

## 0612P MAPEI IN CEMENTITIOUS TOPPINGS

**Branded worksection**

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**Worksection abstract**

This branded worksection *Template* is applicable to **Mapei Australia Pty Ltd** self-levelling smoothing compounds and repair mortars, and generic cementitious toppings on floors and steps. There is no relevant standard in Australia.

**Background**

Toppings may be used for a variety of purposes, principally for levelling before laying of other floor finishes and as wearing surface for direct foot and vehicular traffic. Any topping which is critical in appearance or function should have structural engineering assessment, particularly if shrinkage problems are to be minimised. There are numerous guides available from BRANZ and Cement Concrete and Aggregates Australia (CCAA).

**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 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:

- 0181p MAPEI in adhesives, sealants and fasteners.
- 0314 Concrete in situ.
- 0315 Concrete finishes.
- 0411p MAPEI in waterproofing – external and tanking.
- 0613 Terrazzo in situ.
- 0621p MAPEI in waterproofing - wet areas.

**Material not provided by Mapei Australia Pty Ltd**

This branded worksection includes generic material which may not be provided by the Product Partner.

**Documenting this and related work**

You may document this and related work as follows:

- Show the location of this and other floor finishes on drawings to your office documentation policy.
- Use the specification to define the type(s) of toppings.
- Show the arrangement and details of joints on the drawings.
- Refer to BRANZ Bulletin 389 for information on concrete toppings.

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 treatment.

Search [acumen.architecture.com.au](http://acumen.architecture.com.au), the Australian Institute of Architects' practice advisory subscription service, for notes on the following:

- Guarantees and warranties.

**Specifying ESD**

The following may be specified by including additional text:

- Low VOC emitting materials.
- Recycled material content.

- Lightweight products, reducing transportation requirements.
- Products resistant to mould when applied in damp environments.

Refer to the NATSPEC TECHreport TR 01 on specifying ESD.

## 1 GENERAL

Mapei is a world leader in the manufacture of innovative products for the construction industry. Products include adhesives, grouts, waterproofing membranes, levelling compounds, repair mortars and quality related building products. Numerous projects executed all around the world are testimony to the outstanding quality of Mapei products that are preferred by architects, designers and building contractors. Mapei products are manufactured in Brisbane and distributed through an extensive network of distributors.

### 1.1 RESPONSIBILITIES

#### General

Requirement: Provide cementitious toppings, as documented.

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

#### Performance

Requirements:

- Consistent in level, finish, colour and texture.
- Free of discontinuities.
- Resistant to environmental degradation within the manufacturer's stated life span.
- Accommodating movement in the substrate between control joints.
- If floating, without edge curl.
- If bonded, without drummy areas.
- Without obvious shrinkage cracks.

*It is the responsibility of the designer to select the surface finish to conform to the requirements for slip resistance.*

### 1.2 COMPANY CONTACTS

#### Mapei technical contacts

Website: [www.mapei.com/AU-EN/contacts.asp](http://www.mapei.com/AU-EN/contacts.asp)

### 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 STANDARDS

#### Slip resistance

Classification: To AS 4586.

*See NATSPEC TECHnote DES 001 on slip resistance. The slip resistance of timber varies with the type of timber and finish applied. See WoodSolutions 48 for options that increase wood's slip resistance, including choice of orientation for pedestrian traffic, surface texturing, incorporating inserts and attachments and applying coatings.*

### 1.5 MANUFACTURER'S DOCUMENTS

#### Technical manuals

Data sheets: [www.mapei.com/AU-EN/products.asp](http://www.mapei.com/AU-EN/products.asp)

Systems: [www.mapei.com/AU-EN/systems.asp](http://www.mapei.com/AU-EN/systems.asp)

## 1.6 INTERPRETATION

### Definitions

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

- Concrete class – normal: Concrete that is specified primarily by a standard compressive strength grade up to 50 MPa and otherwise in conformance with AS 1379 clause 1.5.3.
- Granolithic topping: A topping mix with the coarse aggregate restricted to between 2 and 3 mm.
- Substrate: The surface to which a material or product is applied.
- Topping: Mixture of binders, aggregate and water applied to substrates in a plastic state and dried and cured to a hard surface.
- Topping function:
  - . Levelling: Topping placed to receive applied floor finishes.
  - . Wearing: Topping placed to act as the finished floor.
- Topping method:
  - . Bonded or post applied: Topping which is bonded to a hardened substrate from which laitance has been removed and to which a bonding agent has been applied.
  - . Floating: Topping which is separated from a hardened substrate by a resilient layer.
  - . Monolithic or wet applied: Topping placed on a plastic substrate so that a chemical bond is created between the substrate and the topping.
  - . Separated: Topping which is separated from a concrete subfloor by a membrane.

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

## 1.7 TOLERANCES

### General

Thickness: Deviation from the documented thickness:

These tolerances are intended to accommodate the combinations of concrete sub-floor variations and nominal thicknesses specified.

- Thickness < 15 mm: ± 2 mm.
- Thickness ≥ 15 < 30 mm: ± 5 mm.
- Thickness ≥ 30 mm: ± 10 mm.

Flatness: Maximum deviations from a straightedge laid in any direction on a plane surface:

- Class A: 4 mm from a 2 m straightedge.
- Class B: 6 mm from a 3 m straightedge.

These tolerances are unlikely to be precise enough for super flat floor profiles required in high bay warehouses. See ACI 302-1R and ASTM E1155M test method for determining FF (floor flatness) and FL (floor levelness) numbers. It has been assumed that smoothness and projection tolerances form part of substrate preparation for the applicable floor finishes. If the final substrate correction is to be performed at this stage, import the tolerance values from 0651 Resilient finishes, 0652 Carpets, 0654 Engineered panel flooring or 0655 Timber flooring as appropriate.

## 1.8 SUBMISSIONS

### Operation and maintenance manuals

Requirement: At completion, submit the manufacturer's published use, care and maintenance instructions.

### Products and materials

Manufacturer's data: Submit manufacturer's product data for the following:

- Admixtures.
- Bonding products.
- Colouring products.
- Curing products.
- Sealant products.
- Slip-resistant products.
- Surface treatment products.

Edit the list as appropriate.

If the strength grade of pre-mixed concrete for toppings is critical, consider changing the following *Optional* style text to *Normal* style text.

Product conformity: Submit current assessments of conformity as follows:

- Premixed concrete: Production assessment to AS 1379.

### Prototypes

Vary size of prototype if required or delete.

The following *Optional* style text may be included by changing to *Normal* style text:

Incorporation: Subject to approval, incorporate the prototype in the completed works.

Show on the drawings the location, extent and other details of the prototypes. Delete if the size of the project does not justify a prototype.

### Samples

General: Submit samples of the following products:

- Colouring products.
- Control joint products.
- Surface treatment products.

### Tests

0171 General requirements covers tests in **Definitions** and calls for an inspection and testing plan under **SUBMISSIONS, Tests**.

Site tests: Submit results, as follows:

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

Site testing is expensive. Delete if not required. See NATSPEC TECHnote DES 001.

- Flatness.
- In situ crushing resistance/soundness.
- Slip resistance test of completed installation.

### Warranties

Requirement: Submit warranties to **COMPLETION, Warranties**.

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

## 1.9 INSPECTION

### Notice

General: Give notice so that inspections may be made of the following:

- Substrates ready for laying of toppings.
- Prototypes ready for inspection.

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 **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.

#### Standards

Mapei products: To BS EN 13813.

#### 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.

### Storage and handling

General: Deliver, unload and store products and accessories in unbroken manufacturer's packaging and containers in a dry, well-ventilated and secure storage area, unaffected by weather.

Powdered product is stable for at least 12 months. Storage over 12 months could determine a slower setting time however the final characteristics of the product do not alter.

## 2.2 MAPEI SELF-LEVELLING SMOOTHING COMPOUNDS

Application: Surface correction with product selection matched to different thicknesses, areas of use and substrates.

### Adesilex P4

Description: High performance, rapid-setting smoothing compound for thicknesses from 1 mm to 30 mm.

- VOC content: 0.01 g/l.

Application: Tile installation and internal and external levelling.

### Latexplan Trade

Description: Two-part internal levelling and smoothing compound of thicknesses from 1 mm to 10 mm.

- VOC content: < 10 g/l.

Application: Suitable for use over properly prepared fibre cement sheeting and timber flooring.

### UC Leveller

Description: Fast hardening, internal levelling and smoothing compound for thicknesses from 3 mm to 70 mm.

- VOC content: 0.01 g/l.

Application: Particularly suitable for pumping and as a bulk-filling underlayment.

### Novoplan 21

Description: Fast hardening levelling and smoothing compound for thicknesses from 1 mm and 10 mm.

- VOC content: 0.01 g/l.

Application: Suitable for pumping new and existing substrates, including underfloor heating systems, and wheelchair traffic.

### Ultraplan

Description: Ultra-fast drying, internal self-levelling compound for thicknesses up to 15 mm.

- VOC content: 0.01 g/l.

Application: Suitable for use with underfloor heating systems before the installation of all floor coverings and wheelchair traffic. Can be spread in thicknesses up to 15 mm per coat without shrinkage, cracking or crazing.

### Ultraplan Eco

Description: Ultra-fast hardening, internal self-levelling compound for thicknesses from 1 mm to 10 mm.

- VOC content: 0.01 g/l.

Application: New and existing substrates.

### Ultraplan Maxi

Description: Ultra-fast drying, internal levelling compound suitable for thicknesses from 3 mm to 30 mm per pour.

- VOC content: 0.01 g/l.

Application: Underfloor heating and areas requiring levelling compound to withstand wheeled traffic.

**Ultraplan Fast Track**

Description: Ultra-fast hardening levelling compound for thicknesses from 1 mm and 10 mm with a 2 hour waiting time before installation of floor coverings.

- VOC content: 0.01 g/l.

Application: Suitable for internal use.

**2.3 MAPEI REPAIR MORTARS****Mapefer 1K**

Mapefer 1K: One component corrosion-inhibiting cement mortar for the protection of reinforcing rods.

- VOC content: 0.5 g/l.

Application: Corrosion-inhibiting protection of concrete reinforcing rods and adhesion improver for concrete repair mortars.

**Mapegrout T40**

Description: Medium strength (40 MPa) shrinkage-compensated, fibre-reinforced thixotropic mortar for repairing concrete.

- VOC content: 0.01 g/l.

Application: Repair of degraded vertical or horizontal concrete surfaces with mortar possessing medium mechanical performance characteristics.

**Mapegrout T60**

Description: Sulphate resistant, fibre-reinforced shrinkage-compensated, thixotropic mortar for the repair of concrete.

- VOC content: 0.01 g/l.

Application: Repair of degraded concrete structures or reinforced concrete structures subject to sulphate attack.

**Mapegrout Fast Set**

Description: Fast-setting and drying, shrinkage-compensated, fibre-reinforced mortar for concrete repair.

- VOC content: 0.01 g/l.

Application: Repair of exterior vertical and horizontal deteriorated concrete surfaces.

**Mapegrout HI Flow SP**

Description: Shrinkage-compensated, fibre-reinforced mortar to repair structures.

- VOC content: 0.01 g/l.

Application: Repair of structures where particular thicknesses and the state of deterioration require the use of a high flow mortar.

**Planitop Smooth and Repair R4**

Description: Structural R4-class, rapid-setting, shrinkage-compensated, thixotropic, fibre-reinforced cementitious mortar, applied in a single layer from 3 mm to 40 mm thick for structural repairs and smoothing of concrete.

- VOC content: 0.01 g/l.

Application: Structural repairs and smoothing over internal and external horizontal and vertical concrete surfaces and suitable for repairing structures exposed to the open air and in permanent contact with water.

**Planiprep SC**

Description: High performance, rapid-setting, fibre-reinforced skim-coating and patching compound.

- VOC content: 0.01 g/l.

Application: Internal use.

**Mapecem Quickpatch**

Description: High performance, high flow, fast-setting ramping and patching compound.

- VOC content: 0.01 g/l.

Application: Versatile product for Internal and external use. Can be applied from feather-edge up to 75 mm.

**Mapegrout SV**

Description: Fast-setting and hardening shrinkage-compensated, easy flow mortar for repairing concrete and for fixing inspection shafts, manholes and highway coating materials.

- VOC Content: 0.01 g/l.

Application: Repair of badly-damaged concrete structures that require the use of high flowing mortars. Repair of industrial floorings, highways and airport works that needs to be reopened to traffic within a short space of time. Rapid fixing of inspection shafts and manholes.

## 2.4 MAPEI THIXOTROPIC SMOOTHING COMPOUNDS

Thixotropic compounds will remain stable as a ramp or used to repair vertical surfaces.

### Nivorapid

Nivorapid: Ultra-fast setting, thixotropic, internal levelling compound for horizontal and vertical surfaces from 1 mm to 20 mm thick.

- VOC Content: 0 g/l.

Application: Repairing, levelling and smoothing interior floors, walls, steps and risers where very rapid hardening and drying are required.

### Nivorapid + Latex Plus

Description: Ultra-fast setting, thixotropic, internal levelling compound for horizontal and vertical surfaces from 1 mm to 20 mm thick with Latex Plus to increase bond strength.

- VOC Content: 0 g/l.

Application: For levelling with increased bonding strength on metal surfaces, old rubber floors, PVC, chipboard, timber, linoleum or similar.

### Planitop Smooth and Repair R4

Description: Structural R4-class, rapid-setting, shrinkage-compensated, thixotropic, fibre-reinforced cementitious mortar, applied in a single layer from 3 mm to 40 mm thick for structural repairs and smoothing of concrete.

- VOC content: 0.01 g/l.

Application: Structural repairs and smoothing over internal and external horizontal and vertical concrete surfaces and suitable for repairing structures exposed to the open air and in permanent contact with water.

### Planitop 210

Description: Water-repellent cementitious skimming mortar with a fine natural finish for concrete and plastic coatings that may be applied at a maximum thickness of 3 mm per coat.

- VOC content: 0.01 g/l.

Application: For fine-grained, natural-finish skim coats on internal and external concrete, cementitious and lime-mortar render, old quartz paint and scratch-effect plastic coatings.

## 2.5 MAPEI CEMENTITIOUS SCREEDS

### Mapecem Pronto

Description: Pre-blended ready-to-use, quick-setting (24 hours) and drying, controlled shrinkage mortar with a hydraulic binder base, admixtures and selected aggregates.

- VOC content: 0.01 g/l.

Application: For internal and external floating and bonded screeds on old and new floor slabs, for laying wood, PVC, linoleum, carpet, ceramic, natural stone where immediate laying of the floor covering is required, Mapecem Pronto is not suitable for screeds subject to rising damp.

### Topcem Pronto

Description: Ready to use normal setting controlled-shrinkage mortar for quick-drying screeds (4 days).

- VOC content: 0.01 g/l.

Application: For forming unbonded and bonded screeds on new and existing slabs in interiors and exteriors prior to installing wood, PVC, linoleum, ceramic tile, natural stone, carpet or other floor coverings in areas where fast-drying screeds are required in order to lay floorings in a short time.

### Planicrete SP

Description: Multipurpose latex additive for mortar and cementitious adhesive.

- VOC content: 0.11 g/l.

Application: For the preparation of screeds and levelling compounds with high-resistance for interior and exterior use and cement slurry with high adhesion for bonding new screed on to existing screeds and concrete.

## 2.6 GENERIC MATERIALS

There are a wide range of products available. Some toppings will have the characteristics of plaster or mortar; others, usually much thicker, are effectively fine concrete. Grano, or granolithic topping describes what was once a trade name for a topping incorporating granite coarse aggregate of 2 to 3 mm size.

### Admixtures

Standard: To AS 1478.1.

The use of admixtures should not be permitted unless there is confidence that there will be an improved outcome.

### Aggregates

Standard: To AS 2758.1.

Coarse aggregate: Nominal single size less than or equal to 1/3 topping thickness.

¼ topping thickness is recommended for reinforced toppings.

Fine aggregate: Fine, sharp, well-graded sand with a low clay content and free from efflorescing salts.

### Bonding products

General: Provide proprietary products manufactured for bonding cement-based toppings to concrete substrates.

### Separating layer

General: Provide a bond-breaker to separate the topping from the substrate, as documented.

### Cement

Standard: To AS 3972.

- Type: SL.

Type SL (shrinkage limited) is to be preferred in situations where shrinkage of the topping needs to be minimised. For other cases replace SL with GP.

### Colouring products

General: Provide proprietary products manufactured for colouring cement toppings.

Integral pigment proportion: 10% maximum by weight of cement.

### Concrete

Standard: To AS 1379.

Unreinforced topping: Normal class.

### Reinforced topping table

Exposure location	Strength grade	Cover to reinforcement
Internal and external greater than 50 km inland and non-industrial and non-tropical	N25	20 mm
External greater than 50 km inland and tropical and External near coastal (> 1 km < 50 km)	N32	30 mm
External coastal less than 1 km but not in the splash zone	N40	35 mm

### Reinforcement

Standard: To AS/NZS 4671.

Mesh sizes for joint spacing as follows:

- SL 42: Up to 3 m internal, 2 m external.
- SL 62: Up to 6 m internal, 4 m external.

### Curing products

General: Provide proprietary products manufactured for use with cement-based toppings and with the floor finish to be laid on the toppings.

### Water

General: Clean and free from any deleterious matter.

### Mixes

General: Provide toppings as follows or select mix proportions to the **Mix proportion table**:



- Air entrainment:  $\leq 3\%$ .
- Nominal coarse aggregate size:  $\leq 0.3 \times$  topping thickness.
- Slump: 80 mm.
- Standard strength grade: N25.

Water quantity: The minimum necessary to achieve full compaction and prevent excessive water being brought to the surface during compaction.

#### Mix proportion table

Mix type	Thickness (mm)	Upper and lower limits of proportions by weight		
		Cement	Fine aggregate	Coarse aggregate
Bonded – cement and sand	35	1 1	3 4.5	0 0
Bonded – fine concrete	40	1 1	3 3	1 2
Floating – fine concrete	100	1 1	3 3	1 2
Granolithic	Floors: 25 Skirtings: 13	1	2	1, of 2 mm - 3 mm
Separated – fine concrete	70	1 1	3 3	1 2

This table, as an alternative to pre-mixed concrete to AS 1379, allows a degree of flexibility to select a mix to suit the conditions. Edit as required.

#### Slip resistance products

General: Provide proprietary products manufactured to improve the wet slip resistance of toppings.

- Silicon carbide granules:
  - . Granule size:  $\geq 300 < 600 \mu\text{m}$ .
- Silicon carbide two-part resin:
  - . Granule size:  $\geq 300 \mu\text{m}$ .

#### Surface treatment products

General: Provide proprietary products manufactured for use with cement-based toppings to change the characteristics of the surface of the finished topping.

Treatment: [complete/delete]

Insert required property e.g. Surface hardener, or Product name.

## 2.7 CONTROL JOINTS

#### Control joint materials

General: As documented.

Document in the **Control joints schedule**.

Control joint strip: A proprietary expansion joint consisting of a neoprene filler sandwiched between plates with lugs or ribs for mechanical keying. Set flush with the finished surface.

Proprietary slide plate divider strip: An arrangement of interlocking metal plates grouted into pockets formed in the concrete joint edges.

Sealant: One-part self-levelling non-hardening mould-resistant, silicone or polyurethane sealant applied over a backing rod. Finish flush with the terrazzo surface.

- Floors: Trafficable, shore hardness greater than 35.

Backing rod: Compressible closed cell polyethylene foam with a bond-breaking surface.

### 3 EXECUTION

#### 3.1 PREPARATION

##### Substrates

General: Provide substrates as follows:

- Clean and free from any deposit which may impair adhesion of monolithic or bonded toppings.
- Remove excessive projections and voids and fill hollows with a mix not stronger than the substrate or weaker than the topping.
- Concrete substrates for Mapei products: To the Mapei Technical Data Sheet for the selected product and the Mapei *Surface Preparation Requirements Guide: Floor Covering Installation Systems*.

Refer to NATSPEC TECHnote DES 008 on the preparation of concrete substrates.

##### Substrates for bonded toppings

Hardened concrete: Roughen by scabbling or the like to remove 2 mm of the laitance and expose the aggregate.

General: Before laying topping wash the substrate with water and provide a bonding product, or treat as follows:

- Keep wet for 2 hours or more.
- Remove surplus water and brush on neat cement or a clean slurry of cement and water.
- Place the topping while the slurry is wet.

#### 3.2 MAPEI SELF LEVELLING TOPPINGS

##### Primer

Requirement: To the Mapei *Selection Guide for Levelling and Patching Compounds*, as documented.

##### Application procedure

Requirement: To the Mapei Technical Data Sheets for the product selected from the Mapei *Selection Guide for Levelling and Patching Compounds*.

#### 3.3 CEMENTITIOUS TOPPINGS APPLICATION

##### Installation

The topping method depends on the degree of bonding to the substrate. A monolithic topping can be relatively thin and must be laid so that a chemical bond with the substrate is formed. There is debate as to whether monolithic (or wet applied) toppings are truly monolithic without any fracture planes. Fully bonded (but not monolithic) toppings which should not be reinforced, need to be controlled in depth otherwise they have a tendency to curl up at the edges of bays. Thicker toppings need to be treated as independent slabs and maybe be separated from the substrate by a membrane or by floating on a resilient layer of some kind. Unbonded toppings should include reinforcement.

General: Spread the mix and compact. Strike off, consolidate and level surfaces to finished levels.

Monolithic toppings: Lay while concrete subfloor is plastic and the surface water is no longer visible.

Bonded toppings: Lay separating layer.

Toppings over 50 mm thick:

- Lay in two layers of equal thickness.
- Place a layer of reinforcement between the topping layers. Lap reinforcement 200 mm and tie. Do not create four way laps.

##### Temperature control

General: Make sure that the temperature of mixes, substrates and reinforcement are not less than 5°C or greater than 35°C at the time of application.

Severe temperature: If the ambient shade temperature is greater than 38°C, do not mix topping.

#### 3.4 CEMENTITIOUS TOPPINGS SURFACE FINISHES

Toppings may be finished with most of the methods used for in situ concrete including trowelling, hardening, sealing, grinding and otherwise exposing the aggregate.

For toppings which are to be self-finished for decorative purposes, the principal enemy of the desired effect is (usually) cracking which is not normally of any structural significance. Shrinkage is a function of the following:

- Aggregate type, both coarse and fine.

- Cement type (e.g.: SL shrinkage limited).
- Water:cement ratio.
- Mixing.
- Reinforcement if any and reinforcement cover.
- Bonding to substrate.
- Placing.
- Curing.

Admixtures offering shrinkage reduction would need to have a positive influence on, or complementary function to, one or more of the above. Some products aid (shrinkage) crack closure through reacting with constituents to form products that expand into cracks and voids.

### Finishing methods – primary finish

Machine float finish:

- After levelling, consolidate the surface using a machine float.
- Cut and fill and refloat immediately to a uniform, smooth, granular texture.
- Hand float in locations inaccessible to the machine float.

Steel trowel finish: After machine floating finish as follows:

- Produce a smooth surface relatively free from defects using power tools.
- When the surface has hardened sufficiently, use steel hand trowels to produce the final consolidated finish free of trowel marks and uniform in texture and appearance.

Burnished finish: Continue steel trowelling until the concrete surface attains a polished or glossy finish, uniform in texture and appearance, and free from trowel marks and defects.

For burnished concrete finishes see the following publications:

- CCAA Briefing 05.
- CCAA Data Sheet The specification of burnished concrete finish. It provides suggested specification clauses for inclusion by the engineer in the appropriate concrete worksections.

Wood float finish: After machine floating, produce the final consolidated finish free of float marks and uniform in texture and appearance using wood or plastic hand floats.

Broom finish: After machine floating draw a broom or hessian belt across the surface to produce a coarse even-textured slip-resistant transverse-scored surface.

Scored or scratch finish: After screeding, give the surface a coarse scored texture using a stiff brush or rake drawn across the surface before final set.

Sponge finish: After machine floating, obtain an even textured sand finish by wiping the surface using a damp sponge.

Exposed aggregate finish: After floating and when concrete has stiffened, wet the surface and scrub with stiff fibre or wire brushes, flushing continuously with clean water, until the aggregate is uniformly exposed. Rinse the surface with water.

See CCAA Briefing 02 for information on exposed aggregate finishes.

### Finishing methods – supplementary finish

Abrasive blast: After steel trowelling, abrasive blast the cured surface to provide texture or to form patterns without exposing the coarse aggregate using fine, hard, sharp, graded abrasive particles.

Coloured applied finish: After machine floating, apply a proprietary liquid or dry shake material to the manufacturer's recommendations, and trowel to achieve the required appearance.

Stamped and coloured pattern paved finish: Provide a proprietary finishing system.

Polished finish: After steel trowelling, grind the cured surface of the concrete.

For polished or honed concrete finishes see the following publications:

- CCAA Briefing 05.
- CCAA Data Sheet The specification of honed or polished concrete finishes. It provides suggested specification clauses for inclusion by the engineer in the appropriate concrete worksections.

The range of treatments to achieve and to embellish polished concrete surfaces is large, and includes colouring, texturing, patterning by saw cutting or inlaying of metal or timber strips or of tiles or pavers. The effect required should be comprehensively documented.

**Slip-resistant treatment**

Surface treatment: Apply silicon carbide granules after floating and before the topping surface has set, and trowel into the surface so that the granules remain exposed.

Application rate: 1 kg/m<sup>2</sup> evenly distributed.

**Slip-resistant treatment to stair treads and landings**

Slip resistance treatment: Form two grooves and fill with a silicon carbide two-part resin.

Dimensions: 10 mm deep, 15 mm wide, length width of tread less 100 mm.

Position:

- First groove: Centre 35 mm from tread nose.
- Second groove: Centre 60 mm from step nose.

**Surface treatment**

General: Apply the surface treatment after floating and before the topping surface has set.

Edit to suit the manufacturer's recommendations.

**3.5 CONTROL OF MOVEMENT**

The purpose of control joints is to accommodate movement in the finish or the substrate, or both. Movement may be caused by substrate shrinkage, thermal expansion and contraction, and the like. The location and details of all control joints should be shown on the drawings. Check the expected movement of structural control joints with the structural engineer and make sure the joint width will accommodate the anticipated movement. Where floor heating is installed or where passive solar heating is a design feature, pay particular attention to the added requirements for control joints and consider flexible adhesive.

**General**

Requirement: Provide control joints as documented and as follows:

- Location:
  - . Over structural control joints.
  - . To divide complex room plans into rectangles.
  - . Around the perimeter of the floor.
  - . At junctions between different substrates.
  - . To divide large topping-finished areas into bays.
  - . At abutments with the building structural frame and over supporting walls or beams where flexing of the substrate is anticipated.

Document in the **Control Joints schedule**. Note on drawings. Suggested spacings are 6 x 6 m internally and 4 x 4 m externally at the ratio of 1:1:6.

- Depth of joint: Right through to the substrate.
- Depth of elastomeric sealant: One half the joint width, or 6 mm, whichever is the greater.

Control joints to divide topping into bays: Provide joints using one of the following methods:

- Form in situ using square edge steel forms and trowelling a 3 mm radius to edges.
- Form a groove, extending at least one quarter the depth of the section, either by using a grooving tool, by sawing, or by inserting a premoulded strip.
- Install a control joint product proprietary product, as documented.

**3.6 JOINT ACCESSORIES****Weather bars**

General: Provide a corrosion-resistant metal weather bar suitably fixed to the substrate. Locate directly below the centres of closed doors.

**Floor finish dividers**

General: Provide a corrosion resistant metal dividing strip suitably fixed to the substrate at junctions with differing floor finishes, with top edge flush to the finished floor. If changes of floor finish occur at doorways, make the junction directly below the centre of the closed door.

**3.7 TESTING**

0171 General requirements covers tests in **Definitions** and calls for an inspection and testing plan under **SUBMISSIONS, Tests**.

**Site tests**

General: Test and assess conformity of construction as follows:

- Flatness: If flatness properties are required:
  - . Method: To ASTM E1155M.

This is a test of finished work and would only be for super flat floors. Delete if ASTM E1155M requirements are not documented.

- In situ crushing resistance/soundness: If a soundness category is required:
  - . Method: To BS 8204-1.

BS 8204-3 describes a BRE screed tester which creates an indentation that can then be measured. This is a test of finished work and would only be documented for special floors. Other properties that could be documented include wear resistance and slip resistance. Delete if BS 8204-1 requirements are not documented.

**Completion tests**

Slip resistance of completed installation: To AS 4663.

Delete if not required. See NATSPEC TECHnote DES 001. The wet-barefoot inclining platform test and the oil-wet inclining platform test cannot be performed in situ.

**3.8 COMPLETION****Curing**

General: Prevent premature or uneven drying out and protect from the sun and wind.

Curing: Use a curing product or, as soon as toppings have set sufficiently, keep them moist by covering with polyethylene film for seven days.

**Joint sealant**

General: If required, seal joints as follows:

- Formed joints: ≤ 25 mm deep with filler and bond-breaker.
- Sawn joints: Full depth of cut.

**Protection**

General: Protect finished work from damage during building operations.

**Warranties**

Requirement: Cover materials and workmanship in the terms of the warranty from the installer.

- Form: Against failure of materials and execution under normal environment and use conditions.
- Period: As offered by the installer.

List the requirements of the product to be warranted. Usually 10 years for installation and 7 years for products. Confirm with installer.

**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 SCHEDULES****Mapei self-levelling smoothing compounds schedule**

Property	CT1	CT2	CT3
Mapei product			
Substrate			
Thickness			
Topping function			
Applied finish			

CT1, CT2, CT3: These designate each instance or type or location of the item scheduled. Edit to align with the project's codes or tags.

Mapei product: Guidance for selections is available in the hyperlinked manufacturer's documents and as described in **PRODUCTS**.

Substrate: Usually concrete.  
 Thickness: As documented.  
 Topping function: e.g. Levelling to receive an applied finish, or Wearing.  
 Applied finish: e.g. Resilient finish or Carpet.

**Mapei repair mortars schedule**

Property	CT1	CT2	CT3
Mapei product			
Substrate			
Thickness			
Topping function			
Applied finish			

CT1, CT2, CT3: These designate each instance or type or location of the item scheduled.  
 Edit codes in the **Schedule** to match those on the drawings.  
 Mapei product: Guidance for selections is available in the hyperlinked manufacturer's documents and as described in **PRODUCTS**.  
 Substrate: Usually concrete.  
 Thickness: As documented.  
 Topping function: e.g. Levelling to receive an applied finish, or Wearing.  
 Applied finish: e.g. Resilient finish or Carpet.

**Mapei thixotropic smoothing compounds schedule**

Property	CT1	CT2	CT3
Mapei product			
Substrate			
Thickness			
Topping function			
Applied finish			

CT1, CT2, CT3: These designate each instance or type or location of the item scheduled.  
 Edit codes in the **Schedule** to match those on the drawings.  
 Mapei product: Guidance for selections is available in the hyperlinked manufacturer's documents and as described in **PRODUCTS**.  
 Substrate: Usually concrete.  
 Thickness: As documented.  
 Topping function: e.g. Levelling to receive an applied finish, or Wearing.  
 Applied finish: e.g. Resilient finish or Carpet.

**Mapei cementitious screeds schedule**

Property	CT1	CT2	CT3
Mapei product			
Substrate			
Thickness			
Topping function			
Applied finish			

CT1, CT2, CT3: These designate each instance or type or location of the item scheduled.

Edit codes in the **Schedule** to match those on the drawings.

Mapei product: Guidance for selections is available in the hyperlinked manufacturer's documents and as described in **PRODUCTS**.

Substrate: Usually concrete.

Thickness: As documented.

Topping function: e.g. Levelling to receive an applied finish, or Wearing.

Applied finish: e.g. Resilient finish or Carpet.

#### Generic cementitious toppings construction schedule

Property	CT1	CT2	CT3
Proprietary item			
Substrate			
Separation layer: Location			
Separation layer: Type			
Thickness			
Topping function			
Topping method			
Primary finish			
Flatness tolerance			
Supplementary finish			
Surface treatment product			
Slip resistance classification			
Slip resistance product: Colour			
Crushing resistance/soundness			
Topping joints			

CT1, CT2, CT3: These designate each instance or type or location of the item scheduled.

Edit codes in the **Schedule** to match those on the drawings.

Proprietary item: Refer to the manufacturer's product data sheets for a complete product description.

Separation layer: Type e.g. Polyethylene film, or Waterproof membrane.

Topping function: e.g. Levelling to receive an applied finish, or Wearing.

Topping method: e.g. Bonded, Floated, Separated or Monolithic.

Primary finish: e.g. Wood float, Machine float, Steel trowel, Burnished, Broomed, Scored, Scratched, or Exposed aggregate.

Flatness tolerance: e.g. Class A or B.

Suggested primary finish and tolerance class for typical applied finishes:

- Resilient finishes: Steel trowelled finish, tolerance class A.
- Carpet: Machine float finish, tolerance class B.

Supplementary finish: e.g. Steel shot abrasive blast, Fine aggregate abrasive blast, Colour applied, Stamped and coloured faux paved or cobblestone finish, or Polish. Add product, method, colour, pattern, or texture as required.

Surface treatment: e.g. Required as documented.

Slip resistance classification: For selections refer to NATSPEC TECHnote DES 001, SA HB 197 and SA HB 198. Select the slip resistance test and classification to suit the location and application.

Refer also to CCAA Data Sheet Slip resistance of residential concrete paving surfaces and CCAA Data Sheet Slip resistance of polished concrete surfaces for guidance.

Slip resistance products: Colour: e.g. silicon carbide colour.

Crushing resistance: Refer to **Site tests**.

Topping joints: e.g. Trowel V joint in situ, to control minor shrinkage cracks usually at 1200 x 1200 mm for non-reinforced topping.

#### Control joints schedule

Property	A	B	C
Control joint strip: Joint side-plate material			
Control joint strip: Neoprene colour			
Control joint strip: Width			
Control joint strip: Fixing			
Proprietary slide plate: Product			
Proprietary slide plate: Material			
Proprietary slide plate: Insert colour			
Sealant: Type			
Sealant: Colour			
Sealant: Width (mm)			

A, B, C: These designate each instance or type or location of the item scheduled.

Edit codes in the **Schedule** to match those on drawings.

Control joint strip:

- Joint side-plate material: e.g. Perforated brass angles.
- Fixing: e.g. Mortar bed.

Proprietary slide plate:

- Material: e.g. stainless steel.
- Insert colour: Nominate colour or omit if no insert.

Sealant:

- Type: e.g. One part modified silicone or Polyurethane. For major control joints a proprietary system of sliding plates may be required.
- Colour: State requirement if sealant is to be specially coloured.

Edit joint strip type as required.

#### Joint accessories schedule

Property	A	B	C
Floor finish divider: Type			
Floor finish divider: Material			
Floor finish divider: Finish			
Floor finish divider: Size			
Weather bar: Type			
Weather bar: Material			
Weather bar: Finish			
Weather bar: Size			

A, B, C: These designate each instance or type or location of the item scheduled.

Edit codes in the **Schedule** to match those on drawings.

Floor finish divider:



- Type: e.g. Angle.
- Material: e.g. Brass, Anodised aluminium, Zinc or Rebonite.
- Finish: e.g. Satin finish.
- Size: e.g. 40 mm x 40 mm x 3 mm.

Weather bar:

- Type: e.g. Flat bar.
- Material: e.g. Brass or Anodised aluminium.
- Finish: e.g. Satin finish.
- Size: e.g. 40 mm x 3 mm.

#### REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS 1379	2007	Specification and supply of concrete
AS 1478		Chemical admixtures for concrete, mortar and grout
AS 1478.1	2000	Admixtures for concrete
AS 2758		Aggregates and rock for engineering purposes
AS 2758.1	2014	Concrete aggregates
AS 3972	2010	General purpose and blended cements
AS 4586	2013	Slip resistance classification of new pedestrian surface materials
AS 4663	2013	Slip resistance measurement of existing pedestrian surfaces
AS/NZS 4671	2001	Steel reinforcing materials
BS 8204		In-situ floor finishes
BS 8204-1	2003	Code of practice for concrete bases and screeds to receive in-situ floorings
BS EN 13813	2002	Screed material and floor screeds - Screed material - Properties and requirements
ASTM E1155M	2014	Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers

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

SA HB 197	1999	An introductory guide to the slip resistance of pedestrian surface materials
SA HB 198	2014	Guide to the specification and testing of slip resistance of pedestrian surfaces
CCAA		Cement Concrete & Aggregates Australia
CCAA Data Sheet BCF	2010	The specification of burnished concrete finish
CCAA Data Sheet HPC	2010	The specification of honed or polished concrete finishes
CCAA Data Sheet SRP	2006	Slip resistance of polished concrete surfaces
CCAA Data Sheet SRR	2003	Slip resistance of residential concrete paving surfaces
CCAA Briefing 02	2007	Exposed-aggregate finishes for flatwork
CCAA Briefing 05	2006	Polished concrete floors
NATSPEC DES 001	2016	Slip resistance performance
NATSPEC DES 008	2006	Preparation of concrete substrates
NATSPEC GEN 006	2007	Product specifying and substitution
NATSPEC GEN 024	2015	Using NATSPEC selections schedules
NATSPEC TR 01	2019	Specifying ESD
WoodSolutions 48	2018	Slip Resistance and Wood Pedestrian Surfaces.
BS 8204		In-situ floor finishes
BS 8204-3	2004	Code of practice for polymer modified cementitious wearing surfaces
BRANZ Bulletin 389	1999	Concrete Toppings
ACI 302-1R	2015	Guide for concrete floor and slab construction