slate, 0427 Roofing – tiles
Metal flashings and sealing non-porous substrates		0431 Cladding – combined, 0432 Curtain walls, 0434 Cladding – flat sheets and panels, 0435 Cladding – planks and weatherboards, 0436 Cladding – profiled and seamed sheet metal
Window and external doors		0432 Curtain walls, 0451 Windows and glazed doors, 0453 Doors and access panels, 0463 Glass blockwork
Hydraulic services		0811 Sanitary fixtures, 0812 Tapware, 0813 Water heaters, 0815 Drinking water dispensers

Describe the location and details or refer to the drawings.

Product: Select a product or give a generic description as follows:

- Metal flashings and rainwater goods: Silicone neutral cure.
- Sealing non-porous substrates: 1 part elastomeric polyurethane for fast moving joints in light components e.g. metal.
- Windows and external doors: 1 part elastomeric polyurethane.
- Hydraulic services: Silicone neutral cure formulated to prevent microbiological growth for kitchen and sanitary ware applications.

Relevant worksection: Coordinate the selection with related default text.

Adhesives, sealants and fasteners combined function schedule

Application	Product	Relevant worksections
Cool rooms fixing and sealing	Documented in relevant worksections	0762 Cool rooms
Fixing and sealing acoustic ceiling tiles		0531 Suspended ceilings – combined
Control joints, tile adhesives and wet area sealants		0631 Ceramic tiling, 0632 Stone and terrazzo tiling
Timber floor control joints, adhesives and fixings		0655 Timber flooring, 0654 Multilayered board flooring
Wet area sealants and lightweight detail items		0525 Cubicle systems, 0551 Joinery, 0811 Sanitary fixtures

Describe the location and details or refer to the drawings.

Product: Select generically from the following:

- Acoustic ceiling tiles: Polyurethane modified silicone for general purpose gap filling.
- Wet area sealants and lightweight detail items: Silicone neutral cure formulated to prevent microbiological growth for kitchen and sanitary ware applications.
- Acrylic latex: For general interior pointing.
- 1 part elastomeric polyurethane: For fast moving joints in lightweight components e.g. metal.
- Control joints and wet area sealants: 2 part elastomeric polyurethane for fast moving joints in light structures.
- Timber floor control joints: 2 part elastomeric polyurethane for fast moving joints in light structures.

Relevant worksection: Coordinate the selection with related default text.

4.4 SEALING STRUCTURALLY DESIGNED CONTROL JOINTS

Application schedule

Application	Sealant type	Bond breaking	Sealant colour	Relevant worksection
Masonry control joints				0322 Tilt-up concrete, 0331 Brick and block construction, 0332 Stone masonry
Trafficable masonry control joints				0274 Concrete pavement, 0275 Paving – mortar and adhesive bed

Describe the location and details or refer to the drawings.

Sealant type: e.g. 2 part elastomeric polyurethane for fast moving joints in light structures or slow moving joints in heavy structures. Polysulfide sealants have been largely superseded by polyurethanes that are now the equal or better and less toxic. Alternatively, describe a product by name.

Bond breaking: Consult manufacturers for joint fillers, e.g. closed cell expanded polythene, for compatibility with the sealant. Rigid fillers such as pulp board, cork or semi-rigid foam should not be specified.

Sealant colour: e.g. Grey.

Relevant worksection: Coordinate the selection with related default text.

REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AEFAC TN 09	2019	Selection and installation of fasteners in masonry
AS 1110		ISO metric hexagon bolts and screws - Product grades A and B
AS 1110.1	2015	Bolts
AS 1110.2	2015	Screws
AS 1111		ISO metric hexagon bolts and screws - Product grade C
AS 1111.1	2015	Bolts
AS 1111.2	2015	Screws
AS 1112		ISO metric hexagon nuts
AS 1112.1	2015	Style 1 - Product grades A and B
AS 1112.2	2015	Style 2 - Product grades A and B
AS 1112.3	2015	Product grade C
AS 1112.4	2015	Chamfered thin nuts - Product grades A and B
AS/NZS 1214	2016	Hot-dip galvanized coatings on threaded fasteners (ISO metric coarse thread series) (ISO 10684:2004, MOD)
AS 1237		Plain washers for metric bolts, screws and nuts for general purposes
AS 1237.1	2002	General plan
AS/NZS 1390	1997	Cup head bolts with ISO metric coarse pitch threads
AS/NZS 1393	1996	Coach screws - Metric series with ISO hexagon heads
AS 1420	2008	ISO metric hexagon socket head cap screws
AS 1720		Timber structures
AS 1720.1	2010	Design methods
AS 1897	2016	Fasteners - Electroplated coatings
AS/NZS 2312		Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings
AS 2334	1980	Steel nails - Metric series
AS/NZS 2465	1999	Unified hexagon bolts, screws and nuts (UNC and UNF threads)
AS 2753	2018	Adhesives - for bonding gypsum plaster linings to wood and metal framing members
AS 3566		Self-drilling screws for the building and construction industries
AS 3566.1	2002	General requirements and mechanical properties
AS 4312	2019	Atmospheric corrosivity zones in Australia
AS 4397	2007	Electroplated coatings of zinc on steel fasteners with imperial threads
AS/NZS 4402	2015	Hexagon head tapping screws
AS/NZS 4403	2015	Slotted pan head tapping screws
AS/NZS 4404	2015	Slotted countersunk (flat) head tapping screws (common head style)
AS/NZS 4405	2015	Slotted raised countersunk (oval) head tapping screws (common head style)
AS/NZS 4406	2015	Cross-recessed pan head tapping screws
AS/NZS 4407	2015	Cross-recessed countersunk (flat) head tapping screws (common head style)
AS/NZS 4408	2015	Cross-recessed raised countersunk (oval) head tapping screws
AS/NZS 4409	2015	Hexagon washer head tapping screws
AS/NZS 4410	2015	Hexagon flange head tapping screws

AS/NZS 4680	2006	Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS 5216	2021	Design of post-installed and cast-in fastenings in concrete
ASTM A240/A240M	2020	Standard specification for chromium and chromium-nickel stainless steel plate, sheet and strip for pressure vessels and for general applications
ISO 11600	2002	Building construction - Jointing products - Classification and requirements for sealants
The following documents are mentioned only in the <i>Guidance</i> text:		
AS 2699		Built-in components for masonry construction
AS 3700	2018	Masonry structures
BCA C3.15	2019	Fire resistance - Protection of openings - Openings for service installations
BCA C3.16	2019	Fire resistance - Protection of openings - Construction joints
Green Star	2021	Green Star Buildings
NATSPEC DES 010	2021	Atmospheric corrosivity categories for ferrous products
NATSPEC DES 017	2015	Selection of sealants
NATSPEC GEN 006	2015	Product specifying and substitution
NATSPEC GEN 024	2021	Using NATSPEC selections schedules
NATSPEC PRO 001	2015	CCA (Copper chrome arsenate) treated timber
NATSPEC PRO 004	2014	Ceramic tile and adhesive selection
NATSPEC TR 01	2021	Specifying ESD
SCAQMD Rule 1168	1989	South Coast Air Quality Management District Rule 1168 - Adhesive and sealant applications (California, U.S.)