



BY CONCRETE
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Off-the-form concrete surface finishes

Successful processes to achieve the desired concrete surface finish are now mainstream and can be reproduced by capable tradespeople.



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Form linings can be used to create attractive surface designs.

NZS 3114:1987 *Specification for concrete surface finishes* provides the format for the specifier's concrete finishing requirements to be communicated to the contractor. The application of the standard permits appropriate qualities of finish to be assigned to all surfaces, and attention is drawn to specific requirements.

Guidance in the standard

NZS 3114:1987 covers the different methods in which the surface is prepared:

- Finishes that are formed and thus mirror the characteristics of the form are F finishes and are described in part 1, off-the-form finishes.

- Exposed aggregate finishes, whether formed or otherwise, are described in part 2, exposed aggregate finishes. This section refers to parts 1 and 3 using the suffix E.
- Unformed surfaces are generally laid horizontally and incorporate screeding, floating or trowelling during production. These surfaces are described in part 3 and include floors, slabs, exterior pavements and inverts (surfaces that remain exposed when concrete casting is complete) and are classified as U finishes.

The standard provides guidance on the characteristics that can be expected to affect the finish

and defines limits for the various grades of finish, including:

- surface plane variations
- colour variation
- physical irregularities
- the X factor (for exceptions)
- provision of sample reference panels.

Off-the-form finishes

This category covers the concrete surfaces that are dependent on the formwork for texture and finish. The formwork dimensions, rigidity, joint tightness and texture all become of increasing importance. Time spent before casting to ensure the exactness of all the above is invaluable. The six classifications (F1–F6) cover all qualities of formed finish.

They range from hidden surfaces (F1 such as foundations, the rear of retaining walls and lined surfaces), plaster surfaces (F2) and exposed surfaces viewed from afar (F3) to architectural and high-quality panels (F6).

Although there is a grey scale included in the standard, there are no specific limits set for the variations accepted under each finish. It is up to the specifier to determine an acceptable range and to monitor this with a sample reference panel. Any finish that has a nominated colour range restriction must be designated with the X suffix and the range specified.

Exposed aggregate finishes

Surfaces in this category have exposed aggregate on their surface. The specification extends the

classification from parts 1 and 3 with an E suffix. For example, finish F5E is a formed finish to F5 tolerance limits with exposed aggregate surface texture. In all cases, sample reference panels are required to provide a basis for quality and finish assessment.

Materials and workmanship

The finish will depend on concrete grade, cement content, workability, formwork, release agents, placement technique, compaction, curing methods, protection, finishing method and dressing.

Production of off-the-form finishes

A systematic approach and consistently good quality products are needed to achieve the required off-the-form finish.

The range of patterned and smooth textured finishes is considerable. A range of materials can be used to create different finishes.

Timber

Timber can be sandblasted to raise the grain or rough-cut to enhance a bold texture. For a smooth finish, use only dressed tongue and groove boards or grooved boards with loose tongues and plastic foam strips. To achieve uniformity of colour, pre-treat the timber by oiling before the first use.

Plywood

The advantages of exterior grade plywood include rapid fixing, large surface areas without joints, resistance to impact and resistance to moisture shrinkage and swelling. Plywood can also be bent to form a curved surface.

Plywood's strength depends on the direction of the grain of the outer plywood face. Panels should normally be used with the grain parallel to the span of the sheet.

Surface coatings on the plywood reduce the colour variations on the concrete face as well as extending the plywood's use. As the surface coating becomes more impermeable, there tend to be more blowholes.

Steel

Steel formwork produces concrete of uniform colour provided it is protected from rusting and form face vibration can be reduced. However, its impermeability can create blowholes.

Due to the flexibility of sheet steel facing, pay attention to jointing to avoid leakage during vibration and ensure that the steel sheet is of sufficient thickness to limit deflection.

Always select a mould oil with rust-inhibiting properties.

Oil-tempered hardboard

This provides concrete of reasonably uniform colour although some surface blowholes are inevitable as it is relatively impermeable. A recommended procedure is to wet the back of sheets and stack flat for 48 hours before use. Preferably the sheets should be centre pinned and fully supported to reduce buckling.

The material should be oiled before use. Clean down using a stiff brush and cold water before reoiling.

Rubber linings

Rubber linings may be used to create textured or profiled surfaces. The surface is of uniform colour.

For fixing in vertical positions, linings can be glued or tacked to a backing form.

Mineral oil-based release agents must not be used since these soften the rubber. Castor oil or lanolin are suitable release agents. On shallow profiles, no release agent is necessary. The rubber liners should be cleaned down with water and then lightly oiled.

Select the right release agents

Most form materials require a release agent on the surfaces that will contact the concrete. Along with their function of effecting release, agents can influence the surface appearance and durability. The release agent should be carefully selected so the specified finish can be achieved.

Striking or stripping the formwork

The quality of an off-the-form finish is also dictated by appropriate striking – stripping of the formwork.

The time of striking is normally specified, otherwise follow NZS 3109:1997 *Concrete construction*. Correct striking can also impact the reusability of the form, including any liners.

Quality requires care

Concrete should provide a long-term maintenance-free surface finish. However, excellent finishes do not just happen. A wide variety of aspects need to be considered and skilled professionals involved in the process. ◀