

0311P STRAMIT CONDECK IN CONCRETE FORMWORK**Branded worksection**

This branded worksection has been developed by NATSPEC in conjunction with **STRAMIT** (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 Stramit Condeck HP profiled steel sheeting, possibly in conjunction with other formwork types or systems, for the production of formwork for concrete work in buildings and associated structures. This worksection is generally used in conjunction with other concrete worksections.

Background

Stramit Condeck HP steel sheeting comes in one profile type in three different thicknesses (0.75 mm, 0.90 mm and 1.00 mm) manufactured from BlueScope DECKFORM for zinc coating weights Z350 and Z450 (galvanized coating protection) conforming with the requirements of AS 1397 and AS/NZS 4600. An alternative to BlueScope DECKFORM is Stramit's ZAM coated steel (ZAM ZM350) which is a heavy duty protective coating for corrosive environments such as marine areas conforming with the requirements of AS 1397 for Type ZM coatings. ZAM is a blended coating protection system made up of zinc, aluminium and magnesium. The Stramit Condeck HP profiles are manufactured from G550 steel and available in number of corrosion protection coating systems as mentioned above. Note, the Z450 coating can be supplied based on minimum order quantity and availability. A unique addition to Stramit Condeck HP steel sheeting is Stramit Condeck HP Plus which is an end span enhancement accessory for achieving longer unpropped spans and greater design efficiency. The Stramit Condeck HP plus accessory is manufactured from G550 steel with a Z275 galvanized coating protection. Since Stramit Condeck HP Plus is always fully embedded within the finished concrete slab a lower protective coating grade is applied. There is a range of other system compatible accessories including edge forms and two-part ceiling hangers.

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. See for example:

- *0312 Concrete reinforcement.*
- *0313 Concrete post-tensioned.*
- *0315 Concrete finishes.*
- *0341p STRAMIT purlins and girts in structural steelwork.*
- *0423p STRAMIT roofing - profiled sheet metal.*
- *0431p STRAMIT in cladding - combined.*

Material not provided by Stramit

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

- All formwork other than Stramit Condeck HP.
- Formwork liners.
- Release agents.
- Void formers.
- Formwork support.
- Fasteners.

Documenting this and related work

You may document this and related work as follows:

- Either fully detail the work in the structural drawings or define the performance criteria (load supporting capability factors, limits for settlement, deflection or distortion with progressive placement of concrete or differential movement of placements separated by construction joints) for any anticipated contractor design. For design by contractor, independent certification by a professional engineer of the design and documentation of the formwork system, including installation, performance and stripping is appropriate.
- Show on drawings any special requirements.

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

- Surface finish class.
- Formwork procedures and loadings.
- Extent of Stramit Condeck HP Plus end span accessory.
- Minimum number of structural supports for a continuous span using Stramit Condeck HP.
- Permanent structural support to Stramit Condeck HP.
- Trimming reinforcement around large penetrations.

Specifying ESD

The following may be specified by retaining default text:

- Stramit Condeck HP composite formwork.

The following may be specified by including additional text:

- Re-usable formwork.
- Engineered wood form panels.
- Timber forms from a sustainable source, e.g. plantation.
- Other permanent formwork, e.g. unfinished or prefinished fibre cement, polymer formwork, aluminium composite panels and insulating formwork.
- Fabric formwork to reduce formwork material weight.

Refer to NATSPEC TECHreport TR 01 on specifying ESD.

1 GENERAL

We're one of Australia's leading manufacturers and suppliers of roll formed steel building products – and for good reason. For everything steel roofing, rainwater or structural, you can count on us. With dedicated support from our technical services team, we work with clients from project specification stages through to delivery and installation. With our national network, the backing of Fletcher Building, our state-of-the-art R&D facility and rigorous product testing, you can kick off your next project with confidence. When you work with Stramit, you can consider the job done.

1.1 RESPONSIBILITIES

General

Requirement: Provide Stramit Condeck HP profiled steel sheeting composite formwork and other formwork, as documented.

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

1.2 DESIGN

This worksection can be used to document the contractor's design and documentation responsibilities in addition to those set out in DESIGN in 0171 General requirements. If the design, or completion of the design, is not the responsibility of the contractor, delete this clause and associated requirements.

Refer to NATSPEC TECHreport TR 03 on specifying design and construct for mechanical services. It discusses some of the issues and presents a range of approaches for preparing design and construct specifications that can be applied more generally.

General

Formwork: The design of formwork, other than Stramit Condeck HP profiled steel sheeting composite formwork, is the contractor's responsibility. Allow for dimensional changes, deflections and cambers resulting from the following:

- Imposed actions.
- Concrete shrinkage and creep.
- Temperature changes.
- The application of prestressing forces (if any).

This applies to all formwork types, including conventional, proprietary (non-composite formwork) or purpose-made formwork.

Requirements

General: To DESIGN in 0171 General requirements.

Authority requirements: [complete/delete]

In particular, draw attention to any specific requirements of the DA and other regulatory bodies. Consider attaching DA conditions, if appropriate.

1.3 COMPANY CONTACTS

Stramit technical contacts

Website: www.stramit.com.au/resources/technical-services .

1.4 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.

- 0315 *Concrete finishes*.

1.5 STANDARDS

General

Formwork design and construction: To AS 3610.1.

CIA Z36 provides guidance on the safe design and construction of formwork.

Plywood formwork: To AS 6669.

Composite steel-concrete construction, including profiled steel sheeting and shear connectors: To AS/NZS 2327.

Reinforced concrete construction: To AS 3600.

Refer to Stramit - Manual 04 Condeck HP technical manual for additional guidance on composite steel sheeting design and span tables.

1.6 MANUFACTURER'S DOCUMENTS

Technical manuals

Website: www.stramit.com.au/products/formwork/stramit-condeck-hp-composite-slab-system.

Download product brochure, technical specs, free design manuals, design software, installation guides and span tables.

1.7 INTERPRETATION

Definitions

General: For the purposes of this worksection, the definitions and terms given in AS 3610.1 apply.

Edit the **Definitions** subclause to suit the project or delete if not required. List alphabetically.

AS 3610.1 clause 1.5 includes definitions and Appendix E includes a glossary of terms.

1.8 TOLERANCES

Formwork

Plumb of elements > 8 m high: 1:1000.

Plumb of elements ≤ 8 m high: To AS 3610.1.

Position: Construct formwork so that finished concrete conforms to AS 3600 clause 17.5, AS 3610.1 clause 3.3 and as documented.

Document formwork tolerances in the **Formwork dimensional deviation schedule**.

AS 3600 clause 17.5.2 states the limits beyond which the design rules of the standard no longer apply. They are not intended as building tolerances. More stringent tolerances may be suitable.

0310 *Concrete – combined* and 0315 *Concrete finishes* document tolerance requirements for the finished concrete surface.

1.9 SUBMISSIONS

Certification

Formwork design certification: For other than permanent composite form systems, submit certification by a professional engineer experienced in formwork design verifying conformance of the design.

Formwork execution certification: Submit certification by a professional engineer experienced in formwork design and construction, verifying conformance of the completed formwork, including the suitability of the formwork for the documented surface finish class.

Design documentation

Formwork calculations: Submit calculations by a professional engineer experienced in formwork design to show that allowable concrete stresses will not be exceeded and formwork capability will be maintained if the following is proposed:

- Formwork procedures or loadings that differ from those documented.
- Props above a floor that do not coincide with the props below.
- Undocumented formwork shoring or stripping procedures.
- Loadings from stacked materials.

Execution details

Moveable formwork: Provide the following details on the formwork drawings:

- Table form and climbing formwork: Proposed method and sequence of moving the formwork to provide concrete of the documented quality and surface finish.
- Continuously climbing formwork (Slipform): The average rate of movement.

Formwork removal: Submit formwork removal procedures.

Reshoring: Submit details of any proposed reshoring.

Slab penetrations: Submit location and size of proposed penetrations through Stramit Condeck HP steel sheeting.

Products and materials

Void formers: Submit type-test results as evidence of conformity to requirements of **FORMWORK, Void formers**.

Shop drawings

Formwork: Submit shop drawings including details of proposed forms, falsework, form liners, bolt positions, release agents and, where applicable, re-use of formwork.

Warranties

Stramit Condeck HP: On completion, submit the Stramit published product performance warranties.

Refer to Stramit's product performance warranty fact sheet on their website for further information.

Stramit also can provide a material warranty for their Stramit Condeck HP ZAM coated steel. Contact Stramit for further information on this warranty and document the requirements here.

Alternatively, for BlueScope DECKFORM steel, BlueScope warrants the material used to produce Stramit Condeck HP in certain applications and subject to meeting a number of conditions. This covers the DECKFORM steel with zinc coating mass of Z350 and Z450. Refer to BlueScopes website for further information on warranty details and what information is required to be submitted. Document the additional submissions here.

1.10 INSPECTION

Notice

Inspection: Give notice so that inspection may be made of the following:

- Completed formwork with all dust and debris removed from forms before placing concrete.
- Used forms, after cleaning and before re-use.

Amend to suit the project adding critical stage inspections required.

Hold points, if required, should be inserted 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.

2.2 FORMWORK

General

Form face, linings and release agents: Compatible with documented concrete surface finish and any proposed applied finishes to concrete.

Lost formwork: Free of timber or chlorides and not to impair the structural performance of the concrete members.

Void formers

Requirement: Material capable of maintaining rigidity and shape until the concrete has set, capable of withstanding construction loads and non-collapsible on absorption of moisture.

Laboratory testing: Use void formers tested under laboratory conditions for conformance with the following:

- Deflection during placing and compaction of the concrete does not exceed beam or slab span/1000.
- Additional deflection between initial set and 7 days does not exceed span/400.

Test method: Place formers on damp sand and load with a mass of wet concrete at least equal to the mass of the beams or slabs to be supported.

Stramit Condeck HP profiled steel sheeting composite formwork

Material: Hot-dipped zinc-coated sheet steel or ZAM coated high tensile sheet steel to AS 1397.

Refer to BlueScope TB-14 guide on standards for steel sheet and additional information on Stramit's website at www.stramit.com.au/products/formwork/stramit-condeck-hp-composite-slab-system.

Minimum steel grade: G550.

Zinc coating mass: [complete/delete]

Nominate one of the following three levels of protection:

- Z350: 350 g/m² zinc coating mass is recommended for use in non-aggressive areas. This is the most common available protective coating mass which Stramit supply.
- ZAM ZM350: 350 g/m² zinc, aluminium and magnesium coating mass. Stramit ZAM is recommended for severe and aggressive environments where a build-up of airborne corrosive contaminants can affect the coating. Stramit ZAM is an alternative heavy duty protective coating for corrosive environments such as marine areas confirming with the requirements of AS 1397 for Type ZM coatings. Profiles with this level of corrosion protection are less common and may take longer to procure. Check with Stramit on lead times and availability.
- Z450: 450 g/m² zinc coating mass is also available from Stramit for severe and aggressive environments. Note this coat mass can be supplied by Stramit subject to availability.

Contact Stramit for further recommendations on the coating type to suit the environmental influences of the project.

Also make sure that the product documented has the level of galvanizing selected. See NATSPEC TECHnote DES 010 for information on atmospheric corrosivity categories.

Accessories:

- Stramit Condeck HP Plus: Zinc coating mass Z275.
- All other accessories adopt material and corrosion protection to match the profiled steel sheeting.

For Stramit Condeck HP there is a range of other system compatible accessories including Stramit Edgeforma and Stramit Two-Part Ceiling Hanger.

Profiled steel sheeting composite forms

Material: Hot-dipped zinc-coated sheet steel to AS 1397.

Refer to BlueScope TB-14 guide on standards for steel sheet and strip products.

Minimum steel grade: G550.

Amend if appropriate.

Zinc coating mass: [complete/delete]

Nominate one of the following two levels of protection:

- Z350: 350 g/m² zinc coating mass is recommended for use in non-aggressive areas.
- Z450: 450 g/m² zinc coating mass is recommended for severe and aggressive environment where a build-up of airborne corrosive contaminants can affect the coating.

Make sure that the product documented has the level of galvanizing selected. See NATSPEC TECHnote DES 010 for information on atmospheric corrosivity categories.

Accessories: Use materials and corrosion protection compatible with the profiled steel sheeting.

Plywood forms

Material: To AS 6669.

AS 6669 does not cover off-form surface finish Class 1.

Grade: Use appropriate grade for the documented design dimensions, loading and surface quality.

Refer to AS 6669 for information on surface quality, veneer qualities, and stress grades.

Joints: Seal the joints consistent with the documented surface finish class.

Tolerances: To AS 3610.1 Section 3.

Document any special requirements.

3 EXECUTION

3.1 CONSTRUCTION

General

Requirement: Conform to *0315 Concrete finishes*.

Bolt holes

Formwork tie bolts left in the concrete: Position more than 50 mm from the finished surface.

Corners

Work above ground: Bevel with a chamfer at re-entrant angles, and a fillet at corners.

Face of bevel: 25 mm.

Embedments

Fixing: Fix embedments through formwork to prevent movement, or loss of slurry or concrete, during concrete placement.

Openings

Requirement: In vertical forms provide openings or removable panels for inspection and cleaning, at the base of columns, walls and deep beams.

Access: For thin walls and columns, provide access panels for placing concrete.

Release agents

Application: Before placing reinforcement, apply a release agent to form face and linings. Spread the coating uniformly in a thin film and remove any surplus before placing concrete.

Staining: If oil or grease is used, make sure that surfaces to be exposed will not be stained or discoloured.

Unlined timber forms: Thoroughly wet timber before oiling.

Climbing formwork

Provision for inspection: Provide access below the movable formwork, from which surface treatment and inspection may be carried out.

Steel linings

Rust: Clean off any rust and apply rust inhibiting agent prior to re-use.

Visually important surfaces

Surface finish classes 1, 2 or 3: Set out the formwork to give a regular arrangement of panels, joints, bolt holes, and similar visible elements in the formed surface.

Void formers

Protection: Keep void formers dry until use, install on a firm level surface and place reinforcement and concrete with minimum delay.

3.2 STRAMIT CONDECK HP PROFILED STEEL SHEETING COMPOSITE FORMWORK

Installation

Fixing: If sheeting cannot be fixed to structural steel supports with self-drilling and tapping screws, powder actuated drive pins, puddle welds, or with welded shear studs, provide details of proposed fixings.

Fixing position:

- End support fixing: Fix at 1st, last and every intermediate rib.
- Internal support fixing: Fix at 1st, last and every 3rd

Shear stud welding: Compatible with Stramit Condeck HP galvanized coating.

Site cutting sheets: Use a power grinder fitted with an abrasive disc or power reciprocating saws fitted with a metal cutting blade. Start cuts with the steel sheeting laid upside down (ribs facing down) and turn over to cut ribs if necessary.

Continuous spans: If Stramit Condeck HP has been documented as continuous over supports, provide continuous sheets over the minimum number of supports documented for that sheet. Do not lap or butt sheets together.

Not meeting the minimum number of supports over which the sheeting is required to be continuous can lead to excessive deflections and possible overloading of the composite slab.

Aesthetic considerations

Requirement: Limit deflection and local deformation of the Condeck HP steel sheeting during construction loading to Stramit - Manual 04 Condeck HP product technical manual Tables 3 - *Deflection limit span / 240* and Tables 4 – *Deflection limit span / 150*.

Stramit provide recommended spans and slab thicknesses to suit deflection limits of span / 240 and span / 150 due to construction loading (i.e. the placement of the wet concrete). Stramit tables 3 and 4 account for aesthetic considerations in such situations, by providing shaded zones, denoting spans and slab thicknesses not recommended for exposed soffits. Stramit note, the actual deflection of the steel sheeting can vary significantly due to a range of practical site variables. These include concrete density, concrete placement position, slab thickness, material thickness and level of supports.

A more stringent deflection limit due to construction loading may be adopted in situations where the exposed steel sheeting soffit has an important aesthetic significance in its final application. Contact Stramit in such situations and document the additional requirements here.

Support

Permanent support: Provide structural support to Stramit Condeck HP, as documented and as follows:

- Minimum sheet end bearing on support: 50 mm.
- Masonry wall supports: Provide a damp-course strip between the masonry and Stramit Condeck HP.

Refer to the *Stramit Condeck HP composite slab system* technical manual for a range of recommended details for different types of structural supports.

Temporary support: Provide propping, as documented and as follows:

- Standard: To AS 3610.1.
- Locate, as documented.
- Place continuous support transverse to the span of the steel sheeting.
- Minimum prop bearer width 100 mm.
- For soffits where Stramit Condeck HP will be left exposed, provide 450mm wide compressible fibre sheets or plywood between the soffit and supporting bearer.

Support isolation

Requirement: Isolate the Condeck HP steel sheeting from direct contact with plywood forms or timber bearers, to prevent localised corrosion due to a direct moisture contact surface with the steel sheeting, using a moisture resistant barrier.

Typical moisture resistant barriers include compressible foam and plastic sheeting.

Penetrations

Small slab penetrations: 200 mm diameter or less:

- No cutting of penetrations prior to concrete placement and curing.
- Locate centrally within the pan of the steel sheeting, a minimum 1 m from adjacent slab penetrations and clear from internal supports.

Large slab penetrations: Over 200 mm diameter:

- No cutting of penetrations prior to concrete placement and curing.
- Form with steel reinforcement trimmer bars, as documented.

Construction loads

Stacked construction material: Limit to 150 kg/m².

Side-lap fastening: If construction materials are stacked on the installed sheeting, fix the side laps of the installed sheeting together with No.10 x 16 self-drilling and tapping screws. Position screw through the trough in the rib tops and at mid span on every rib.

Consideration must also be given to not overloading the profiled steel sheeting with wet concrete during placement. If required, add any special requirements to the concrete specification.

Stramit Condeck HP Plus

General: Provide Stramit Condeck HP Plus to each end span rib, as documented.

Stramit Condeck HP Plus provides additional strength to the Condeck HP steel sheeting allowing it to span further without the need for additional temporary props. As part of the permanent formwork design it may be required by the design engineer to increase the stiffness of the end spans.

In steel framed buildings, Stramit Condeck HP Plus accessory can also be used to create partial continuity over an internal steel beam/support under certain conditions. Contact Stramit for further details and document the requirements here if required.

Length: Full length of the end span plus an additional 300 mm or 10 % of the end span length, whichever is greater. Extend additional length into the adjacent internal span.

Side fixing: Attach through each rib side/web with minimum No.10 x 16 self-drilling and tapping screws at the following locations:

- Slab edge support.
- Middle of the end span.
- Stramit Condeck HP Plus end within the internal span.

Vertical fixing: Fix down the Stramit Condeck HP Plus to the end and internal support with a No.10 x 16 self-drilling and tapping screw.

3.3 COMPLETION**Formwork removal**

Extent: Remove formwork, other than permanent forms and trapped forms, including formwork in concealed locations.

Timing: Do not disturb formwork until concrete has reached sufficient hardness to withstand formwork movements and removal without damage.

Stramit Condeck HP temporary props: Do not remove temporary props until concrete has achieved a minimum of 75% of its required 28 day characteristic strength.

Stripping:

- General: To AS 3600 where it is more stringent than AS 3610.1.
- Vertical formwork: To AS 3610.1 Appendix C Table C2.
- Multi-storey work: Remove formwork without disturbing props supporting succeeding floors.
- Post-tensioned concrete: Remove formwork supporting post-tensioned concrete members to AS 3600 clause 17.6.2.7.

Removable bolts: Remove tie bolts without damaging the concrete.

Bolt hole filling: Provide material with durability and colour matching the concrete.

Recessed filling: Fill or plug the hole to 6 mm below the finished surface.

Curing: If formwork is stripped before the minimum curing period for the concrete has elapsed, continue curing the exposed faces as soon as the stripping is completed, within an hour of exposure.

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 SCHEDULE

Stramit Condeck HP profiled steel sheeting composite formwork schedule

Item	Location	Profile designation	Material
Stramit Condeck HP profiled steel sheeting composite decking			
Stramit Condeck HP accessories			

Profile designation: As appropriate, select from:

- Stramit Condeck HP - BMT 0.75 mm
- Stramit Condeck HP - BMT 0.90 mm
- Stramit Condeck HP - BMT 1.00 mm

Material:

- Grade: G550
- Protection level: Z350 (standard), Stramit ZAM ZM350 and Z450 (subject to availability).
- Stramit Condeck HP Plus: Z275 (accessory)

Stramit Condeck HP accessories: As appropriate, select from:

- Stramit Condeck HP Plus
- Edgeforma
- Two-part ceiling hanger

Formwork dimensional deviation schedule

Dimension or measurement	Location or element	Deviation (mm)

Dimension or measurement: e.g. Absolute position.

Location or element: e.g. Class 2 surface, Class 3 surface.

Deviation (mm): e.g. 15, 20, 25.

REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS 1397	2021	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS/NZS 2327	2017	Composite structures - Composite steel-concrete construction in buildings
AS 3600	2018	Concrete structures
AS 3610		Formwork for concrete
AS 3610.1	2018	Specifications
AS 6669	2016	Plywood - Formwork
Stramit - Manual 04	2012	Condeck HP composite slab system technical manual

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

AS/NZS 4600	2018	Cold-formed steel structures
BlueScope TB-14	2019	Professional's guide to Australian Standards for steel sheet and strip products
CIA Z36	2016	Formwork handbook
NATSPEC DES 010	2021	Atmospheric corrosivity categories for ferrous products
NATSPEC GEN 006	2015	Product specifying and substitution
NATSPEC GEN 024	2021	Using NATSPEC selections schedules
NATSPEC TR 01	2021	Specifying ESD
NATSPEC TR 03	2018	Specifying design and construct for mechanical services