

0181P HILTI ANCHORS

Branded worksection

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Worksection abstract

This branded worksection *Template* is applicable to HILTI anchors.

How to use this worksection

Customise this worksection *Template* 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 branded worksections by HILTI:

- *0182p HILTI in fire-stopping.*

Documenting this and related work

You may document this and related work as follows:

- Location and details of connections are best shown on the drawings.

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:

- Corrosion resistance for durability to improve material life cycle.

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 HILTI anchors, as documented.

<i>Documented</i> is defined in <i>0171 General requirements</i> as meaning contained in the contract documents.
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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.
- Compatibility: Compatible with adjacently located products and materials.
- Movement: If a 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 or [ask.hilti.com.au/](mailto:ask.hilti.com.au)

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

Hilti anchors: 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.

Subcontractors

HILTI anchor installer training: Submit evidence of supplier specific training or an AEFAC anchor installer certificate.

Delete if not required.

Tests

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

Site tests: Submit test results to confirm the quality of anchor installation.

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 warranty.

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

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 GENERAL - ANCHORS

Standards

Safety-critical fastening applications: The prequalification of post-installed fasteners and cast-in anchor channels for suitability and admissible service conditions to AS 5216 (2021) Appendix A.

Guidance on acceptable evidence for prequalification, including European Technical Assessments (ETA's), is provided in AS 5216 (2021) 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 (2002).

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

Stainless steel fasteners: To ASTM A276/A276M (2023).

Unified hexagon bolts, screws and nuts: To AS/NZS 2465 (1999).

Fasteners in CCA treated timber: 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. Stainless steel IS the preferred alternative.

Bolts

Coach bolts: To AS/NZS 1390 (1997).

Hexagon bolts Grades A and B: To AS 1110.1 (2015).

Hexagon bolts Grade C: To AS 1111.1 (2015).

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.

Nuts

Hexagon chamfered thin nuts Grades A and B: To AS 1112.4 (2015).

Hexagon nuts Grade C: To AS 1112.3 (2015).

Hexagon nuts Style 1 Grades A and B: To AS 1112.1 (2015).

Hexagon nuts Style 2 Grades A and B: To AS 1112.2 (2015).

Screws

Coach screws: To AS/NZS 1393 (1996).

Hexagon screws Grades A and B: To AS 1110.2 (2015).

Hexagon screws Grade C: To AS 1111.2 (2015).

Hexagon socket screws: To AS 1420 (2008).

Self-drilling screws: To AS 3566.1 (2002).

Self-tapping screws:

- Cross-recessed countersunk (flat – common head style): To AS/NZS 4407 (2015).
- Cross-recessed pan: To AS/NZS 4406 (2015).
- Cross-recessed raised countersunk (oval): To AS/NZS 4408 (2015).
- Hexagon: To AS/NZS 4402 (2015).
- Hexagon flange: To AS/NZS 4410 (2015).
- Hexagon washer: To AS/NZS 4409 (2015).
- Slotted countersunk (flat – common head style): To AS/NZS 4404 (2015).

- Slotted pan: To AS/NZS 4403 (2015).
- Slotted raised countersunk (oval – common head style): To AS/NZS 4405 (2015).

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 (2019). Coating requirements for metal sheet roofing, referred to in BCA (2022) H1D7(2)(c), are set out in four environmental corrosivity categories that are aligned with AS 4312 (2019). 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 (2019).

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 (2018) 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 (2019)	Threaded fasteners and anchors	
	Material	Minimum local metallic coating thickness (µm)
C1 and C2	Electroplated zinc or Hot-dip galvanized	30
C3	Hot-dip galvanized	45
C4	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 (2016).
- Imperial thread: To AS 4397 (2007).

Galvanizing:

- Threaded fasteners: To AS/NZS 1214 (2016).
- Other fasteners: To AS/NZS 4680 (2006).

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.

2.3 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 (2021).

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 (2021).

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.

HIT-RE 500 V4: 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 (2021).

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 (2021).

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.

2.4 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: Ultimate class, heavy-duty A4 stainless steel anchor for anchoring in concrete. Suitable for dynamic loading including seismic, fatigue and shock, with seismic performance C1 and C2 to AS 5216 (2021). Configuration as follows:

- HSL-3-R: Hex head.
- HSL-3-SKR: Countersunk head.

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 (2021). Configuration as follows:

- HSL4-B: Torque controlled red cap design.
- HSL4-G: Threaded rod connection.
- HSL4-SK: Countersunk head.

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 (2021).

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 (2021). Material and configuration as follows:

- HDA-P: Zinc-plated carbon steel, pre-set.
- HDA-PF: Hot-dipped galvanized/Sherardised carbon steel, pre-set.
- HDA-PR: Stainless steel, pre-set.
- HDA-T: Zinc-plated carbon steel, through-set.
- HDA-TF: Hot-dipped galvanized/Sherardised carbon steel, through-set.
- HDA-TR: 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 (2021). 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 (2021). 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 (2021). Material and configuration as follows:

- HUS3-H: Zinc-plated carbon steel with hex head.
- HUS3-HF: Carbon steel with multi-layer coating with hex head.
- HUS3-C: Zinc-plated carbon steel with countersunk head.
- HUS3-P: Zinc-plated carbon steel with pan head.
- 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.

HUS4: Ultimate class, high to medium duty, screw anchors for anchoring in concrete and masonry with seismic performance C1 and C2 to AS 5216 (2021). Material and configuration as follows:

- HUS4-H: Galvanized carbon steel with hex head.
- HUS4-HF: Carbon steel with multi-layer coating with hex head.
- HUS4-C: Galvanized carbon steel with countersunk head.
- HUS4-A: Galvanized carbon steel with threaded rod connection.
- HUS4-AF: Carbon steel with multi-layer coating with threaded rod connection.

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

SAFEset technology: No.

Seismic loading: Yes, C1 & C2.

Load capacity during fire: Refer to ETA assessment.

HUS4-Max Ultimate class, high to medium duty, screw anchors with the HUS4-Max foil capsule for anchoring in concrete and masonry with seismic performance C1 and C2 to EOTA TR 075 (2020). Same material and configuration as HUS4 in previous section.

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

SAFEset technology: No.

Seismic loading: Yes, C1 & C2.

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 (2021).

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 (2021).

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.

2.5 HILTI CAST-IN ANCHOR CHANNELS

There are various methods of fixing steel elements to concrete base materials. The selection of the most appropriate method will depend on many factors including base material compressive strength and thickness, fixing spacing, edge distances, type of fixture, loading and the site adjustment required.

General

Cast-in channels: Provide HILTI cast-in anchor channels for fixings to concrete elements, as documented.

T-Bolt fixings: For cast-in anchor channels, provide HILTI T-bolts.

Cast-in anchor channels

HAC: Ultimate class, cast-in anchor channel with optimised V-shaped profile formed by innovative rollshaping (TCRS). Available with hot-dipped galvanized coating.

Optimised profile shape allows greater engagement of concrete and allows closer edge distances.

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

The design provisions of AS 5216 (2021) do not apply to seismic, fatigue and fire design of anchor channels. Contact HILTI for seismic, fatigue and fire data.

Well-sealed end caps prevent concrete slurry from entering channel cavity.

Single piece environmentally friendly foam material also prevents slurry and reduces removal time via tear out strips.

HAC-T: Ultimate class, cast-in anchor channel with optimised V-shaped profile and serrated lip. Available with hot-dipped galvanized coating.

Achieves high slip resistance at low installation torque.

Optimised profile shape allows greater engagement of concrete and allows closer edge distances.

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

The design provisions of AS 5216 (2021) do not apply to seismic, fatigue and fire design of anchor channels. Contact HILTI for seismic, fatigue and fire data.

Well-sealed end caps prevent concrete slurry from entering channel cavity.

Single piece environmentally friendly foam material also prevents slurry and reduces removal time via tear out strips.

HAC-C: Standard cast-in anchor channel with traditional rectangular profile. Available with hot-dipped galvanized coating or in stainless steel.

Hot-rolled variants with thick sturdy profiles.

Cold-formed variants with rounded profiles and constant material thickness.

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

Well-sealed end caps prevent concrete slurry from entering channel cavity (only for hot-rolled).

Single piece environmentally friendly foam material also prevents slurry and reduces removal time via tear out strips.

HAC-C-P: Premium line cast-in anchor channel with traditional rectangular profile. Available with hot-dipped galvanized coating or in stainless steel.

Upgraded load capacity with higher tension and shear values.

Hot-rolled variants with thick sturdy profiles.

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

Well-sealed end caps prevent concrete slurry from entering channel cavity.

Single piece environmentally friendly foam material also prevents slurry and reduces removal time via tear out strips.

HAC Edge: Ultimate class cast-in anchor channel assembly with optimised V-shaped profile, rebar and edge confinement plate

The HAC Edge system is a performance design solution outside the scope of AS 5216 (2021). Contact HILTI for design input.

Edge confinement plate and rebar increasing concrete breakout strength.

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

Product manufactured to edge distance requirements.

Well-sealed end caps prevent concrete slurry from entering channel cavity.

Single piece environmentally friendly foam material also prevents slurry and reduces removal time via tear out strips.

HAC Front-of-slab rebar: Cast-in anchor channel with optimised V-shaped profile and rebar in place of round head anchors. Available with hot-dipped galvanized coating.

The HAC Front-of-slab rebar system is a performance design solution outside the scope of AS 5216 (2021). Contact HILTI for design input.

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

Designed to overlap with efficiency when used as a joint system in corners.

Well-sealed end caps prevent concrete slurry from entering channel cavity.

Single piece environmentally friendly foam material also prevents slurry and reduces removal time via tear out strips.

T-bolts for anchor channels

HBC-C: T-bolt for HILTI cast-in anchor channels with V-shaped profiles. Available with hot-dipped galvanized coating or in stainless steel.

Universal fit, same T-bolt for HAC-40 to HAC-70 V-shaped profiles.

For tension and perpendicular shear loads.

HBC-C-N: Notched T-bolt for HILTI cast-in anchor channels with V-shaped profiles. Available with hot-dipped galvanized coating.

Universal fit, same T-bolt for HAC-40 to HAC-70 V-shaped profiles.

For tension, perpendicular and parallel shear loads.

HBC-T: Serrated T-bolt for HAC-T serrated lip V-shaped profile channel. Available with hot-dipped galvanized coating.

Universal fit, same T-bolt for HAC-T50 to HAC-T70 V-shaped profiles.

For tension, perpendicular and parallel shear loads.

HBC: Standard T-bolt for cast-in anchor channels with rectangular profile. Available with hot-dipped galvanized coating or in stainless steel.

For HILTI HAC-C(-P) cast-in anchor channels with rectangular profile.

For tension and perpendicular shear loads.

3 EXECUTION

3.1 GENERAL

General

Requirement: Install to HILTI's installation instructions.

Fastening into concrete and masonry

Concrete substrate: To AS 5216 (2021) Appendix B.

Masonry substrate: To AEFAC TN 09 (2019).

3.2 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.

- Required spacing between fasteners.
- Minimum required thickness of the base material.
- Preparation of holes for fixings: Drill to the correct hole depth and perpendicular to the surface of the base material. Conform to the documented hole drilling method and the following:
 - . HILTI SAFEset system: Additional cleaning not required.
 - . Conventional hammer drilling: Clean holes using a steel brush, hand pump or compressed air.
 - . Diamond core drilling: Use the HILTI hole roughening tool to roughen the sides of the holes along its full depth and thoroughly clean holes using a steel brush, water and compressed air.

Holes prepared using the HILTI SAFEset system, comprised of a HILTI hollow drill bit connected to a vacuum cleaner do not require additional cleaning. Make sure the nominated chemical anchor is suitable for use with the HILTI SAFEset system. Edit text as required.

- Injection method, including direction, depth and condition (e.g. water-filled) of injection.
- Do not load anchors until the curing time has elapsed.

3.3 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.
- Required spacing between fasteners.
- Minimum required thickness of the base material.
- Preparation of holes for fixings: Drill to the correct hole depth and perpendicular to the surface of the base material. Conform to the documented hole drilling method and the following:
 - . HILTI SAFEset system: Additional cleaning and installation torque using torque wrench not required.
 - . Conventional hammer drilling: Clean holes using a steel brush, hand pump or compressed air.
 - . Diamond core drilling: Conform to product ETA or HILTI instructions.

Holes prepared using the HILTI SAFEset system, comprised of a HILTI hollow drill bit connected to a vacuum cleaner do not require additional cleaning. Make sure the nominated mechanical anchor is suitable for use with the HILTI SAFEset system. Edit text as required.

- Setting depths.
- Installation of anchors and fixings using correct tools and required torque.

3.4 HILTI CAST-IN ANCHOR CHANNELS

General

Installation: Install cast-in anchor channels 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.
- Leveling and positioning of the channels.
- Setting depths.
- Make sure channel and/or tied reinforcement does not move during pour.
- Appropriate compaction of concrete around channel.
- Installation of T-bolts to torque requirements.

3.5 TESTING

0171 General requirements defines different tests in **INTERPRETATION**, **Definitions** and calls for an inspection and testing plan in **TESTING - GENERALLY**, **Inspection and testing plan**.

Site tests

Anchor installation: Verify the quality of the installation to the AEFAC TN 05series.

Test locations: As documented.

Test loads: As documented.

Document test locations and loads on drawings. For example, nominate locations where anchors undergo tension and the relevant test load requirements.

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.

4.1 HILTI ANCHORS

HILTI chemical anchor schedule

	HIT-RE 100	HIT-RE 500 V3	HIT-RE 500 V4	HIT-HY 200 V3	HIT-HY 170	HIT-HY 270
Location						
Chemical: ETA number						
Anchoring element (threaded rod, threaded sleeve, rebar)						
Anchor rod: Material/coating						
Anchor rod: Grade						
Anchor rod: Diameter (mm)						
Anchor rod: Length (mm)						
Anchor rod: Embedment (mm)						
Drill hole: Diameter (mm)						
Drill hole: Depth (mm)						
Hole diameter in fixture (mm)						
Wet borehole						
Drilling method						
Hole cleaning method						
Curing time						
Working time						
Base material: Strength (grade)						
Base material: Thickness (mm)						
Cracked/uncracked concrete						
Design life						
Seismic category						
Injection with piston plug						
Maximum tightening torque (Nm)						
Filling washer set						

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

Document the anchor layout and spacing on drawings.

Location: Schedule, or match codes to drawings.

Chemical: ETA number: Insert the ETA number for the product.

Anchor rod: Material/coating: e.g. Zinc plated carbon steel.

Anchor rod: Grade: 5.8 or 8.8.

Wet borehole: Specify location conditions.
 Drilling method: e.g. Hammer drill, diamond core.
 Hole cleaning method: e.g. Compressed air, steel brush, hammer drilling with hollow drill bit (SAFEset).
 Curing time: Check product ETA.
 Working time: Check product ETA.
 Cracked/uncracked concrete: Confirm condition of substrate. Assumed cracked.
 Design life: Insert if applicable. Check product ETA.
 Seismic category: Specify if required (C1 or C2). Check product ETA.
 Injection with piston plug: Specify if required.
 Maximum tightening torque (Nm): Check product ETA.
 Filler washer set: Specify if required.

HILTI mechanical anchor schedule

	HSA	HSL 3	HSL 4	HST 3	HUS3	HUS4	HDA	HMU	HSC
Location									
Anchor: ETA number									
Anchor: Material/coating									
Anchor: Diameter (mm)									
Anchor: Length (mm)									
Anchor: Nominal embedment (mm)									
Anchor: Effective embedment (mm)									
Drill hole: Diameter (mm)									
Drill hole: Depth (mm)									
Hole diameter in fixture (mm)									
Cracked/uncracked concrete									
Drilling method									
Hole cleaning method									
Installation torque (Nm)									
Seismic category									
Filler washer set									

The codes in the header row of the schedule designate each product type.
 Document the anchor layout and spacing on drawings.
 Location: Schedule, or match codes to drawings.
 Anchor: ETA number: Insert the ETA number for the product.
 Anchor: Material/coating e.g. Zinc plated carbon steel.
 Anchor: Nominal embedment (mm): Check product ETA and/or design software.
 Anchor: Effective embedment (mm): Check product ETA and/or design software.
 Cracked/uncracked concrete: Confirm condition of substrate. Assumed cracked.
 Drilling method: e.g. Hammer drill, diamond core.
 Hole cleaning method: e.g. Compressed air, steel brush, hammer drilling with hollow drill bit (SAFEset).
 Installation torque (Nm): Check product ETA.
 Seismic category: Specify if required (C1 or C2). Check product ETA.
 Filler washer set: Specify if required.

HILTI cast-in anchor channel and T-bolt schedule

	HAC	HAC-T	HAC-C	HAC-C-P	HAC Edge	HAC Rebar	HBC-C	HBC-C-N	HBC-T	HBC
Location										
Anchor: ETA number										
Anchor: Material/coating										
Anchor: Diameter (mm)										
Anchor: Length (mm)										
Anchor: Embedment (mm)										
Cracked/uncracked concrete										
Tightening torque (Nm)										
Seismic approval										

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

Location: Schedule, or match codes to drawings.

Anchor: ETA number: Insert the ETA number for the product.

Anchor: Material/coating e.g. Hot-dipped galvanized, stainless steel.

Anchor: Diameter (mm): Nominate for HBC-T bolts.

Anchor: Embedment (mm): Check product ETA and/or design software.

Cracked/uncracked concrete: Confirm condition of substrate. Assumed cracked.

Tightening torque (Nm): Check product ETA.

Seismic approval: Specify if required. Check product ETA.

REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

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 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/NZS 2465	1999	Unified hexagon bolts, screws and nuts (UNC and UNF threads)
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
AEFAC TN 05		Guidelines for site testing of anchors
AEFAC TN 09	2019	Selection and installation of fasteners in masonry
ASTM A276/A276M	2023	Standard specification for stainless steel bars and shapes
EOTA TR 075	2020	Design of bonded screw fasteners for use in concrete

The following documents are mentioned only in the *Guidance text*:

AS 2699		Built-in components for masonry construction
AS 3700	2018	Masonry structures
BCA H1D7	2022	Class 1 and 10 buildings - Structure - Roof and wall cladding
AEFAC		Australian Engineered Fasteners and Anchors Council (AEFAC)
NATSPEC DES 010		Atmospheric corrosivity categories for ferrous products
NATSPEC GEN 006		Product specifying and substitution
NATSPEC GEN 024		Using NATSPEC selections schedules
NATSPEC PRO 001		CCA (Copper chrome arsenate) treated timber
NATSPEC TR 01		Specifying ESD