AMSA Lighthouse Coating Specification

Record of Amendments

Revision	Date	Revision details
0	10/08/2018	Issued for Coating Manufacturer Review
1	16/08/2018	Final
2	06/03/2019	Amendments to sections 9, 14, 16.4, 16.5, 16.7, 16.11, 16.12 and 16.13
3	26/07/19	Luxathane SPX replaced with Luxathane MPX
4	17/12/09	Section 8.6.3 added Section 16.8 added subsequent number revised to suit Sections 8.2, 12.1 and 12.4 wording revised
5	23/09/2020	Numerous
6	31/03/2021	Amendments to section 3, 20.4, 20.6 and A12
7	17/05/2022	Amendments to sections 5, 6, 7,10.2, 11, 11.2, 13, 14, 15.3.2, Appendix A Section 20.6 trafficable polyurethane membrane added subsequent numbering revised Section 20.11 internal timber surfaces – decorative added subsequent numbering revised Addition of Wattyl and Jotun specifications throughout
8	20/01/2023	Addition of PPG specifications throughout Lead clearance test requirements amended A12
9	04/04/23	Addition of Pile coating specification 20.16

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1 Scope

This specification is a generic document that sets out the minimum requirements for the surface preparation and application of protective coating systems for AMSA lighthouse repaint projects.

2 Application of the coating specification

The coating systems specified herein represent AMSA's minimum requirements and the final coating systems utilised for each project must be agreed between AMSA, the Service Provider and the Coating Manufacturer prior to site work commencing.

In consultation with AMSA and the Coating Manufacturer the Service Providers must, for each specific project:

- select the most suitable coating system of the options presented for each substrate/surface.
- or specify an alternative coating system to meet the durability requirements.

The Service Provider must gain manufacturers endorsement for the final coating systems in the form of a project specific manufacturers coating specification. The manufacturers coating specification must supplement this Coating Specification and address any site specific amendments to AMSA's minimum specified requirements. AMSA will assist in facilitating this process where possible.

The Service Provider must warrant that any amendments to the coating systems specified herein or alternative coating systems utilised will meet AMSA's durability requirements and the relevant warranty conditions to the Work Order or Contract.

As far as reasonably practical the Service Provider must utilise a single Coating Manufacturer for each project.

3 Durability requirements

The ferrous coating systems and other requirements specified here in have been developed in line with AMSA's prior experience with lighthouse protective coatings and the standard coating systems specified in AS2312 to achieve a "Very Long term" durability (15-25 years to first major maintenance) for an atmospheric corrosivity category of C5-M. Any changes to the standard coating systems must take into account this durability requirement.

The coating systems and other requirements specified here in for substrates other than ferrous have been developed in line with AMSA's prior experience with lighthouse protective coatings to achieve a "Very Long term" durability (15-25 years to first major maintenance). Any changes to the standard coating systems must take into account this durability requirement.

4 Precedence of Documents

In the event of any inconsistency between documents the following order of precedence shall prevail:

- Legislation
- The Contract or Work Order
- The specification to the Contract or Work Order

- This Coating Specification
- Australian Standards
- International Standards
- Specifications issued by contractors, subcontractors or materials suppliers to this project

5 Referenced Standards

AMSA is bound by the Work Health and Safety (WHS) Act 2011.

Where there is inconsistency between relevant Commonwealth and State legislation, the more stringent legislative standard must be adopted.

All relevant duty holders should check the currency of Australian Standards, Commonwealth and State legislation and approved Codes of Practice for more comprehensive information to ensure they fulfil their legislative and broader community obligations.

Unless otherwise specified, the applicable issue of a referenced standard, legislation, regulation code of practice etc. shall be the issue current at the date one week before the date of issue of this specification. These include but are not limited to:

Australian Standards

AS 1627	Metal finishing – Preparation and pretreatment of surfaces
AS 1627.2	Power tool cleaning
AS1627.9	Pictorial surface preparation standard for painting steel surfaces
AS/NZS 2310	Glossary of paint and painting terms
AS/NZS2311	Guide to the painting of buildings
AS/NZS 2312	Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings
AS 3730.8	Guide to the properties of paints for buildings -Latex - Exterior – Semi-gloss
AS 3730.10	Guide to the properties of paints for buildings - Latex - Exterior – Gloss
AS3730.17	Guide to the properties of paints for buildings – Primer – Wood – Latex – Interior/Exterior
AS 3730.22	Guide to the properties of paints for buildings – Concrete and Masonry Sealer – Solvent-borne – Interior/exterior
AS/NZS 3750	Paints for steel structures
AS/NZS 3750.1	Part 1: Epoxy mastic (two-pack) – For rusted steel
AS/NZS 3750.6	Part 6: Full gloss polyurethane (two-pack)
AS/NZS 3750.14	Part 14: High build epoxy (two-pack)
AS/NZS 3750.17	Part 17: Etch primers (single pack and two-pack)
AS/NZS 3750.19	Part 19: Metal primer general purpose

AS3894	Site testing of protective coatings
AS3894.3	Determination of dry film thickness
AS3894.4	Assessment of degree of cure
AS3894.5	Determination of surface profile
AS3894.6	Determination of residual contaminants
AS3894.7	Determination of surface temperature
AS3894.8	Visual determination of gloss
AS3894.10	Inspection report - Daily surface and ambient conditions
AS3894.12	Inspection report - Coating
AS3894.13	Inspection report – Daily
AS/NZS 4233	High pressure water (hydro) jetting systems
AS/NZS 4548.1	Guide to long-life coatings for concrete and masonry – Wall coatings – Latex extensible
AS/NZS 4548.2	Guide to long-life coatings for concrete and masonry – Latex finish coatings – high-build, low profile
AS/NZS 4361.1	Guide to hazardous paint management, Part 1 – Lead and other hazardous metallic pigments in industrial applications
HB 84	Guide to concrete repair and protection

International Standards

ICRI 310.2 Technical Guidelines – Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, Polymer Overlays, and Concrete Repair

Australian Government

Work Health and Safety Act (WHS Act)

Work Health and Safety Regulation (WHS Regulations)

Work Health and Safety (Abrasive Blasting) Code of Practice

Work Health and Safety (Managing Risks of Hazardous Chemicals in the Workplace) Code of Practice

National Environment Protection (Movement of Controlled Waste between State and Territories) Measure

Australian Government (Comcare) – Notification of Lead Risk Work

Australian Government (Comcare) – Notification of Removal of a Worker from Lead Risk Work

Australian Government (Comcare) – Guide to Lead Risk Work Notifications

6 Definitions

The definitions of painting terms contained within AS/NZS 2310 shall apply to terms used throughout this specification.

“Instructing officer” means the AMSA Instructing Officer as specified in the Work Order or their nominated representative.

“Service Provider” means any company or business contracted by AMSA to carry out the works of this specification. May also be referred to as “Contractor”.

“Manufacturer” means any company manufacturing and supplying the coatings and other products to be used in carrying out the specified works, and whose name appears on the product data sheets and SDS’s for the relevant products.

“Worker” means a person who carries out work in any capacity for a person conducting a business or undertaking.

“Lead Process” – As per r392 of the WHS Regulations 2011. Lead is defined in schedule 19 of the regulation as meaning lead metal, lead alloys, inorganic lead compounds, and lead salts of organic acids.

“Shall” means a mandatory requirement.

7 Supervision and qualifications

Unless approved otherwise by AMSA Quality assurance testing must be undertaken and recorded by personnel with a minimum AMPP Level 2 and reviewed/approved by AMPP Level 3 prior to submission to AMSA.

All surface preparation and coating application works must be undertaken by personnel with Certificate iii in Surface Preparation and Coating Application or approved industry equivalence unless approved otherwise by AMSA.

8 Emissions - General

Irrespective of the presence of hazardous paints all surface preparation and paint application (utilising spray equipment) must be carried out in a manner that prevents the emission of dust, debris and overspray to the environment.

All surface preparation utilising a methodology with a high dust/mist emission potential must be carried out in a containment system that will allow the collection of all wastes and debris generated. For the purpose of this specification this includes:

- Dry abrasive blasting with no vacuum
- Wet abrasive blasting/water jetting with no vacuum
- Soda blasting
- Rotary power tool cleaning with no vacuum

The containment system must completely enclose the structure or component of the structure where works are being undertaken allowing adequate access for surface preparation activities without obscuring surfaces and must be able to be cleaned of spent abrasive and debris on a regular basis. Spent abrasive blast material must be removed on a daily basis. An impervious floor must be provided to aid cleaning and prevent contamination of the surrounding ground.

9 Hazardous Paint Management

Where hazardous paints have been identified the Service Provider must undertake all works in compliance with the requirements of AS/NZS 4361.1 and Appendix A.

10 Waste Management

10.1 Testing of wastes

The Service Provider must, on behalf of the AMSA, perform all testing of all waste generated to determine their classification in accordance with Commonwealth, State, Territory and local waste regulations.

10.2 Site handling and storage of wastes

The Service Provider must carry out all site handling and storage of wastes in accordance with Commonwealth, State, Territory and local waste regulations.

Where hazardous paints are present all wastes must be stored and handled in accordance with the relevant parts of AS/NZS 4361.1.

All hazardous and non-hazardous waste must be segregated.

10.3 Transport and disposal of wastes

The Service Provider must dispose of all waste in accordance with any Commonwealth, State and local laws that apply to the disposal of waste materials. Where required hazardous wastes must be transported by licensed carriers and disposed of at licensed waste treatment facilities, this includes transport by land, air or water.

Waste tracking and disposal documentation must be provided for all hazardous wastes.

10.4 Liquid waste management

All liquid waste generated from surface preparation, operation of site hygiene facilities or from any other source must be collected and disposed of in accordance with any Commonwealth, State and local laws that apply to the disposal of waste material.

Wastewater must not be discharged to ground without the prior approval of the landowner and relevant authority.

10.5 Labelling of waste

Appropriate labelling must be affixed to all waste containers for storage on site and transport.

11 Surface Preparation

High pressure water washing with clean water and non-ionic detergent added is to be used as the first step of surface preparation to ensure all surfaces are free of contamination from oil, grease, salts (to the extent specified at 17.2.3), poorly adherent paint, laitance and other contaminants. Re-washing may be required after mechanical preparation on some substrates to achieve required cleanliness. The Service Provider is responsible for any testing required to demonstrate the water to be used for washing is suitable.

Care must be taken by the Service Provider on delicate surfaces (e.g. render, stone and timber) to ensure they are not damaged.

Any damage to the substrate during surface preparation must be repaired by the Service Provider using a repair methodology and materials approved by AMSA.

11.1 Surface preparation of heritage structures

All surface preparation undertaken to heritage structures requires qualification in accordance with 11.2 and may require approval from relevant heritage departments.

11.2 Qualification of surface preparation methods

Surface preparation methods requiring qualification must be qualified to the satisfaction of AMSA on a test area no larger than $1m^2$.

As part of the qualification the Service Provider must demonstrate:

- quality assurance requirements for the surface preparation of the substrate are met including but not limited to:
    - Degree of surface cleanliness, refer 17.2.1
    - surface profile, refer 17.2.2,
    - freedom from residual contaminates, refer 17.2.3
- The substrate is not damaged by the surface preparation method

The Service Provider must repair any damage caused during surface preparation qualification utilising a method and materials approved by AMSA.

11.3 Preparation of ferrous surfaces

Ferrous surfaces must be prepared by dry abrasive blast cleaning carried out in accordance with AS1627.4, to achieve a standard of surface cleanliness equivalent to AS1627.9 Class Sa 2 ½.

The blast cleaned surface must have a medium, angular surface profile of between 50 - 75 µm.

11.4 Preparation of aluminium, galvanised steel and stainless steel

Aluminium, galvanised steel and stainless steel surfaces must be prepared by dry abrasive blast cleaning or other means to strip the paint and establish a uniform roughened surface profile without warping or damaging the substrate.

The surfaces must be over coated prior to the formation of oxide layers.

Metallic or recycled abrasive material must not be utilised for preparation of aluminium and stainless steel.

11.5 Preparation of copper, brass and bronze surfaces

Copper, brass and bronze surfaces that are to remain unpainted shall have all existing coatings removed in a manner that will not damage or scratch the surface. Chemical strippers containing ammonia must not be utilised due to the potential for embrittlement.

Copper, brass and bronze surfaces that are to be painted must be prepared by light sweep blast cleaning or other means to strip the paint and establish a uniform roughened surface profile without warping or damaging the substrate.

11.6 Preparation of masonry surfaces

11.6.1 Concrete and rendered surfaces

Concrete, and rendered surfaces must be prepared by a qualified surface preparation method that:

- removes any existing coatings and laitance
- provides a finish equivalent to CSP 3
- leaves the surface free of contamination
- does not damage or erode the substrate

11.6.2 Stone

Stone surfaces must be prepared by a qualified surface preparation method that:

- removes the existing coatings
- provides a suitable finish
- leaves the surface free of contamination
- does not damage or erode the substrate

11.6.3 Cement sheet

Cement sheet surfaces must be prepared by a qualified surface preparation method that:

- removes any existing coatings
- leaves the surfaces free of contamination
- does not damage or erode the substrate

The Service Provider must confirm any aged cement sheet does not contain asbestos prior to undertaking surface preparation.

11.7 Preparation of timber

Timber surfaces must be prepared using a qualified surface preparation method that:

- removes the existing coatings
- provides a suitable finish
- leaves the surface free of contamination
- does not damage or erode the substrate

Abrasive blasting and water jetting may only be used for the preparation of hardwood timber surfaces by qualification. Softwood surfaces must not be prepared by abrasive blasting or water jetting and must be protected during such surface preparation activities to nearby substrates.

Where heat guns or flame are used, the Service Provider must control heat temperatures to prevent charring of timber or the release of toxic fumes.

For surfaces to be finished in clear the existing coatings must be removed as above and the surfaces sanded with 180-240 grit sandpaper.

11.8 Preparation of fibreglass surfaces

Fibreglass surfaces must be prepared using a qualified surface preparation method that:

- removes the existing coatings
- provides a uniform roughened surface profile without damaging the substrate or significantly eroding underlying gelcoat finishes

- leaves the surface free of contamination.

11.9 Preparation of plastic surfaces

Plastic surfaces must be prepared using a qualified surface preparation method that:

- removes the existing coatings
- provides a uniform roughened surface profile without warping or damaging the substrate
- leaves the surface free of contamination.

11.10 Preparation of glass surfaces

Glass surfaces must be prepared using a qualified surface preparation method that:

- removes the existing coatings
- provides a uniform roughened surface profile
- leaves the surface free of contamination
- does not damage the substrate.

11.11 Removal of sealants

Unless specifically stated otherwise all old sealants must be removed during surface preparation and the surfaces beneath them prepared to meet the specified requirements for the substrate.

11.12 Choice of abrasive

The abrasive used must be a hard inert mineral abrasive such as garnet.

Recyclable abrasives used as blasting medium must have all respirable dust and other contaminants removed prior to their re-use in the blasting process.

Sand, metallurgical slag or coal slag abrasives must not be used.

11.13 Chemical, induction and other means of coating removal

Surfaces may be prepared by chemical stripping, induction or other means of coating removal however the final surface preparation method must achieve the specified surface profile and cleanliness. Ferrous surfaces must be abrasive blasted as the final means of preparation prior to coating application.

The preferred product for chemical stripping of stonework is Heritage No.1 or Dulux Dumond range. Chemical strippers containing Methylene Chloride (DiChloroMethane) must only be used where adequate ventilation can be provided and recommended WHS precautions can be implemented.

11.14 Protection of adjacent surfaces

All adjacent surfaces and any surfaces that are not to be painted must be protected during abrasive blasting and other surface preparation techniques to ensure they are not damaged. Any surfaces damaged must be repaired or replaced at the Service Providers expense.

12 Edge and weld preparation

The Service Provider must radius all sharp edges of ferrous substrates to a minimum of 2mm, where this is not possible they must be provided with a 1-2mm chamfer.

The service provider must remove any sharp projections, crests, weld splatter, weld slag or weld undercut by grinding or similar.

Where the above treatment is required it must be completed prior to surface preparation or the area addressed reblasted post treatment.

In general this requirement applies to:

- Sharp edges caused by severe corrosion, pitting, casting defects
- New fabrication
- Repairs involving welding, brazing or other such treatments

13 Corrosion and Porosity Repairs for Metallic Surfaces

The Service Provider must repair all instances of porosity and pitting or general corrosion using a two-pack epoxy putty recommended by the manufacturer as being suitable for this use. All epoxy putty repairs, when sufficiently cured must be ground or sanded smooth with the surrounding surface before application of the paint products.

The application of the epoxy putty must be in accordance with the manufacturer's recommendations and must only be applied after application of the specified prime coat.

Epoxy putty must not bridge joints in the substrate.

HOLD POINT - The epoxy putty must only be applied after application of the prime coat and quality assurance documentation has been provided to AMSA to demonstrate the required dry film thickness for the prime coat and surface preparation requirements have been met.

Coating Manufacturer	Approved product
International	Interfill 830 Interfill 833
Dulux	Luxepoxy filler Luxepoxy UHB Other epoxy filler by approval from Dulux and AMSA
Wattyl	SeaPro EFC
Jotun	As recommended by the manufacturer
PPG	As recommended by the Manufacturer

Any instance of structural or severe corrosion must be repaired by welding in of new material to match the existing profile in accordance with the requirements of the Contract or Work Order under which the coating works are being undertaken.

14 Sealing Crevices

All external seams, crevices, fastener/rivet heads, lap joints, butt joints etc. must be sealed with a suitable paintable sealant prior to application of the Finish coat. Internal crevices that are a heightened risk of corrosion must also be sealed.

HOLD POINT - The sealant must only be applied after application of the intermediate coat (primer for two coat systems) and quality assurance documentation has been provided to AMSA to demonstrate the required dry film thickness for the combined prime and intermediate coat has been met.

Coating Manufacturer	Approved product
International	Sikaflex 11FC
Dulux	Selleys Pro-series Flexiseal Parchem Nitoseal PU400
Wattyl	Sikaflex 11FC
Jotun	As recommended by the manufacturer
PPG	Sikaflex 11FC

15 Paint Requirements

15.1 Approved products

The products mentioned as examples in paint systems below are approved products.

The Service Provider may request approval for another product by submitting written documentation from the supplier or manufacturer demonstrating its ability to comply with this specification.

AMSA is under no obligation to approve any product, and may reject such applications without providing written cause.

15.2 Labelling and storage

All products used during the works (including thinners and cleaning aids) must be brought to the site in their original unopened containers, bearing the manufacturer's label, batch number, colour and date of expiry, where applicable.

All containers must be stored under conditions which do not lead to deterioration of the product and within a suitable enclosure that is to be bunded against spills.

15.3 Manufacturer's literature

15.3.1 Product data sheets

The Service Provider must obtain the Manufacturers current Product Technical Data Sheets for all products used; and these must be kept on site at all times during the works.

The Manufacturer's Product Technical Data Sheets and other written instructions shall form part of this specification, and must be followed in all particulars relating to ambient conditions, surface temperature, mixing, pot life, application equipment and cure times.

15.3.2 Manufacturer's endorsement

Prior to site works commencing the Service Provider must obtain from the intended Coating Manufacturer a project specific manufacturers coating specification. The manufacturers coating specification must supplement this Coating Specification and address any site specific amendments to AMSA's minimum specified requirements

15.3.3 Safety data sheets (SDS)

The Service Provider must obtain the Manufacturers current Safety Data Sheet (SDS) for all products used; and these must be kept on Site at all times during the Works. SDS's must comply with the requirements of Commonwealth and relevant State Work Health and Safety legislation.

15.3.4 Colours

Coated items that have specific colour requirements are listed in the scope of works for the work order. The Service Provider must use these colours for the areas listed. For areas not listed the Service Provider must contact AMSA for colour requirements.

All paints used must be tinted to the required colour by the paint manufacturer.

For red finishes the specified top coat for red surfaces must be utilised i.e. Interthane 4379 or Weathermax HBR 770H0067. If available factory milled coatings must be utilised in preference to shop tinted.

16 Coating Application

16.1 Atmospheric conditions during application

The Dew Point and Relative Humidity (RH%) must be determined prior to any application of paint.

The steel surface temperature must also be determined at the same time using an appropriate surface thermometer in accordance with AS 3894.7.

Paint must not be applied under conditions of wind, temperature, humidity or atmospheric contamination that will adversely affect the performance or appearance of the applied system. Unless otherwise specified by the Coating Manufacturer in writing, products must not be applied if any one of the following conditions exists:

- the ambient temperature is below 10°C;
- the surface temperature is less than 10°C or above 40°C;
- the surface temperature is less than 3°C above the dew point;
- the relative humidity is above 85%;
- the weather is clearly deteriorating;
- Other condition as specified by the Coating Manufacturer.

16.2 Maximum exposure of blasted ferrous surfaces

It is the Service Provider's responsibility to ensure that the prime coat is applied to the prepared ferrous surfaces before any surface deterioration occurs. The maximum time period between surface preparation and prime coating will be FOUR (4) hours. This time is dependent on prevailing conditions and may need to be reduced, particularly in marine environments and for cast iron substrates.

16.3 Moisture content – concrete, masonry, stone and timber surfaces

New concrete, mortars and renders must be greater than 28 days old prior to application of coatings unless specified otherwise by the Coating Manufacturer and concrete/mortar/render manufacturer.

Unless specified otherwise by the Coating Manufacturer the moisture content of concrete, masonry, stone, timber and other similar surfaces must be less than 6% or wood moisture equivalent of 16 or less (15 for Taubmans). The moisture content must be measured in nominally 4 locations per surface to be coated or 2 locations per $10m^2$ of surface area whichever is the greater. Additional measurements must be taken in areas that have indications of higher moisture content.

The instrument utilised must be capable of measuring to a minimum substrate depth of 20mm.

16.4 Non-slip surfaces

Where non-slip surfaces are required, clean inert commercial grade aggregate must be cast into the finish coat. The finish coat must be applied in two (2) or more coats; the aggregate must be cast into the first wet finish coat, the finish coat must be allowed to cure and any loose aggregate removed prior to application of the final coat.

16.5 Brushing in and stripe coating

Regardless of the final method of application, a stripe coat must be brushed into all crevices, pits, edges, welds at rivets and bolts and at other surface irregularities or difficult-to-access locations prior to application of the full coat.

A stripe coat must be applied for all coats except for the finish coats. Wet-on-wet stripe coat application is permitted.

All stripe coating must be feathered to prevent picture framing.

Stripe coating must utilise a contrasting colour to the surface onto which it is being applied.

16.6 Protection of uncured paint

All freshly applied paint must be protected against damage or inclusion from wind-borne dust or spray, other debris or inclusions, and against damage from spray or air lines, covers and suspended dust from operation of nearby equipment or processes.

16.7 Gloss

The completed coating must have a uniform, even gloss level consistent with the manufacturer's stated gloss level for the finish coat.

16.8 Protection of adjacent surfaces

All adjacent surfaces and any surfaces that are not to be painted must be protected during paint application to ensure they are not affected by overspray or inadvertent paint application.

Any overspray or inadvertent paint application must be rectified at the Service Providers expense.

16.9 Workmanship

The completed coating must be of uniform colour, opacity and finish with all surfaces free from runs, sags, inclusions and other defects.

17 Inspection Procedures

17.1 Ambient conditions

17.1.1 Relative humidity

The relative humidity must be determined at the start of each day, at three hourly intervals thereafter and again on completion of coating application, using a sling psychrometer with a wet bulb and a dry bulb thermometer. After reading both the wet and dry bulb temperatures, the relative humidity shall be calculated using standard conversion charts. Electronic ambient conditions gauges may be utilised. However if any of the below conditions exist than the ambient conditions must be confirmed utilising a sling psychrometer:

- the surface temperature is less than 5°C above the dew point, or
- the relative humidity is above 80%, or
- there is any doubt as to the accuracy of the electronic gauge

17.1.2 Dew point calculation

Each time the relative humidity is measured, the dew point must be calculated from the ambient (dry bulb) temperature and the relative humidity, using standard conversion charts.

17.1.3 Surface temperature

Each time the relative humidity is measured, the surface temperature must be measured using a magnetic surface thermometer, thermocouple or infra-red thermometer in accordance with AS 3894.7.

17.2 Surface preparation

17.2.1 Degree of surface cleanliness

The surface cleanliness of all cleaned surfaces must be determined by comparison to the relevant pictorial standards of AS 1627.9.

Where doubt exists as to whether or not all graphitised cast iron has been removed, Method-E of AS 3894.6 must be used to clarify this.

17.2.2 Surface profile

The surface profile for substrates must meet the requirements specified in the manufacturer's documentation for the first coat applied unless noted otherwise in this specification.

The surface profile of all abrasive blast cleaned surfaces must be determined using profile replicating tape in accordance with Method A of AS 3894.5.

17.2.3 Freedom from residual contaminants

The cleanliness of all prepared surfaces from dust must be determined using Method C of AS 3894.6. The acceptance criterion for surface dust shall be a rating of 1 or less.

The surface salt concentration of all prepared metallic surfaces must be determined using Method A of AS 3894.6. The acceptance criterion for surface salt shall be 50 mg/m^2 (5 µg/cm^2).

The frequency of testing must be at least three times for each batch of prepared surface immediately prior to priming.

17.3 Degree of cure

Where considered appropriate, the degree of cure must be determined using Method C – Solvent Rub Test, of AS 3894.4.

Any coating that leaves a deposit on the test cloth or suffers softening or a significant loss of gloss when tested in accordance with this procedure must be removed and replaced in accordance with all aspects of this specification.

17.4 Gloss

The gloss of the finish coats must be assessed visually against the manufacturer's coupons for consistency.

If doubt exists about the level of gloss it must be determined instrumentally using the procedure of AS 3894.8.

17.5 Continuity testing

All external cast iron lattice surfaces and other external surfaces that represent a high risk of pinholes, holidays, cracks and other discontinuities must be tested for continuity utilising the high voltage (brush) method in accordance with AS3894.1.

Testing must be undertaken after application of the intermediate coat and prior to application of the finish coat.

Earth points must be established prior to application of the prime coat to the substrate and must be removed and the location prepared and painted in accordance with the specification for the substrate prior to application of the finish coat.

18 Dry Film Thickness

18.1 Method of determination

The dry film thickness of the coatings on ferrous surfaces must be determined in accordance with Method B of AS 3894.3, except that for cast-iron surfaces the electronic film thickness gauge is to be field calibrated on the prepared cast iron substrate using certified thickness shims.

The dry film thickness of the coatings on non-ferrous surfaces must be determined in accordance with Method B of AS 3894.3 using an eddy-current gauge, field calibrated on the prepared substrate using certified thickness shims.

The base metal reading must be determined and recorded for all surfaces and must be taken into account when determining the dry film thicknesses.

The dry film thickness of each coat of paint must be determined by measuring the total paint thickness and subtracting the average cumulative dry film thickness of all paint present prior to the application of that particular coat of paint. This is particularly to be observed for the finish coats.

The average dry film thickness of each coat of paint must conform with the specified average dry film thickness before proceeding to the application of the subsequent coats of paint.

HOLD POINT - The Service Provider must not commence application of a subsequent coat until relevant quality assurance documentation has been provided to AMSA to demonstrate that this requirement has been achieved.

18.2 Dry film thickness on non-metallic substrates

Coating thickness on non-metallic substrates such as timber and concrete surfaces (where DFT's cannot accurately be measured) does not require measurement but must be assured by strict compliance with the recommended spreading rate necessary to achieve the specified thickness of each coat and measured wet film thickness (where surface roughness allows). Test coupons may also be utilised to demonstrate compliance with the coating specification. When wet film thickness measurements are undertaken photographic or physical evidence must be maintained.

The Service Provider must maintain (and submit, prior to coating application commencing) lay-out sketches/drawings for non-metallic substrates showing surface area calculations and corresponding paint usage to verify that the correct paints have been applied at the correct spreading rate necessary to achieve the specified DFT.

If insufficient paint is found to be applied for any of the specified coats, an additional application must be carried out to achieve the specified spreading rate before proceeding to the next coat.

If any doubt exists about the DFT achieved, small sections of applied coating must be removed by small diameter coring or careful chiselling for verification of DFT using microscopy.

18.3 Dry film thickness records

The Service Provider must maintain hand written records of all dry film thickness testing undertaken.

19 Quality Assurance

19.1 Test equipment

All test equipment must be fully functional and must have a current calibration certificate from a NATA accredited organisation.

19.2 Quality Assurance records

The Service Provider must utilise daily reporting forms based on AS 3894.10, .12 and .13, to record climatic conditions, surface inspection and preparation, and all coating activities and must contain details (and results) of all testing.

19.3 Inspection and test plan

The Service Provider must prepare and implement an Inspection and Test Plan (ITP) sufficient to ensure that all preparation works and all coating installation conform to the requirements of this specification.

The ITP must contain mandatory Hold (H), Witness (W) and In-Process (IP) Points to verify work performed in accordance with the Contract.

19.3.1 Hold points

Hold points are defined as inspection activities that must be witnessed by the AMSA Instructing Officer or their nominated representative, unless written notification to proceed is provided to the Service Provider from the Instructing Officer. The Service Provider must provide at least 7 calendar days' notice to the Instructing Officer prior to the inspection activity.

19.3.2 Witness points

Witness points are defined as inspection activities that may be witnessed by the AMSA Instructing Officer or their nominated representative. The Service Provider must provide at least 7 calendar days' notice to the Instructing Officer prior to the inspection activity.

19.3.3 In-Process points

In Process points are defined as inspection activities that may be witnessed by the AMSA Instructing Officer or their nominated representative. The Service Provider is not required to provide notice to the Instructing Officer prior to the inspection activity.

19.4 Inspection and testing by the AMSA

In addition to the inspection and testing carried out by the Service Provider, the AMSA Instructing Officer or their independent Coating Inspector may at their sole discretion carry out additional testing and inspection as they deem necessary to ensure conformance with the specification.

The Service Provider must provide full access to all target surfaces to allow the inspections to be carried out.

20 Coating Specifications

20.1 Ferrous surfaces

Surface Preparation	Primer	Intermediate Coat	Finish Coat
Refer Section 11.3	Surface tolerant two-pack epoxy	Two–pack epoxy	Two-pack gloss/matt polyurethane
Dry film thickness	Average of 175 µm, no less than 140 µm	Average of 175 µm, no less than 140 µm	Average of 100 µm, no less than 80 µm
Approved Products			
International	Interseal 670HS Interplus 356	Interseal 670HS	Interthane 990
	Interplus 1180 Interplus 356	Interplus 1180	Interthane 990 Interthane 4379 for red surfaces Interthane 987 for matt surfaces
Dulux	Durebuild STE	Durebuild STE	Weathermax HBR Red surfaces must use 770H0067 factory milled paint Luxathane MPX for matt surfaces
Wattyl	Epinamel DTM985	Epinamel DTM985	Poly U 750 Poly U 775 with matting agent added at shop/factory for matt surfaces
Jotun	Jotamastic 90	Jotamastic 90	Hardtop AX Hardtop XPL for matt surfaces
PPG	Amerlock 400/2k	Sigmacover 410/410 MIO	Sigmadur 550 PPT Performance Polyurethane for Matt Surfaces

20.1.1 Primer

The prime coat for all ferrous surfaces must be a two-pack surface tolerant epoxy primer complying with the requirements of AS/NZS 3750.1.

The epoxy primer must be brush, roller or spray applied in one (1) or more coats to an average dry film thickness of 175 µm, and must nowhere be less than 140 µm.

Note if Interplus 356 is utilised as the primer the average dry film thickness for the primer must be reduced to 125 µm with the intermediate coat increased to an average dry film thickness of 225 µm.

20.1.2 Intermediate coat

The intermediate coat must be a two-pack epoxy paint complying with the requirements of AS 3750.14.

The intermediate paint must be brush, roller or spray applied in one (1) coat at an average dry film thickness of at least 175 µm, and must nowhere be less than 140 µm.

The combined dry film thickness for the applied primer and intermediate paint must have an average of at least 350 µm, and must nowhere be less than 280 µm.

20.1.3 Finish coat - gloss

The finish coat must be a two-pack gloss polyurethane paint complying with the requirements of AS 3750.6, applied in one (1) or more coats at a combined average dry film thickness of at least 100 µm, and must nowhere be less than 80 µm.

Together with the primer and intermediate, the total dry film thickness for the applied paint system must have an average of at least 450 µm, and must nowhere be less than 360 µm.

Note additional finish coats must be applied as required to ensure full colour opacity or where non slip surfaces are required.

Refer to section 16.4 for non-slip surfaces.

20.1.4 Finish coat – matt

The finish coat for matt surfaces must be a two-pack matt polyurethane paint, applied in one (1) or more coats at a combined average dry film thickness of at least 100 µm, and must nowhere be less than 80 µm.

Together with the primer and intermediate, the total dry film thickness for the applied paint system must have an average of at least 450 µm, and must nowhere be less than 360 µm.

20.2 External cast iron lattice surfaces

Surface Preparation	Primer	Intermediate Coat	Finish Coat
Refer Section 11.3	Surface tolerant two-pack epoxy	Two–pack epoxy	Two-pack gloss polyurethane
Dry film thickness	Average of 125 µm, no less than 100 µm	Average of 375 µm, no less than 300 µm	Average of 100 µm, no less than 80 µm
Approved Products			
International	Interseal 670HS Interplus 356	Interseal 670HS	Interthane 990
	Interplus 1180 Interplus 356	Interplus 1180	Interthane 990 Interthane 4379 for red surfaces
	Interzone 954 Interplus 356	Interzone 954	
Dulux	Durebuild STE	Durebuild STE Duremax HBE	Weathermax HBR Red surfaces must use 770H0067 factory milled paint
Wattyl	Epinamel DTM985	Epinamel DTM985	Poly U 750
Jotun	Jotamastic 90	Jotamastic 90	Hardtop AX
PPG	Sigmacover 350 Sigmashield 880	Sigmashield 880	Sigmadur 550

20.2.1 Primer

The prime coat for all prepared external cast iron lattice surfaces must be a two-pack surface tolerant epoxy primer complying with the requirements of AS/NZS 3750.1 or 14.

The epoxy primer must be brush applied in one (1) or more coats at a combined average dry film thickness of at least 125 µm, and must nowhere be less than 100 µm.

For Interzone 954 surfaces must be water washed between coats if greater than 24 hours or if subjected to high winds.

20.2.2 Intermediate coat

The intermediate coat must be a two-pack epoxy paint complying with the requirements of AS 3750.14.

The intermediate paint must be brush applied in three or more coats to achieve a combined average dry film thickness of at least 375 µm, and must nowhere be less than 300 µm.

The combined dry film thickness for the applied primer and intermediate paint must have an average of at least 500 µm, and must nowhere be less than 400 µm.

For Interzone 954 surfaces must be water washed between coats if greater than 24 hours or if subjected to high winds.

20.2.3 Finish coat

The finish coat must be a two-pack gloss polyurethane paint complying with the requirements of AS 3750.6, applied in one (1) or more coats at a combined average dry film thickness of at least 100 µm, and must nowhere be less than 80 µm.

Together with the primer and intermediate, the total dry film thickness for the applied paint system must have an average of at least 600 µm, and must nowhere be less than 480 µm.

Note additional finish coats must be applied as required to ensure full colour opacity.

20.3 Aluminium, galvanised steel and stainless steel surfaces

Surface Preparation	Primer	Finish Coat
Refer Section 11.4	Surface tolerant Two-pack epoxy	Two-pack gloss/matt polyurethane
Dry film thickness	Average of 125 µm, No less than 100 µm	Average of 100 µm, no less than 80 µm
Approved Products		
International	Interplus 356	Interthane 990 Interthane 987 for matt surfaces Interthane 4379 for red surfaces
Dulux	Durebuild STE	Weathermax HBR Red surfaces must use 770H0067 factory milled paint For matt surfaces Luxathane MPX
Wattyl	Epinamel PR250	Poly U 750 Poly U 775 with matting agent added at shop/factory for matt surfaces
Jotun	Jotamastic 90	Hardtop AX Hardtop XPL for matt surfaces
PPG	Sigmacover 350	Sigmadur 550
	Sigmacover 280	PPT – Performance Polyurethane for matt surfaces

Note: This specification is for use on galvanised substrates that are new or in good condition with minimal to no depletion of the galvanising that are required to be painted for decorative or navigational purposes. For aged galvanised substrates with depletion of the galvanising and where corrosion is evident the ferrous coating specification (20.1) must be utilised and best efforts must be made to remove the remaining galvanising during the surface preparation process.

20.3.1 Primer

The prime coat for all prepared aluminium, galvanised steel and stainless steel surfaces must be a two-pack surface tolerant epoxy primer complying with the requirements of AS/NZS 3750.1.

The epoxy primer must be brush, roller or spray applied in one (1) or more coats to an average dry film thickness of 125 µm and must nowhere be less than 100 µm.

20.3.2 Finish coat - gloss

The finish coat for gloss surfaces must be a two-pack gloss polyurethane paint complying with the requirements of AS 3750.6, applied in one (1) or more coats at a combined average dry film thickness of at least 100 µm, and must nowhere be less than 80 µm.

Together with the primer, the total dry film thickness for the applied paint system must have an average of at least 225 µm, and must nowhere be less than 180 µm.

Note additional finish coats must be applied as required to ensure full colour opacity or where non slip surfaces are required.

Refer to section 16.4 for non-slip surfaces.

20.3.3 Finish coat - matt

The finish coat for matt surfaces must be a two-pack matt polyurethane paint, applied in one (1) or more coats at a combined average dry film thickness of at least 100 µm, and must nowhere be less than 80 µm.

Together with the primer and intermediate, the total dry film thickness for the applied paint system must have an average of at least 225 µm, and must nowhere be less than 180 µm.

20.4 Copper, brass and bronze surfaces

Surface Preparation	Primer	Intermediate	Finish Coat
Refer Section 11.5	Surface tolerant two-pack epoxy	Two–pack epoxy	Two-pack gloss/matt polyurethane
Dry film thickness	Average of 100 µm, no less than 75µm	Average of 100 µm, no less than 75 µm	Average of 100 µm, no less than 80 µm
Approved Products			
International	Interplus 356	Interplus 356 Interplus 1180	Interthane 990 Interthane 987 for matt surfaces Interthane 4379 for red surfaces
	Interplus 356	Interseal 670HS	Interthane 990
Dulux	Durebuild STE	Durebuild STE	Weathermax HBR Red surfaces must use 770H0067 factory milled paint For matt surfaces Luxathane MPX
Wattyl	Epinamel PR250	Epinamel PR250	Poly U 750 Poly U 775 with matting agent for matt surfaces
Jotun	Penguard HB	Jotamastic 90	Hardtop AX Hardtop XPL for matt surfaces
PPG	Sigmacover 280	Sigmacover 410/410 MIO	Sigmadur 550
		Sigmacover 280	PPT – Performance Polyurethane for matt surfaces

20.4.1 Primer

The prime coat for all prepared copper, brass and bronze surfaces must be a two-pack surface tolerant epoxy primer complying with the requirements of AS/NZS 3750.1.

The epoxy primer must be brush, roller or spray applied in one (1) or more coats to an average dry film thickness of 100 µm and must nowhere be less than 75 µm.

20.4.2 Intermediate coat

The intermediate coat must be a two-pack epoxy paint complying with the requirements of AS 3750.14.

The intermediate paint must be brush, roller or spray applied in one (1) coat at an average dry film thickness of at least 100 µm, and must nowhere be less than 75 µm.

The combined dry film thickness for the applied primer and intermediate paint must have an average of at least 200 µm, and must nowhere be less than 150 µm.

20.4.3 Finish coat – gloss

The finish coat for gloss surfaces must be a two-pack gloss polyurethane paint complying with the requirements of AS 3750.6, applied in one (1) or more coats at a combined average dry film thickness of at least 100 µm, and must nowhere be less than 80 µm.

Together with the primer, the total dry film thickness for the applied paint system must have an average of at least 300 µm, and must nowhere be less than 230 µm.

Note additional finish coats must be applied as required to ensure full colour opacity.

20.4.4 Finish coat – matt

The finish coat for matt surfaces must be a two-pack matt polyurethane paint, applied in one (1) or more coats at a combined average dry film thickness of at least 100 µm, and must nowhere be less than 80 µm.

Together with the primer and intermediate, the total dry film thickness for the applied paint system must have an average of at least 300 µm, and must nowhere be less than 230 µm.

20.5 Concrete, masonry and stone surfaces – trafficable

Surface Preparation	Primer	Finish Coat
Refer Sections 11.6 and 16.3	Surface tolerant two-pack epoxy	Two-pack gloss polyurethane
Dry film thickness	Average of 125 µm, no less than 100 µm	Average of 100 µm, no less than 80 µm
Approved Products		
International	Interseal 670HS Interplus 1180	Interthane 990
Dulux	Durebuild STE	Weathermax HBR
Wattyl	Epinamel PR250	Poly U 750
Jotun	Jotamastic 90	Hardtop AX
PPG	Sigmacover 350 Amerlock 400/2K	Sigmadur 550

Note: this specification is for application to cement sheet lantern room blanking panels and walking surfaces such as internal floors and stairs only. This system may also be used for small areas of a structure that is comprised predominantly of metallic substrates where the acrylic systems specified in section 20.7 would otherwise not be utilised.

20.5.1 Primer

The prime coat for all prepared concrete, masonry and stone surfaces (trafficable) must be a two-pack surface tolerant epoxy primer complying with the requirements of AS/NZS 3750.1.

The epoxy primer must be brush, roller or spray applied in one (1) or more coats to an average dry film thickness of 125 µm, and must nowhere be less than 100 µm.

The prime coat may be thinned up to 15% for better penetration into substrate surfaces.

Substrates with loose, powdered, crumbly surfaces must be treated with a penetrating epoxy primer prior to application of the specified primer.

20.5.2 Finish Coat

The finish coat must be a two-pack gloss polyurethane paint complying with the requirements of AS 3750.6, applied in one (1) or more coats at a combined average dry film thickness of at least 100 µm, and must nowhere be less than 80 µm.

Together with the primer, the total dry film thickness for the applied paint system must have an average of at least 225 µm, and must nowhere be less than 180 µm.

Note additional finish coats must be applied as required to ensure full colour opacity or where non slip surfaces are required.

Refer to section 16.4 for non-slip surfaces.

20.6 Concrete, masonry and stone surfaces – trafficable polyurethane membrane

Surface Preparation	Primer	Intermediate	Finish Coat
Refer Sections 11.6 and 16.3	Penetrating or epoxy primer	Polyurethane membrane	UV and wear resistant finish coat
Dry film thickness	In accordance with manufacturers specifications for penetrating primer Epoxy primer – 2 coats at 300 µm each	Average of 2500 µm	Average of 450 µm,
Approved Products			
Parchem	Nitoprime 120	Nitoproof 810	Nitoproof top coat UV
Mapei	Plniseal MR	Aquaflex WPU	Not applicable

Note: this specification is for application to walking surfaces such as lantern room balconies.

20.6.1 Primer

The prime coat for all prepared concrete, masonry and stone surfaces (trafficable polyurethane membrane) must be a two-pack water based epoxy or single pack penetrating primer.

The first coat of the epoxy primer coat may be thinned up to 5% for better penetration into substrate surfaces.

20.6.2 Intermediate

The intermediate coat must be a single pack polyurethane membrane, applied in two or more coats to achieve a dry film thickness of at least 2500 µm.

20.6.3 Finish Coat

Where specified the finish coat must be a single pack UV and wear resistant finish coat compatible with the intermediate coat. The finish coat must be applied in one or more coats to achieve an average dry film thickness of 450 µm.

20.6.4 Sealant and reinforcement

Parchem

- Prior to priming any structural or expansion joints must be filled with Nitoseal MS400.
- Emerclad Fabric Reinforcing Tape must be used for all substrate junctions, joints, cracks and any other locations of potential movement.

Mapei

- Prior to application of the primer any structural or expansion joints must be primed with Primer M and filled with Mapeflex PU 45 FT.

- Subsequent to priming and prior to the application of the intermediate coat a fillet of Mapeflex PU 45 FT must be applied to any wall floor junctions.
- Mapetex SEL reinforcing tape must be used for all substrate junctions, joints, cracks and any other locations of potential movement.

20.6.5 Interface with Acrylic membrane

Where applicable the contractor must select a suitable location for the interface between the trafficable polyurethane membrane and the acrylic membrane (specification 20.7). A suitable overlap between the two membranes must be provided to ensure full waterproofing coverage of the substrates.

20.7 Concrete, masonry and stone surfaces – non-trafficable

Surface Preparation	Primer	Intermediate coat	Finish Coat
Refer Sections 11.6 and 16.3	Penetrating masonry and concrete primer	Acrylic membrane	Acrylic membrane
Dry film thickness	In accordance with manufacturers specifications	Average of 330 µm, no less than 260 µm	Average of 100 µm, no less than 75 µm
Approved Products			
Dulux	Acratex Solvent Based 501/2 white Acratex Roof Sealer SB Clear	Acratex 968 Acraskin low gloss	Acrashield Advance low gloss
Wattyl	Grano Prime S	Granoskin	Grano Impact
PPG - Taubman	Armawall sealer bonder	Armawall Armashield	Armawall Armashield

Note: This coating system must be applied in a manner that results in a smooth surface finish with minimal texture.

20.7.1 Primer

The prime coat for all prepared concrete, masonry and stone surfaces (non-trafficable) must be a single pack acrylic penetrating masonry and concrete primer complying with the requirements of AS 3730.22.

The primer must be brush or roller applied in one or more coats in accordance with the manufacturer's specifications.

20.7.2 Intermediate coat

The intermediate coat must be a single pack acrylic membrane paint complying with the requirements of AS/NZS 4548.1 or 2.

The intermediate paint must be applied in two or more coats to a combined average dry film thickness of at least 330 µm, and must nowhere be less than 260 µm.

The first coat of the Intermediate coat must be applied by brush or roller to ensure it is worked into imperfections in the masonry substrate. Subsequent coats must be brush, roller or spray applied.

20.7.3 Finish coat

The finish coat must be a satin/semi-gloss or gloss single pack acrylic paint complying with the requirements of AS/NZS 4548.1 or 2.

The finish coat must be brush, roller or spray applied in one or more coats to achieve an average dry film thickness of at least 100 µm, and must nowhere be less than 75 µm.

Together with the intermediate, the total dry film thickness for the applied paint system must have an average of at least 430 µm, and must nowhere be less than 335 µm.

20.8 Concrete, masonry and stone surfaces – decorative

Surface Preparation	Primer	Finish Coat
Refer Sections 11.6 and 16.3	Exterior acrylic primer suitable for the substrate	Exterior Acrylic
Dry film thickness	Average of 40 µm	Average of 75 µm, no less than 60 µm
Approved Products		
Dulux	Acratex Green Render Sealer	Acrashield Advance (gloss level to be confirmed on a case by case basis)
Wattyl	Grano Prime S	Grano Impact
PPG-Taubmans	Armawall sealer bonder	Armawall Armashield

Note: this specification is for decorative finishes to internal and external surfaces where a trafficable or membrane coating is not required such as for cement sheet wall linings and brickwork. This system must only be utilised when specifically directed to do so by AMSA.

20.8.1 Primer

The prime coat for all prepared concrete, masonry and stone surfaces (decorative) must be an acrylic primer paint suitable for the substrate.

The acrylic primer must be brush, roller or spray applied in one (1) or more coats to an average dry film thickness of 40 µm.

20.8.2 Finish Coat

The finish coat must be a water based exterior acrylic paint complying with the requirements of AS4845.1, applied in two coats at a combined average dry film thickness of 75 µm, and must nowhere be less than 60 µm.

20.9 Internal timber Surfaces – clear

Surface Preparation	Primer	filler	Finish Coat
Refer Section 11.7	Oil or Water based clear	Single pack wood putty	Oil or Water based clear
Approved Products			
Dulux/Cabots	Cabothane Clear	Wood tone putty	Cabothane Clear
	CFP Floor (floor surfaces only)	Wood tone putty	CFP Floor(floor surfaces only)
	Cabots exterior clear (surfaces with high sun exposures such as in lantern room)	As recommended by manufacturer	Cabots exterior clear (surfaces with high sun exposures such as in lantern room)
Wattyl	Wattyl Estapol Interior WB Xtra Clear	Wattyl Colourwood timber putty	Wattyl Estapol Interior WB Xtra Clear
	Wattyl Estapol Flooring Water Based Speed Clear	Wattyl Colourwood timber putty	Wattyl Estapol Flooring Water Based Speed Clear
	Weathergard Exterior Varnish (surfaces with high sun exposures such as in lantern room)	As recommended by manufacturer	Weathergard Exterior Varnish (surfaces with high sun exposures such as in lantern room)
PPG-Taubmans	Johnstone's Professional interior exterior clear	As recommended by manufacturer	Johnstone's Professional interior exterior clear
	Johnstone's Professional interior timber floor	As recommended by manufacturer	Johnstone's Professional interior timber floor

20.9.1 Primer

The prime coat for all prepared internal timber surfaces (clear) must be a single pack water or oil based clear.

The primer must be applied in accordance with the recommendations of the manufacturer and in one coats by brush, pad applicator or roller in the direction of the grain.

20.9.2 Filler

Fill any deep gouges, cracks or blemishes with a timber filler in accordance with the manufacturer's specification after application of the prime coat. Match substrate colour to the nearest manufacturer colour. Remove any rough surface finish and feather back to prime coat by light sanding prior to application of the finish coats.

20.9.3 Finish coats

The finish coat must be a single pack water or oil based clear.

The finish coat must be applied in accordance with the recommendations of the manufacturer in two (2) coats by brush, pad applicator or roller in the direction of the grain.

20.10 Internal timber surfaces – structural

Surface Preparation	Primer	Finish Coat
Refer Section 11.7	Surface tolerant two-pack epoxy	Two-pack gloss polyurethane
Dry film thickness	Average of 125 µm, no less than 100 µm	Average of 50 µm, no less than 40 µm
Approved Products		
International	Interseal 670HS Interplus 1180 Interplus 356	Interthane 990
Dulux	Durebuild STE	Weathermax HBR
Wattyl	Epinamel PR250	Poly U 750
Jotun	Jotamastic 90	Hardtop AX
PPG	Sigmacover 350 Amerlock 400/2K	Sigmadur 550

Note: this specification is for application to structural timberwork only.

20.10.1 Primer

The prime coat for all internal timber surfaces must be a surface tolerant two-pack epoxy paint complying with the requirements of AS/NZS 3750.1.

The epoxy primer must be brush, roller or spray applied in one (1) or more coats to an average dry film thickness of 125 µm, and must nowhere be less than 100 µm.

20.10.2 Finish coat

The finish coat must be a two-pack gloss polyurethane paint complying with the requirements of AS 3750.6, applied in one (1) or more coats at a combined average dry film thickness of at least 50 µm, and must nowhere be less than 40 µm.

Together with the primer, the total dry film thickness for the applied paint system must have an average of at least 175 µm, and must nowhere be less than 140 µm.

Note additional finish coats must be applied as required to ensure full colour opacity or where non slip surfaces are required.

Refer to section 16.4 for non-slip surfaces.

20.11 Internal timber surfaces – decorative

Surface Preparation	Primer	filler	Finish Coat
Refer Section 11.7	Oil or Water based primer	Single pack wood putty	Oil or water based gloss enamel
Approved Products			
Dulux	1step oil primer sealer undercoat	As recommended by manufacturer	Super enamel
	1step prep water based primer sealer undercoat	As recommended by manufacturer	Aquanamel
Wattyl	Aqua Prep Acrylic timber primer Aqua Prep Primer Sealer Undercoat	As recommended by manufacturer	Aqua Trim Water Based Enamel
	Mater Prep Timber primer pink	As recommended by manufacturer	Mater Enamel Oil Based Enamel
PPG-Taubmans	Taubmans 3 in 1 Prep	As recommended by manufacturer	Taubmans ultimate enamel
	Taubmans Tradex Tradecote	As recommended by manufacturer	Taubmans oil based enamel

Note: this specification is for application to internal timber such as doors, cabinetry, lining panels etc

20.11.1 Primer

The prime coat for prepared internal timber surfaces must be a single pack water or oil based enamel primer recommended by the manufacturer as suitable for the age and species of the timber.

The primer must be applied in accordance with the recommendations of the manufacturer and in one coat by brush or roller in the direction of the grain.

20.11.2 Filler

Fill any deep gouges, cracks etc with a filler recommended by the manufacturer and in accordance with the manufacturer's specification after application of the prime coat. Remove any rough surface finish and feather back to prime coat by light sanding prior to application of the finish coats. Note for heritage structures it is not intended to attempt to change the original condition of the timber to present it in "as new" condition, filler should be applied to fill fastener holes and any minor damage that will reduce the durability of the coatings. Any significant damage, rot etc must be repaired in accordance with the applicable specification prior to coating application.

20.11.3 Finish coats

The finish coat must be a single pack water or oil based gloss enamel compatible with the primer and filler.

The finish coat must be applied in accordance with the recommendations of the manufacturer in two (2) coats by brush or roller in the direction of the grain.

20.12 External timber surfaces

Surface Preparation	Primer	Finish Coat
Refer Section 11.7	Exterior acrylic primer suitable for timber	Exterior acrylic
Dry film thickness	Average of 25 µm	Average of 50 µm
Approved Products		
International	Intersheen 579	Intersheen 579
Dulux	Weathershield gloss	Weathershield gloss
Wattyl	Solargard gloss	Solargard gloss
PPG- Taubmans	Taubmans all weather exterior gloss	Taubmans all weather exterior gloss

Note: this specification is for application to external timber surfaces that are subject to weathering and movement of construction joints. This specification must be applied to both the internal and external surfaces of items such as timber window frames, door jambs and doors.

20.12.1 Primer

The prime coat for all prepared external timber surfaces must be an exterior acrylic primer paint suitable for timber complying with the requirements of AS/NZS 3730.17.

The acrylic primer must be brush, roller or spray applied in one (1) or more coats to an average dry film thickness of 25 µm.

20.12.2 Finish coat

The finish coat must be a water based exterior acrylic paint complying with the requirements of AS 3730.10, applied in two coats at a combined average dry film thickness of at least 50 µm.

20.13 Fibreglass

Surface Preparation	Primer	Finish Coat
Refer Section 11.8	Surface tolerant two-pack epoxy primer	Two-pack gloss polyurethane
Dry film thickness	Average of 100 µm, no less than 80 µm	Average of 100 µm, no less than 80 µm
Approved Products		
International	Interplus 1180 Interplus 356	Interthane 990 Interthane 4379 for red surfaces
	Interseal 670HS	Interthane 990
Dulux	Durebuild STE	Weathermax HBR Red surfaces must use 770H0067 factory milled paint
Wattyl	Epinamel PR250	Poly U 750
Jotun	Jotamastic 90	Hardtop AX
PPG	Sigmadur 280 Amerlock 400/2k	Sigmadur 550

20.13.1 Primer

The prime coat for all prepared fibreglass surfaces must be a two-pack surface tolerant epoxy primer complying with the requirements of AS/NZS 3750.1.

The epoxy primer must be brush, roller or spray applied in one (1) or more coats to an average dry film thickness of 100 µm.

20.13.2 Finish coat

The finish coat for gloss surfaces must be a two-pack gloss polyurethane paint complying with the requirements of AS 3750.6, applied in one (1) or more coats at a combined average dry film thickness of at least 100 µm, and must nowhere be less than 80 µm.

Together with the primer the total dry film thickness for the applied paint system must have an average of at least 200 µm, and must nowhere be less than 160 µm.

Note additional finish coats must be applied as required to ensure full colour opacity.

20.14 Plastics – acrylic and perspex

Surface Preparation	Primer	Finish Coat
Refer Section 11.9	Surface tolerant two-pack epoxy primer	Two-pack gloss/matt polyurethane
Dry film thickness	Average of 75 µm, no less than 50 µm	Average of 100 µm, no less than 80 µm
Approved Products		
International	Interplus 356	Interthane 990 Interthane 4379 for red surfaces Interthane 987 for matt surfaces
Dulux	Durebuild STE	Weathermax HBR Red surfaces must use 770H0067 factory milled paint For matt surfaces Luxathane MPX
Wattyl	Epinamel PR250	Poly U 750
PPG	Sigmadur 280 Amerlock 400/2k	Sigmadur 550

20.14.1 Primer

The prime coat for all prepared plastic surfaces must be a two-pack surface tolerant epoxy primer complying with the requirements of AS/NZS 3750.1.

The epoxy primer must be brush, roller or spray applied in one (1) or more coats to an average dry film thickness of 75 µm and must nowhere be less than 50 µm.

20.14.2 Finish coat - gloss

The finish coat for gloss surfaces must be a two-pack gloss polyurethane paint complying with the requirements of AS 3750.6, applied in one (1) or more coats at a combined average dry film thickness of at least 100 µm, and must nowhere be less than 80 µm.

Together with the primer the total dry film thickness for the applied paint system must have an average of at least 175 µm, and must nowhere be less than 130 µm.

Note additional finish coats must be applied as required to ensure full colour opacity.

20.14.3 Finish coat - matt

The finish coat for matt surfaces must be a two-pack matt polyurethane paint, applied in one (1) or more coats at a combined average dry film thickness of at least 100 µm, and must nowhere be less than 80 µm.

Together with the primer the total dry film thickness for the applied paint system must have an average of at least 175 µm, and must nowhere be less than 130 µm.

20.15 Glass

Surface Preparation	Primer	Finish Coat
Refer Section 11.10	Surface tolerant two-pack epoxy primer	Two-pack gloss/matt polyurethane
Dry film thickness	Average of 75 µm, no less than 50 µm	Average of 100 µm, no less than 80 µm
Approved Products		
International	Interplus 356	Interthane 990 Interthane 4379 for red surfaces Interthane 987 for matt surfaces
Dulux	Durebuild STE	Weathermax HBR Red surfaces must use 770H0067 factory milled paint For matt surfaces Luxathane MPX
Wattyl	Epinamel PR250	Poly U 750
PPG	Sigmadur 280 Amerlock 400/2k	Sigmadur 550
	Amerlock 400/2K	PPT – Performance Polyurethane for matt surfaces

20.15.1 Primer

The prime coat for all prepared glass surfaces must be a two-pack surface tolerant epoxy primer complying with the requirements of AS/NZS 3750.1.

The epoxy primer must be brush, roller or spray applied in one (1) or more coats to an average dry film thickness of 75 µm and must nowhere be less than 50 µm.

20.15.2 Finish coat - gloss

The finish coat for gloss surfaces must be a two-pack gloss polyurethane paint complying with the requirements of AS 3750.6, applied in one (1) or more coats at a combined average dry film thickness of at least 100 µm, and must nowhere be less than 80 µm.

Together with the primer the total dry film thickness for the applied paint system must have an average of at least 175 µm, and must nowhere be less than 130 µm.

Note additional finish coats must be applied as required to ensure full colour opacity.

20.15.3 Finish coat - matt

The finish coat for matt surfaces must be a two-pack matt polyurethane paint, applied in one (1) or more coats at a combined average dry film thickness of at least 100 µm, and must nowhere be less than 80 µm.

Together with the primer the total dry film thickness for the applied paint system must have an average of at least 175 µm, and must nowhere be less than 130 µm.

20.16 Pile Structures – In-field repainting

Surface Preparation	Primer	Finish Coat
Refer Section 11.3	Surface tolerant two-pack epoxy suitable for immersion during curing	Two-pack gloss polyurethane
Dry film thickness	Tidal/immersion zone -Average of 500 µm, no less than 450 µm applied in one coat	Average of 75 µm, no less than 60 µm
	Above tidal/immersion zone – Average of 600 µm, no less than 550 µm applied in two coats	
Approved Products		
International	Interzone 954	Interthane 990
Jotun	Marathon 550	Hardtop AX

Note: this specification is for in-field repainting of pile structures where the entire coating system is being replaced. This coating system is not for painting of new piles prior to installation.Finish coat is only to be applied where the pile is required to be a specified colour for navigational purposes.

20.16.1 Primer

The prime coat for all pile surfaces must be a two-pack surface tolerant epoxy primer complying with the requirements of AS/NZS 3750.1 and suitable for immersion during curing.

Within the tidal/immersion zone the epoxy primer must be spray applied in one (1) coat to an average dry film thickness of 500 µm, and must nowhere be less than 450 µm.

Note: The WFT must be confirmed in the tidal zone prior to immersion of the coated surface and additional application undertaken as required to achieve the specified DFT. Where the specified DFT has not been achieved in the tidal zone the coatings must be removed and reapplied in accordance with the specification. Additional coats must not be applied in the tidal zone due to potential for salt contamination and blistering of the coatings.

Above the tidal/immersion zone the epoxy primer must be spray applied in two (2) coats to an average dry film thickness of 600 µm, and must nowhere be less than 550 µm

20.16.2 Finish coat - gloss

The finish coat must be a two-pack gloss polyurethane paint complying with the requirements of AS 3750.6, applied in one (1) or more coats at a combined average dry film thickness of at least 75 µm, and must nowhere be less than 60 µm.

Together with the primer, the total dry film thickness for the applied paint system must have an average of at least 675 µm, and must nowhere be less than 610 µm.

Note additional finish coats must be applied as required to ensure full colour opacity.

Appendix A – Hazardous Paint Management

A1 Hazardous paint compliance plan

The Service Provider must prepare a hazardous paint compliance plan (HPCP) in accordance with the requirements of AS/NZS 4361.1 prior to any works commencing on site. The plan must be reviewed an updated to account for any changes to work process or site conditions.

The HPCP must be submitted to AMSA a minimum of 4 weeks prior to site works commencing.

A2 Emissions

Where hazardous paints are present all surface preparation must be carried out in a containment system that will allow the collection of all wastes and debris generated.

The containment system must be designed to comply with the requirements of AS/NZS 4361.1 table E1.

The containment system must completely enclose the structure or component of the structure where works are being undertaken allowing adequate access for surface preparation activities without obscuring surfaces and must be able to be cleaned of spent abrasive and debris on a regular basis. Spent abrasive blast material must be removed on a daily basis. An impervious floor must be provided to aid cleaning and prevent contamination of the surrounding ground.

Dust extraction must be provided with adequate capacity to create a negative pressure environment within the encapsulation.

A3 Emissions monitoring

The Service Provider must undertake emissions monitoring in accordance with the requirements of AS/NZS 4361.1. The Service Provider must undertake a risk assessment as outlined in AS/NZS 4361.1 and undertake all emissions monitoring requirements identified as being required by the risk assessment.

If emission levels are exceeded, the encapsulation and/or work processes must be modified to prevent further emissions

A4 Ground survey

The Service Provider must engage an Independent Organisation to undertake a background survey for lead in soil surrounding the lighthouse. The survey must use the procedures as per Appendix G of AS/NZS 4361.1.

The number and location of soil samples for the ground survey must be in accordance with AS/NZS 4361.1 Appendix G. On completion of the work a further set of soil samples must be taken at the same locations. Sample locations must be marked with a steel peg with high visibility markings to ensure repeatability of test locations. Photos must also be taken of the sample bag on the ground with other identifying features in the photo to assist identifying the location should pegs be dislodged.

All soil samples must be analysed for lead content in accordance with the US EPA SW-846 Method 3050B or approved equivalent at a NATA registered laboratory to a practical quantitation level of 5ppm or better.

The results of the soil survey before and after the works must be interpreted by a suitably experienced professional (such as a consultant appropriately experienced in hazardous paint management or soil contamination from the Independent Organisation) according to the guidelines set out in AS/NZS 4361.1 and the following criteria:

1. A visual assessment shows that debris (paint chips, spent abrasive, other wastes from paint removal operations) is visible on the ground throughout and around the

site. Where this is evident additional soil samples must be collected to determine the extent of contamination and to allow the remediation to be monitored and assessed.
2. The average soil lead concentration increases by more than 100ppm above the pre-commencement average.
3. An individual post-completion soil lead concentration increases by more than 200ppm above the pre-commencement average.
4. An individual post-completion soil lead concentration increases to a level that exceeds the National Environment Protection Measure (NEPM) health investigation level for lead in soil.

Where any of the above criteria have been met the site will be deemed to have been contaminated by the works and the Service Provider shall be liable for any site remediation required.

For the purpose of criteria 4 the NEPM land-use category will be specified in the Tender, Work Order or Contract documentation.

A report documenting the findings of the ground survey must be provided that includes:

- Soil sampling procedure
- Site observations
- Documented evidence of any pre-commencement contamination of the site
- A photograph of each soil sample test site
- A map or sketch identifying the locations of the sample sites in relation to the lighthouse
- Tabulated results of the analysis
- Interpretation of the results in accordance with the criteria
- Where contamination has occurred:
    - Details of the location and extent of contamination
    - Recommended remediation process

All soil sampling/collection and reporting for the ground survey must be undertaken by the Independent Organisation.

A5 Worker health and safety

All work involving the disturbance of hazardous paint must be carried out in accordance with Australian Standards, the Commonwealth and State laws and Codes of Practice.

A6 Risk assessment

The Service Provider must undertake a risk assessment that identifies all activities that are known or presumed to be a lead process and ascertain whether or not the proposed work is a lead-risk job as defined in specified regulatory requirements.

A7 Health surveillance

The Service Provider must ensure health surveillance regulatory requirements are met including health risk assessment, medical examinations and exposure monitoring.

Health surveillance and notification must be undertaken where inorganic lead is present which may result in possible health effects from exposure or exposure is likely to be in excess of the national exposure standard for lead.

The Service Provider must provide AMSA with written confirmation that all health surveillance for relevant workers has been undertaken and completed.

A8 Training

All Workers must have undergone appropriate lead awareness and site hygiene training for lead paint management, as set out in Appendix I of AS/NZS 4361.1.

A9 Regulated area

The Service Provider must establish a regulated area within the worksite for all lead processes, in accordance with AS/NZS 4361.1. The boundaries of the regulated area shall be verified by air sampling and must be identified by appropriate signs and barriers in accordance with AS1319.

A time-weighted average in accordance with Commonwealth or State legislation regulations must be adopted as the exposure level at the boundary of the regulated area in accordance with AS/NZS 4361.1.

A10 Site hygiene facilities

The Service Provider must install and maintain site hygiene facilities including provision of changing and washing facilities. This must include but not be limited to a hand wash station at the exit from the regulated area and a decontamination unit with walk-through showers and clean room.

The Service Provider must ensure laundering, disposal and removal of personal protective equipment is in accordance with specified regulatory requirements.

The Service Provider must provide workers with an eating and drinking area, which is isolated as far as is practicable, from a regulated or containment are so it cannot be contaminated from a lead process.

A11 Responsible Person

The Service Provider must appoint a Responsible Person for the project as defined in AS 4361.1. The Responsible Person must be on-site at all times whilst lead processes are being carried out to implement and maintain the Hazardous Paint Compliance Plan.

The Responsible Person must have appropriate training and experience in all aspects of recognising and managing hazards associated with the removal of lead paint and must have the authority to act on any matters relating to emissions of lead or other breaches of this specification.

A12 Residual Surface Contamination

The Service Provider must thoroughly clean the lighthouse or structure on completion of the site works to remove the dust created as part of the works. The Service Provider must ensure that all lead dust and spent abrasive is removed from all surfaces and crevices.

On completion of cleaning, the Service Provider must engage an Independent Organisation (with appropriate experience in lead paint management) to undertake surface dust sampling on a representative selection of hard non-absorbent surfaces including:

- Nominally three samples per internal level of the lighthouse/structure including one

sample from each of the following surfaces - floor, wall and windowsill

- One additional sample per hard surface such as desks, tables, seating areas etc internal to the lighthouse/structure.
- External - Nominally one sample per discrete component of the lighthouse or structure such as roofs, balconies, exterior walls etc. For tall structures an additional must be collected on the exterior surface every 10m in height.

Residual lead in surface dust must not exceed the following criteria:

AtoN Category	Acceptance Criterion	Description
Publicly Accessible	0.4 mg/m^2 (as lead)	All interior surfaces.
	8 mg/m^2 (as lead)	Exterior surfaces
Non-Accessible	2 mg/m^2 (as lead)	All interior surfaces
	8 mg/m^2 (as lead)	Exterior surfaces

The Service Provider must undertake any additional cleaning required to meet the lead in surface dust criteria.

All residual surface contamination sampling and reporting must be undertaken by the Independent Organisation. Analysis of the surface dust samples must be undertaken by a NATA accredited organisation.

A13 Compliance Report

On completion of each project involving the removal of hazardous paints the Service Provider must submit a hazardous paint compliance report as outlined in Step 15 of AS/NZS 4361.1.