2.3 FINISHING PAINTS

2.3.1 INTERIOR AND EXTERIOR METALLIC PAINTS (FORMERLY BRONZE/ALUMINIUM PAINT)

Available in a wide range of metallic colours from Silver to Gold e.g. Aluminium Paint.

Composition Metallic paints can be made from mixtures of real metal e.g. aluminium, zinc, copper, or alternatively by using pearlescent pigments that can be used in various proportions to give a number of different colours. Metallic paints can be either water-borne (quick drying) for use on interior surfaces or solvent-borne for exterior use.

Aluminium dust should not be dispersed directly into water, as the metal will chemically react to produce hydrogen gas. Aluminium dust can be dispersed but into the following media:

(i) Cellulose lacquers
(ii) Alkyd resins (oil-based)

Non-reactive metals and pearlescent pigments can also be dispersed as above but also in

(iii) PVA or acrylic emulsions

Properties

Designed to provide protection for interior and exterior wood and metal surfaces. Aluminium paint can withstand temperatures up to 260°C.

Interior metallic paints can be used for the enrichment and gilding of ornamental plasterwork in theatres and in the home, picture frame decoration, theatre props, furniture and radiators, whereas exterior metallic paints are ideal for wrought iron railings, fleur-de-lis, coats of arms, decorative memorabilia and stencils etc.

Drying

Cellulose lacquers dry by evaporation and this process may take several hours depending upon temperature and humidity.

Alkyd resin or oil based paints dry by a process called 'autoxidation' (in the presence of metal drier e.g. cobalt) and can take 16–24 hours to fully dry.

PVA or acrylic copolymer emulsions dry by coalescence and will take 1–2 hours depending upon temperature and humidity.

For exterior solvent-based metallic paints allow a minimum of 24 hours before applying additional coats. Quick drying interior metallic paints can normally be overcoated within 4 hours.

Cleaning solvent

The choice of cleaning solvent will depend upon the type of metallic paint.

Cellulose lacquers will require cellulose thinner.
Oil-based will require white spirit.
PVA or acrylic will require water.

Brushes and rollers should be well cleaned in solvent then detergent and finally rinsed in clean water to ensure all particles of metal are removed.

Spreading rate Typically 18 m^2 per litre on most surfaces.

2.3.2 EGGSHELL OR SATIN FINISH

An interior decorative finish which can be either water-based (quick drying), or solvent-based which dries to a mid-sheen finish.

Composition

Pigment Titanium dioxide (white), mineral extenders and a wide range of coloured pigments.

Film-former Alkyd resin or oil-based binders (some types reinforced with polyurethane for extra hardness). Acrylic copolymer emulsion.

Properties

Hardwearing.
Thixotropic.
Good flow.
Washability.

Non-toxic.
Easily cleaned with detergent.
Film tougher and more washable than emulsion paints.
Requires no undercoat.
Available in wide range of colours.
Excellent opacity (except some yellows and oranges).
Resists normal domestic steam and heat.
Non-reversible.
Use Decorative finish for interior surfaces including ceilings, walls, woodwork and metal frames.
Application
Quick drying eggshell

Solvent-based eggshell

Drying
Quick drying eggshell (acrylic emulsion) dries by coalescence and will take 4–6 hours depending upon temperature and humidity. Additional coats can be applied after 6 hours.
Solvent-based eggshell is an alkyd resin or oil-type paint which dries by autoxidation and can take 16–24 hours to fully dry. Additional coats should only be applied after 24 hours.
Cleaning solvent
The choice of cleaning solvent will depend upon the type of eggshell paint. Quick drying eggshell can be cleaned with water whereas solvent-based eggshell can be cleaned with white spirit.
Spreading capacity 80–85 m^2 per 5 litre.

2.3.3 MATT EMULSION PAINT

An interior water-based decorative emulsion for use on walls and ceilings which dries to flat sheen or finish e.g. vinymatt.

Composition
Pigment Titanium dioxide (white), mineral extenders, opaque polymer and a wide range of coloured pigments.
Film-former There are many different types depending upon the desired film properties and these include:
Polyvinyl acetate or PVA copolymer emulsion.
Ethylene-vinyl acetate or EVA copolymer emulsion.
Acrylic copolymer emulsion.
Styrene-acrylic copolymer emulsion.
Properties
Matt emulsion paints are traditionally highly pigmented (formulated above CPVC) which can impact upon the final film performance, such as poor washability and crack-resistance. However, matt emulsion paints formulated below CPVC show marked improvements in the film.

Typical properties of a matt emulsion paint formulated above CPVC:
Permeable – allows moisture vapour to pass in and out of the film.
Flexible.
Excellent opacity or hiding power.
Washable.
Alkali-resistant.
Good sealing properties on porous materials e.g. new plaster.
Quick drying.
Low odour.

Typical properties of a matt emulsion paint formulated below CPVC:
Permeable – allows moisture vapour to pass in and out of the film.
Flexible.
Excellent opacity or hiding power.
Scrub-resistant.
Stain-resistant.
Tougher than conventional matt and silk emulsion paints.
Burnish-resistant.
Washable.
Alkali-resistant.
Good sealing properties on porous materials e.g. new plaster.
Quick drying.
Low odour.

Use Extensively used for walls and ceilings. Suitable for use over plasterboard, fibre insulating board, wood, hardboard, plaster, brick,

cement rendering, stucco, asbestos sheeting and fabrications, foamed polystyrene and wallpaper.
Application

Drying method Coalescence.
Time 2–4 hours depending upon temperature and humidity.
Overcoating Allow 4 hours. Emulsion painted surface can be papered or painted over after cleaning and denibbing.
Cleaning solvent Water. Cleaning should be carried out immediately after use.
Spreading capacity 65–80 m^2 per 5 litre on smooth non-porous surfaces.
Note The dry film can be softened by methylated spirit.

2.3.4 VINYL SILK EMULSION

Similar to emulsion paint but with poorer opacity and drying to an eggshell sheen.
Composition
Pigment Titanium dioxide (white), mineral extender, opaque polymer and a wide range of coloured pigments.
Film-former
Polyvinyl acetate or PVA copolymer emulsion.
Ethylene-vinyl acetate or EVA copolymer emulsion.
Thinner Water.
Properties
Silk emulsion paint is for use on interior walls and ceilings. It enhances low-relief wall coverings and textured plaster.

Washable.
Scrub-resistant.
Durable.
Alkali-resistant.
High sheen.
Low odour.
Non-yellowing.

Use Where the properties of emulsion paints are required but with a higher sheen, e.g. in kitchens, bathrooms, hospitals, schools, food preparation plants.
Application

Drying method Coalescence.
Time 1–2 hours.
Overcoating 4 hours.
Cleaning solvent Warm water.
Spreading capacity 65–80 m^2 per 5 litre.

2.3.5 GLOSS FINISH

Interior and exterior decorative paint having a full gloss finish. Used as the main protective coating in the decorating industry.
Composition
Pigment Titanium dioxide (white) and a wide range of pigments to produce the full colour range.
Film-former Alkyd resins modified with drying oils. Some types contain a small proportion of other resins such as silicone and polyurethane resins to improve the film performance.
Thinner White spirit.
Properties
Traditional gloss paints are solvent-based for use on interior and exterior wood, metal and masonry surfaces. They can be used on heated surfaces such as hot water pipes and radiators. However, gloss paints do have a tendency to yellow with time and this chemical change takes place in the dark.

Typical film properties for traditional gloss paint are as follows:

High gloss.
Tough and durable.
Washable.
Good gloss retention.
Excellent flow and levelling.
Good adhesion.
Good flexibility.

Good weather resistance.
Heat resistance up to 93°C.
Non-reversible coating.

Use General interior and exterior finishes. Decorative finish over suitably primed and undercoated timber, metals, plaster, concrete, brickwork and building boards.

Application

Drying method Autoxidation.
Time Tack-free in 4–6 hours.
Overcoating Leave overnight to dry.
Cleaning solvent White spirit.
Spreading capacity 75–85 m^2 per 5 litre.

Film-former Pigments ground in cellulose medium dispersed in stabilised water.

Properties
Anti-static, does not attract dust.
Non-toxic.
Washable.
Does not chip.
Excellent adhesion.
Camouflages surface irregularities and joints in boards.
Non-reversible coatings.
Hardwearing and abrasion-resistant.
Liable to lift oil paint substrates.
Shelf-life 6–9 months.
Strong odour and fumes which can be unacceptable in hospitals, food factories, occupied buildings.

Use All types of interior decoration where a decorative and hardwearing surface is important, e.g. in toilets; corridors in schools, hospitals and public buildings. Suitable for application over glazed tiles.

Application

2.3.6 MULTI-COLOUR FINISH

An interior decorative finish which has 2, 3 or 4 separate colours in the form of spots, flecks or streaks applied in one application. Each fleck of paint exists as an individual both in the tin and during application. Then as the film dries it joins up with its neighbours to form a multi-colour finish. The paints contain two incompatible materials, which allows several colours to be used in one container without becoming mixed together. Three types are available:

(a) Cellulose/water medium (spray applied).
(b) Vinyl/resin medium (spray applied).
(c) A brush-applied clear coating containing coloured flecks applied over an opaque coloured ground.

(a) Cellulose multi-colour finish

Composition

Pigment Titanium white and range of coloured pigments.

Medium or large set-ups give best results. Pressure should be about 20–30 psi (1.5–2 bars).

Drying method Evaporation.
Time Touch-dry in 2 hours; hard overnight.
Cleaning solvent Water, and the manufacturer's cleaning solvent.
Spreading capacity 16–20 m^2 per 5 litre.

(b) Vinyl multi-colour finish

Composition

Pigment Titanium white and range of coloured pigments.

Film-former Pigments ground in low-odour spirit-carried vinyl resin dispersed in stabilised water.

Properties
Anti-static.
Non-toxic.
Washable.

Does not chip.
Excellent adhesion.
Camouflages surface irregularities and joints in boards.
Non-reversible coatings.
Hardwearing and abrasion-resistant (although inferior to cellulose multi-colour).
Can be applied over oil paint substrates.
Shelf-life of 6–9 months.
Low odour.
Use All types of interior decoration where a decorative and hardwearing surface is important, e.g. corridors in schools, hospitals and public buildings; restaurants; clubs; food factories. Particularly suitable for use in occupied buildings because of its low odour.
Application

Medium or large set-ups give best results. Pressure should be about 20–30 psi (1.5–2 bars).
Drying method Coalescence.
Time Touch-dry in 4 hours; hard overnight.
Cleaning solvent Water or manufacturer's recommended cleanser.
Spreading capacity 14–20 m^2 per 5 litre.

(c) Brush applied, vinyl medium

Consists of two parts: (i) an undercoat which provides the ground colour, and (ii) the finishing coat which carries the coloured flakes.
Composition – undercoat
Pigment Titanium dioxide with extenders and coloured pigments.
Film-former Copolymer emulsion.
Composition – finishing coat
Pigment No pigment.
Film-former Coloured flakes are suspended in clear copolymer emulsion.
Properties
Non-toxic.
No objectionable odour.
Good adhesion.
Washable.
Abrasion-resistant.
Good flexibility.
Camouflages poor substrates.
Use For interior and exterior surfaces, particularly in public buildings where resistance to abrasion is of prime importance.
Application Undercoat is brushed or rolled. Finishing coat is brush applied. It may be necessary to roll the coating after to remove excess resin.
Drying method Coalescence.
Time Undercoat, 2–4 hours. Finishing coat, touch-dry in 1 hour.
Cleaning solvent Water
Spreading capacity Undercoat – up to 70 m^2 per 5 litre. Finishing coat – up to 50 m^2 per 5 litre.

2.3.7 MASONRY PAINT

(a) Emulsion-based

A water-based, quick drying, smooth or textured finish for exterior walls (not common or fletton bricks).
Composition
Pigment Titanium dioxide (white), mineral extender, opaque polymer, sand and a wide range of coloured pigments. Sand is used for reinforcement and to provide texture to the film.
Film-former Acrylic copolymer emulsion. Styrene-acrylic copolymer emulsion.
Thinner Water.
Properties
Masonry emulsion paints are for exterior walls and brickwork excluding timber. The smooth or textured finish combined with a fungicide and algaecide can help the surface stay cleaner for longer.

Typical film properties for masonry emulsion paints are as follows:

Tough and durable.
Flexible.
Good opacity.
UV-resistant.
Shower-resistant within 30 minutes.
Waterproof.
Mould and algae-resistant.

Covers hairline cracks.
Alkali-resistant.
Non-reversible coating.

Use For protection and decoration of new and old cement rendering, concrete, brickwork, asbestos sheeting, pebbledash, stucco and other types of masonry.

Application

Drying method Coalescence.

Time 1–4 hours depending upon temperature and humidity.

Overcoating Can be overcoated as soon as the film is dry. Any type of decorative finish can be used over masonry paints as long as the surface is sound.

Cleaning solvent Water. It is very difficult to remove all fibrous material from brushes and rollers and they should not subsequently be used in normal finishing systems.

Spreading capacity 60–70 m^2 per 5 litre on smooth non-porous surfaces. Will vary according to the porosity and texture of the surface.

(b) Oil-based

A durable finish for outside use on all suitably primed or sealed surfaces.

Composition

Pigment Titanium dioxide (white) with mineral extenders and coloured pigments.

Film-former Alkyd resins modified with drying oils. Resins may also contain small proportions of phenolic-coumarone resin to improve the film performance.

Thinner White spirit.

Additives Fungicides.

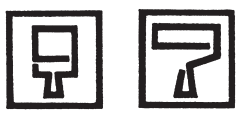
Properties

Masonry gloss paints are solvent-based for use on exterior wood, metal and masonry surfaces. Typical film properties for traditional gloss paint are as follows:

High gloss.
Tough.
Durable.
Washable.
Good gloss retention.
Excellent flow and levelling.
Good adhesion.
Good flexibility.
Good weather resistance.
Mould-resistant.

Use Interior, exterior protection and decoration of dry, primed plaster, brick, stucco, concrete, asbestos, sheeting, cement rendering, wood and metal.

Application



Drying method Oxidation.

Time 16–24 hours.

Overcoating Overnight drying should be allowed. Can be overpainted with any kind of decorative paint.

Cleaning solvent White spirit.

Spreading capacity 85 m^2 per 5 litre on smooth non-porous surfaces. Will vary according to the porosity and texture of the surface.

Note Other masonry paints are based on synthetic rubber, pliolite resins.

2.3.8 CELLULOSE COATING

Quick-drying highly-flammable material, based on nitro-cellulose. Available as primer, sealer, filler and pigmented, clear or metallic finish.

Composition

Pigment Titanium white and a wide range of coloured pigments, extenders, slate powders and metallic powders.

Film-former Basically nitro-cellulose, but many types are modified with synthetic resins for greater flexibility and improved resistance.

Thinner Mixture of solvents according to types of cellulose and their uses. Include hydrocarbons, esters, ethers and ketones.

Properties
Very fast-drying.
Very hard and abrasion-resistant.
Water-resistant.
Reversible coating.
Use
(i) Industrial and car refinishing.
(ii) Aluminium and bronze paints.
Application

Drying method Evaporation (some polymerisation with modified types).
Time Touch-dry in 10–15 minutes.
Overcoating 30–60 minutes depending on type, temperature and humidity.
Cleaning solvent Manufacturer's special thinner.
Spreading capacity For finishing coats these materials are sometimes thinned 50/50 with solvents. Therefore the spreading capacity covers a wide range, according to use.
Note Cellulose finishes provide very thin films; they are often brittle, and can sometimes crack, especially on timber surfaces.

Being reversible coatings, they are almost impossible to apply by brush except on very small areas.

The solvent odour from cellulose materials is strong and good ventilation is essential when spraying them.

These materials are highly flammable (see Part 6).

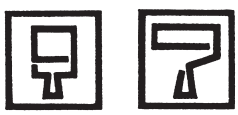
2.3.9 MOISTURE VAPOUR PERMEABLE (MVP) OR MICROPOROUS COATINGS

A paint system which allows moisture vapour to permeate through the dried film, but will not allow liquid water through. Such coatings allow the moisture content of timber to escape without causing the paint to blister or flake. Two types are available:

(a) Spirit thinned
(b) Water thinned

(a) Spirit thinned MVP coatings

Composition
Pigment Titanium white and a range of light fast pigments so give a full colour range.
Film-former Oil modified alkyd resin.
Thinner White spirit.
Properties
Mid sheen to full gloss.
Good flow.
Excellent flexibility.
Excellent durability.
Non-reversible coating.
Low maintenance.
Use All interior and exterior finishes. Can be applied over any bare timber substrate, or directly onto similar coatings in sound condition.
Application



Drying method Oxidation.
Time Touch dry in 3–5 hours.
Overcoating Leave overnight to dry.
Cleaning solvent White spirit.
Spreading capacity 12–15 m^2 per litre.
Maintenance Wash, spot prime, make good, apply two coats MVP coating every 4–6 years according to exposure.

(b) Water thinned MVP coating

Composition
Pigment Titanium white and a range of light fast pigments to give a full colour range.
Film-former Acrylic resin.
Thinner Water.
Properties
Semi-gloss finish.
Good flow.
Excellent flexibility.
Excellent durability.
Non-reversible coating.
Low maintenance.

Use All interior and exterior finishes. Can be applied over any bare timber substrate, or directly onto similar coatings in sound condition.
Application

Drying method Coalescence.
Time Touch dry in 2–4 hours.
Overcoating 4 hours in good drying conditions.
Cleaning solvent Water.
Spreading capacity 12–15 m^2 per litre.
Maintenance Wash, spot prime, make good, apply two coats MVP coating every 4–6 years according to exposure.