

## 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 to AS 1397 (2021). 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.

**How to use this worksection**

Customise this worksection *Template* for each project. See [A guide to NATSPEC worksections \(www.natspec.com.au\)](http://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, including:

- 0312 Concrete reinforcement.
- 0313 Concrete post-tensioned.
- 0314 Concrete in situ.
- 0315 Concrete finishes.

Related branded worksections include:

- 0341p FIELDERS SlimFlor in structural steelwork.
- 0423p FIELDERS roofing - profiled sheet metal.
- 0424p FIELDERS roofing - specialised sheet metal.
- 0436p FIELDERS wall cladding - profiled sheet metal.
- 0437p FIELDERS wall cladding - specialised panels.

**Material not provided by Fielders**

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

- All formwork other than Fielders KingFlor®.
- 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 required.

- Show any special requirements 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.

#### Specifying ESD

The following may be specified by retaining default text:

- KingFlor® composite formwork.

The following may be specified by including additional text:

- Re-usable formwork.
- Engineered wood form panels.
- Timber forms from a sustainable source such as plantations.
- Other permanent formwork such as 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

Fielders is a leading local manufacturer of a comprehensive range of roll-formed steel products supplied to commercial, industrial and domestic building markets throughout Australia.

Fielders' focus on innovation, breadth of product and extensive customer support offering, make it a preferred supplier for engineers, architects and construction companies around the country.

The Fielders range is supported by 10 branches nationwide, including manufacturing facilities at Novar Gardens, SA and Campbellfield, VIC, which also offer in-house processing capabilities.

### 1.1 RESPONSIBILITIES

#### General

Requirement: Provide Fielders KingFlor® 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 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 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

#### Fielders technical contacts

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

### 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 formed surfaces: To AS 3610.1 (2018) and AS 3610.2 (Int) (2023).

CIA Z36 (2016) provides guidance on the safe design and construction of formwork.

Plywood formwork: To AS 6669 (2016).

Steel sheet: To AS 1397 (2021).

Composite steel-concrete construction, including profiled steel sheeting and shear connectors: To AS/NZS 2327 (2017).

Reinforced concrete construction: To AS 3600 (2018).

### 1.6 MANUFACTURER'S DOCUMENTS

#### Technical manuals

Website: Visit [specifying.fielders.com.au](http://specifying.fielders.com.au) to order or download free technical manuals.

### 1.7 INTERPRETATION

#### Definitions

General: For the purposes of this worksection, the definitions given in AS 3610.1 (2018) apply.

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

AS 3610.1 (2018) clause 1.5 includes definitions and Appendix E includes a glossary of terms.

### 1.8 TOLERANCES

#### Formwork

Plumb of elements more than 8 m high: 1:1000.

Plumb of elements not more than 8 m high: To AS 3610.1 (2018).

Position: Construct formwork so that finished concrete conforms to AS 3600 (2018) clause 17.5, AS 3610.1 (2018) clause 3.3 and as documented.

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

The tolerances in AS 3600 (2018) clause 17.5.2 are required for achieving conformance to the strength requirements of the standard. 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 all formwork 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 if proposed, formwork designed for the following:

- 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.

Fixing: If required, submit details of proposed fixing method to **CONSTRUCTION**, ®.

Aesthetic considerations: If required, submit proposals to **CONSTRUCTION**, ®.

### Products and materials

Void formers: Submit a certificate from the manufacturer as evidence of conformity to the 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.

## 1.10 INSPECTION

### Notice

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

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

## 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.

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

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

Material: Hot dip zinc-coated sheet steel to AS 1397 (2021).

Refer to BlueScope TB-14 (2022) guide on standards for steel sheet and strip products.

Minimum steel grades:

- General: G550.
- SlimDek 210 deep deck: G500.

**Zinc coating mass:** [complete/delete]

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

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

Accessories: Use materials and corrosion protection compatible with 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 forms**

Material: To AS 6669 (2016).

AS 6669 (2016) 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 (2016) 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 (2018) 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 to achieve minimum 50 mm concrete cover to bolt.

**Corners**

Work above ground: Chamfer re-entrant angles and provide fillets at corners.

Face of chamfer/fillet: 25 mm.

**Cambers and presets**

Requirement: Provide as documented.

**Embedments**

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

**Joints**

Requirement: Provide joints that prevent loss of grout.

**Openings**

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.

**KingFlor®**

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

Aesthetic considerations: If the KingFlor® soffit has aesthetic significance in its final application, provide 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.

Take specific care for slabs depths over 170 mm as these slabs tend to become more susceptible to deflection control and deformation issues in propped applications.

Support isolation: Isolate KingFlor® decking from direct contact with plywood forms or timber bearers, to prevent localised corrosion due to a direct moisture contact surface with the metal deck, using:

- Malthoid strip.
- Compressible foam.
- Plastic sheeting.
- Other suitable isolation method.

**Steel linings**

Rust: Clean off any rust and apply rust inhibiting agent before 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 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.

Stripping:

- General: To AS 3600 (2018) where it is more stringent than AS 3610.1 (2018) and AS 3610.2 (Int) (2023).
- Vertical formwork: To AS 3610.1 (2018) 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 (2018) 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 FORMWORK SCHEDULE

#### Fielders KingFlor® profiled steel sheeting composite formwork schedule

Select Fielders KingFlor® profiles from [specifying.fielders.com.au/downloads](https://specifying.fielders.com.au/downloads)

| 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.
- SlimDek 210 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) |
|--------------------------|---------------------|----------------|
|                          |                     |                |
|                          |                     |                |
|                          |                     |                |

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 3610.2 (Int) | 2023 | Design and construction                                                                                                   |
| AS 6669         | 2016 | Plywood - Formwork                                                                                                        |

The following documents are mentioned only in the Guidance text:

|                 |      |                                                                                 |
|-----------------|------|---------------------------------------------------------------------------------|
| BlueScope TB-14 | 2022 | Professional's guide to Australian Standards for steel sheet and strip products |
| CIA Z36         | 2016 | Formwork handbook                                                               |
| NATSPEC DES 010 |      | Atmospheric corrosivity categories for ferrous products                         |

|                 |                                                         |
|-----------------|---------------------------------------------------------|
| NATSPEC GEN 006 | Product specifying and substitution                     |
| NATSPEC GEN 024 | Using NATSPEC selections schedules                      |
| NATSPEC TR 01   | Specifying ESD                                          |
| NATSPEC TR 03   | Specifying design and construct for mechanical services |