

**0311P FIELDERS KINGFLOR® IN CONCRETE FORMWORK****Branded worksection**

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**Worksection abstract**

This branded worksection *Template* is applicable to Fielders KingFlor®, 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**

Fielders KingFlor® comes in four profile types manufactured from BlueScope in accordance with AS 1397. The RF55, KF57, KF40, KF70 profiles are manufactured from G550 steel with a Z350 galvanized coating protection. A heavier Z450 coating is available on request on extended lead times. A fifth profile, CF210, is a specialised deep deck profile, manufactured from G500/Z275 steel. There is a range of system compatible accessories including edge forms, end caps or infills, and service hangers. Adoption of Fielders KingFlor® will achieve a cost effective, safe and efficient flooring design and construction. The trapezoidal profiles, KF70 and KF40, are now rolled with SquashCut™ ends which eliminates the need for placing end caps at the ends of the decking.

Refer to [www.fielders.com.au](http://www.fielders.com.au) for product information and links to detailed technical information including design manuals and Fielders KingFlor® Designer Suite Software.

**Guidance text**

All text within these boxes is provided as guidance for developing this worksection and should not form part of the final specification. This *Guidance* text may be hidden or deleted from the document using the NATSPEC Toolbar or the hidden text *Hide* and *Delete* functions of your word processing system. For additional information visit FAQs at [www.natspec.com.au](http://www.natspec.com.au).

**Optional style text**

Text in this font (blue with a grey background) covers items specified less frequently. It is provided for incorporation into *Normal* style text where it is applicable to a project.

**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.
- 0314 Concrete in situ.
- 0315 Concrete finishes.

**Material not included in NATSPEC**

Some projects may include items not covered by NATSPEC. For these you may need to create new text or modify this text or a suitable worksection.

**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.
- This worksection contains text that may be adapted for use in design and construct projects.

**Specifying ESD**

The following may be specified by retaining default text:

- Profiled steel sheeting composite formwork.

The following may be specified by including additional text:

- Re-usable formwork.
- Engineered wood panels.

- Timber from a sustainable source, e.g. plantation.
- Selection of materials and components for formwork systems.
- Other permanent formwork, e.g. unfinished or prefinished fibre cement, aluminium composite panels and insulating formwork.
- Fabric formwork to reduce formwork material weight.

Refer to the NATSPEC TECHreport TR 01 on specifying ESD.

## 1 GENERAL

Fielders have been synonymous with quality and strength for over 100 years in an industry where success is reliant on satisfaction. Initially providing roofing materials, the company has now extended its product range and reach across Australia to include purlins, door frames, carports, verandahs, fencing, sheds and composite steel formwork. This ensures comprehensive product offerings and support for all aspects of building construction. Utilising their progressive culture, specialised resources and market leadership position, Fielders has won a reputation for its innovative approach to manufacturing and installation.

Being at the forefront of international cold formed steel products Fielders have attracted the loyalty of many architects, engineers, roofers, formworkers and builders who have experienced the benefits of reduced logistical, labour and time expenditures. With these and many other new developments, Fielders will continuously strive for growth through superior products, convenience, quality and service. With Fielders, you will always 'Finish On Top'.

### 1.1 RESPONSIBILITIES

#### General

Requirement: Provide formwork, as documented.

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

#### Design

This worksection can be used to document a variety of design and construct approaches. For example:

- Full design and construct: The contractor designs the whole of the project.
- Partial design and construct: The documents show some design details and all the design parameters for the project.

If the design, or completion of the design, is not the responsibility of the contractor, delete the subclause.

**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. Nominate if any part of the design is a NCC Performance Solution.

Formwork: The design of formwork, other than Fielders KingFlor® 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 profiled steel sheeting) or purpose-made formwork.

### 1.2 COMPANY CONTACTS

#### Fielders technical contacts

Website: [www.fielders.com.au/asp/contact.aspx](http://www.fielders.com.au/asp/contact.aspx)

### 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.

- 0315 Concrete finishes.

## 1.4 STANDARDS

### General

Formwork design and construction formed surfaces: To AS 3610 and AS 3610.1.

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

Plywood formwork: To AS 6669.

Steel sheet: To AS 1397.

Profiled steel sheeting including shear connectors: To AS 2327.1.

Reinforced concrete construction: To AS 3600.

## 1.5 MANUFACTURER'S DOCUMENTS

### Technical manuals

Website: Visit [www.fielders.com.au/asp/technical\\_manuals.aspx](http://www.fielders.com.au/asp/technical_manuals.aspx) to order or download free technical manuals.

## 1.6 INTERPRETATION

### Definitions

General: For the purposes of this worksection the following definitions apply:

- Formwork: Formwork: The surface, supports and framing used to define the shape of concrete until it is all self-supporting. Formwork types include:
  - . Jump formwork: Incrementally moved formwork.
  - . Lost formwork: Sacrificial formwork left in place.
  - . Slip formwork: Continuously slipped or moving formwork.
  - . Table forms: Prefabricated and re-usable formwork systems for slabs and beams.

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

## 1.7 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 17.5.2 and as documented in the **Formwork dimensional deviations 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.

## 1.8 SUBMISSIONS

### 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 for the following:

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

### Certification

Formwork design certification: For other than profiled steel sheeting composite formwork, 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.

**Execution details**

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

- Table, slip and jump forms: Proposed method and sequence of moving the formwork to provide concrete of the documented quality and surface finish.
- Slip forms: The average rate of movement.

Re-shoring: Submit details of any proposed re-shoring.

Surface repair method: Submit details of any proposed surface method before starting repairs.

**Products and materials**

Void formers: Submit test results as evidence of conformance to requirements of **PRODUCT, MATERIALS, Void formers**.

**Shop drawings**

Formwork: Submit shop drawings including details of proposed linings, bolt positions, facings, release agents and, where applicable, re-use of formwork.

**1.9 INSPECTION****Notice**

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

- Completed formwork before placing concrete.
- Used formwork, after cleaning and before re-use.

Amend to suit the project adding critical stage or mandatory inspections required by legislation or regulation.

**Hold points**, if required, should be inserted here.

**2 PRODUCTS****2.1 GENERAL****Product substitution**

Other products: Conform to **PRODUCTS, GENERAL, Substitutions** in *0171 General requirements*.

The *0171 General requirements* clause 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 MATERIALS****General**

Form linings, facings and release agents: Compatible with finishes applied 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.
- Collapse and loss of load carrying capacity occurs not more than 48 hours after flooding with water, creating a void at least 60% of the original depth of the void former.

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.

**Fielders KingFlor® profiled steel sheeting composite formwork**

Website: Visit [www.fielders.com.au/asp/kingflor.aspx](http://www.fielders.com.au/asp/kingflor.aspx) for more information.

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

Minimum steel grades:

- General: G550.
- CF210 deep deck: G500.

**Zinc coating weight of [complete/delete]**

Nominate one of the two levels of protection offered by Fielders KingFlor® :

- Z350: 350 g/m<sup>2</sup> zinc coating weight is recommended for use in non-aggressive areas.
- Z450: 450 g/m<sup>2</sup> zinc coating weight 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. Refer to NATSPEC TECHnote DES 010 on atmospheric corrosivity categories for ferrous products.

Accessories: Adopt material and corrosion protection to match the profiled steel sheeting.

For Fielders KingFlor® there is a range of systems compatible accessories including edge forms, end caps or infills, and service hangers.

**Plywood formwork**

Material: Plywood sheeting 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 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 special requirements or dimensions.

**3 EXECUTION****3.1 PREPARATION****Substrate**

Cleaning: Before placing concrete, remove free water, dust, debris and stains from the KingFlor®, forms and the formed space.

**3.2 CONSTRUCTION****General**

Requirement: Conform to the *0315 Concrete finishes* worksection.

**Bolt hole filling**

Removable bolts: Remove tie bolts without damaging the concrete.

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

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.

**Corners**

Work above ground: Chamfer at re-entrant angles, and 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**

General: In vertical forms provide form 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 linings and facings.

**Slip formwork**

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

**KingFlor®**

Fixing: If KingFlor sheeting cannot be fixed to structural steel supports with puddle welds, or with welded shear studs in composite construction, submit details of proposed fixings.

Aesthetic considerations: If the KingFlor® soffit has aesthetic significance in its final application, submit proposals to minimise deflection and local deformation of the decking during construction loading.

The use of 1 mm base metal thickness material will help minimise local deformation (creasing) of the steel pans where the header beams are located compared to thinner gauge profiles.

Wide ply strips may be positioned above the header bearers to assist in dispersing the load and minimise any local deformation of the decking due to the headers.

Specific care must be taken for slabs depths over 170 mm as these slabs tend to become more susceptible to deflection control and deformation issues in propped applications.

**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.

**3.3 COMPLETION****Formwork removal**

Extent: Remove formwork, other than profiled steel sheeting composite formwork and lost formwork, including formwork in concealed locations.

Timing: Do not disturb formwork until concrete is cured enough to withstand formwork movements and removal without damage.

Stripping:

- General: To AS 3600 where it is more stringent than AS 3610.1.
- Vertical formwork: To AS 3610.1 Appendix B Table B1.
- 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.

**4 SELECTIONS**

**Schedules** are a way of documenting a selection of proprietary or generic products or systems by their properties. Indicate their locations here and/or on the drawings. Refer to NATSPEC TECHnote GEN 024 for guidance on using and editing schedules.

**4.1 FORMWORK SCHEDULE****Fielders KingFlor® profiled steel sheeting composite formwork schedule**

Select Fielders KingFlor® profiles from [www.kingflor.com.au](http://www.kingflor.com.au).

Item	Location	Profile designation	Material
Fielders KingFlor® profiled steel sheeting composite decking			
Fielders KingFlor® accessories			

Profile designation: As appropriate, select from:

- KingFlor® KF70 with SquashCut™ ends.
- KingFlor® KF57.
- KingFlor® RF55 (3 pan).
- KingFlor® RF55 (2 pan).

- KingFlor® F40 (3 pan) with SquashCut™ ends.
- KingFlor® F40 (2 pan) SquashCut™ ends.
- CF210 deep profile deck.

Material:

- Grade: G550 or G500.
- Protection level: Z450, Z350 (standard) or Z275.

## 4.2 DIMENSIONAL DEVIATION SCHEDULE

### Formwork dimensional deviation schedule

Dimension or measurement	Location or element	Deviation (mm)

If locations for formed surface finishes are noted in a finishes schedule, note a designation code in the column for concrete element.

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	2011	Continuous hot-dip metallic coated steel sheet and strip - Coatings of zinc and zinc alloyed with aluminium and magnesium
AS 2327		Composite structures
AS 2327.1	2003	Simply supported beams
AS 3600	2009	Concrete structures
AS 3610	1995	Formwork for concrete
AS 3610.1	2010	Documentation and surface finish
AS 6669	2016	Plywood - Formwork

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

CIA Z36	2016	Formwork handbook
NATSPEC DES 010	2009	Atmospheric corrosivity categories for ferrous products
NATSPEC GEN 006	2007	Product specifying and substitution
NATSPEC GEN 024	2015	Using NATSPEC selections schedules
NATSPEC TR 01	2016	Specifying ESD