

Engineering Standard M-SPE-STD-004

Protective Coatings

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1. Purpose

This document is part of a suite of Seqwater Engineering Standards which are in alignment with the Seqwater Quality Management System. Their purpose is to provide a consistent approach to the development, modification, and management of Seqwater infrastructure that is fit for purpose, economic over the life of the asset, and meets Seqwaters Work Health and Safety obligations.

This Standard Specification provides the minimum requirements and recommendations for protective coatings.

This document must be used in conjunction with the documents it references to assist in ensuring fit for purpose infrastructure. This Standard Specification is not intended to be relied on solely for design, supply, and installation works; advice from specialist engineers and/or manufacturers may be required on a case-by-case basis.

Particular note shall be made to the requirements of WSA 201:2020 - Version 2.2 – Manual for Selection and Application of Protective Coatings (WSA 201). Whilst most requirements of WSA 201 are not repeated in this specification, it is noted that full compliance with WSA 201 is required except where mentioned otherwise in this document.

This protective coating standard covers galvanising and taping in addition to typical standard coatings.

This Standard Specification does not cover coatings intended for timber. For jobs intending to coat timber will need to be assessed on a case-by-case basis with reference to AS2311: Guide to the painting of buildings.

2. Scope

This Standard Specification applies to all Seqwater employees, contractors, suppliers and consultants working for or on behalf of Seqwater unless otherwise stated. It applies to all new assets and to all existing assets undergoing refurbishment or modification. It must be used in conjunction with other relevant Seqwater Engineering Standards and project specific documents to define the technical requirements for infrastructure design and construction.

Where single or discrete components of an existing non-compliant system are to be replaced, refurbished or modified, this standard should not automatically be applied to the entire system retrospectively, however consideration should be given, in consultation with relevant stakeholders, to the extent of the application of the standard outside of the components requiring replacement, refurbishment or modification, to ensure safe, economic, and fit for purpose infrastructure.

Seqwater Engineering Standards detail Seqwater's minimum requirements and recommendations to provide infrastructure that will be fit for purpose, and safe to operate and maintain. However, compliance with these requirements and recommendations does not remove, and cannot be relied on as meeting, the designer's overarching responsibility for ensuring infrastructure designed is fit for purpose and safe to construct, operate, maintain, and demolish. The designer must exercise appropriate due diligence to identify and manage hazards so far as is reasonably practicable.

Designers must also ensure compliance with relevant Australian Legislation, Standards, Codes and Guidelines (including those produced by Water Services Association of Australia). Where no Australian Standard exists for a

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particular application, work must conform to the most current version of an industry accepted international standard.

Deviation from meeting the minimum requirements in this Standard Specification requires written agreement from Seqwater as per the deviation process detailed in Procedure X-PRO-STD-008 Asset Standards Management and Application. That process includes completion of an X-TMP-STD-022 Asset Standards Deviation Request Form and submission by the Seqwater Project Representative to the Seqwater Engineering Mailbox. Where noted in this Standard Specification that Seqwater approval, agreement, or acceptance shall/must be sought, such approval, agreement or acceptance must be gained through the Seqwater Asset Standard Deviation process, as outlined above.

Responsibility for ensuring compliance with Seqwater Engineering Standards lies with those engaged in the management and execution of design, construction, and modification of Seqwater infrastructure. This includes modifications to the functional design of the infrastructure including technical changes made which would extend an asset outside of its design operating envelope and/or approved operation and maintenance practices.

Any ambiguities or conflicts identified between specific requirements within this Standard and project documents, another Seqwater Engineering Standard or Australian Legislation, Standards, Codes or Guidelines, these must be brought to the attention of the Seqwater Document Owner, via the Engineering Mailbox, for clarification. Where it is proposed to proceed without meeting the requirements of this standard, agreement must be obtained via the Deviation Process, as outlined above.

Seqwater undertakes regular updates of its Engineering Standards. Before utilising this Engineering Standard the complete list of Seqwater Engineering Standards should be reviewed to ensure currency and applicability of standards to be applied to the works. These can be accessed on the Waternet Engineering and Asset Standards page or using the REX Saved Search "Engineering Stds Controlled Documents by CD Owner".

3. General Requirements

All design and works shall be carried out to accepted standards of good practice by competent personnel and to the satisfaction of Seqwater.

Advice from specialist corrosion engineers, industry experts and/or Coating Manufacturers is required on a case-by-case basis. The Contractor has the responsibility to confirm the suitability of the recommended coating system and methodology prior to commencing works.

It is required that the relevant aspects of WSA 201 will be applied in full to all protective coating works. Seqwater shall be consulted in writing on any decisions required as a part of WSA 201 or any other relevant standard. Where Coating Manufacturer requirements exceed what is stated in WSA 201, they shall be complied with.

Where it is not possible or recommended to use a system detailed in, or compliant with, WSA 201 recommendations, an alternative shall be recommended by the Contractor. The Contractor may recommend use of an alternative system or methodology based on the benefits of the alternative.

Where a proposed protective coating system differs from the options recommended in WSA 201, or a direction within Seqwater documentation, the Contractor shall clearly demonstrate (in writing to Seqwater) that the proposed system will provide, or exceed, the required performance and life. Demonstration shall be to the satisfaction of Seqwater and shall be by provision of documentation proving that the system complies with, or exceeds, the requirements within this Specification, as well as details of where the coating system has been used in a similar

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situation over a length of time equivalent to Seqwater's desired coating life. Any benefits should be quantified to facilitate comparisons, for example, a net present value analysis to demonstrate improved life, reduced maintenance costs etc.

Data sheets, specifications, full application procedure, quality control templates (ITPs) and final coating reports shall be provided to Seqwater. The ITPs shall show the type, sequence, and number of tests to be taken in each area and how the pass or rejection criteria are determined. It shall also identify "hold points" and "witness points" required throughout the works. The contractor shall allow minimum 10 working days for Seqwater to review the relevant documents, prior to the commencement of coating works.

Any work which does not conform to the requirements of the relevant documentation shall be reworked to the satisfaction of the nominated Seqwater Representative and at the Contractor's expense. Such rework may include complete removal of the non-conforming coating, surface preparation and application of a coating system.

The coating manufacturer/brand selected must be a reputable manufacturer which has achieved proven compliance with performance requirements of the selected system type as per WSA 201 Section 8 Coating System Specification or other standard (if WSA 201 does not apply). Proof of compliance shall be provided to the satisfaction of Seqwater. Coating brands shall not be interchanged at any stage. Mixed brand systems will be rejected. All materials used in the coating system shall carry the manufacturer's assurance of compatibility in the coating sequence as specified.

Where coatings are nominated for structures that have cathodic protection (CP), a certificate of suitability from the Coating Manufacturer shall be provided, as documented within WSA 201 Section 5.4.5 Cathodic Protection System Compatibility.

Blast cleaning and painting contractors shall have current, valid PCCP accreditation for the appropriate class and sub-class of work being undertaken. Such accreditation shall be retained throughout the entire duration of the project for which they are engaged on. PCCP accreditation classes can be found in PCCP document PP-D007.

The Contractor shall provide the required guarantees of coating system performance as set out within the contract or scope of works. It is expected that the following shall be undertaken, unless otherwise agreed by Seqwater:

- Provision of coating warranty for a period of a minimum of 5 years, or as specified within the scope of works. Coating warranty is defined in Table 7 Definitions and Abbreviations.

Defects / issues with the application of the coating(s) shall generally be managed within the agreed defects liability period. If available, further warranty on the application of the coating(s) should be considered and provided on a case-by-case basis.

4. Quality Assurance and Quality Control

All quality assurance and control requirements of both WSA 201 Section 2 Quality Assurance and WSA 201 Section 10 Quality Control shall be met at a minimum. Any Coating Manufacturer requirements which exceed or explicitly supersede WSA 201 shall also be complied with. Furthermore, the following shall apply:

- Contractor qualifications: The Contractor shall be qualified in the field of repair and protection of steel and or concrete with a proven successful track record in excess of five (5) years. The Contractor shall maintain qualified personnel who have received product training by a manufacturer's representative.

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- The Contractor shall not commence work until an inspection and test plan (ITP) which includes the test type and the test frequencies as per the testing regime as outlined in section 10 below and this testing regime is endorsed by Seqwater.
- The surface to be coated shall be inspected by the Contractor prior to starting each stage of the coating works (e.g. surface preparation, application etc.). If the Contractor considers that there are any imperfections or other issues, which may render the proposed new coating unsatisfactory, this shall be brought to the attention of the nominated Seqwater representative, in writing, before starting the next stage of the coating works. Subsequent works shall not commence until directed by Seqwater. Note that the 'surface to be coated' could potentially be either bare substrate or an existing coating(s).
- Commencement of the coating work shall indicate acceptance of the surfaces to be coated unless notified, in writing, to the nominated Seqwater Representative.
- The Contractor shall nominate a certified coating inspector to carry out inspection and testing to verify all works performed in accordance with the specification and standards applicable as per WSA 201 Section 2.5 Coating Inspector. Seqwater require that for coatings over concrete in extreme exposure class conditions (WSA 201 Table 5.1), the nominated coating inspector shall hold a SSPC CCI Level 2 - Certification. For all other coatings applied to concrete the inspector will hold SSPC CCI Level 1.
- If requested by Seqwater, sample panels or site testing of any proposed coating system shall be provided as referenced in WSA 201 Section 2.7 Trial Application.

"The location and extent of the trial shall be selected in consultation with Seqwater, to reflect the actual work condition. The trial shall include proposed methods of surface preparation, surface cleaning, surface reinstatement, coating application and acceptance testing. The recording of observations and reporting of the trial shall be agreed with the Seqwater."

- For large critical asset coating works (e.g. water pipelines, sedimentation basins, dam radial gates), the following shall be undertaken in addition to the WSA 201 inspection requirements:
 - Seqwater should engage an independent coating inspector for involvement (certified as per WSA 201 Section 2.5 Coating Inspector). This inspector shall undertake intermittent inspections and audits as outlined below. Note that this inspector does not replace the Contractor's primary coating inspector, who undertakes all ITPs and other quality control activities. The independent coating inspector shall hold a SSPC CCI Level 2 certification for coatings over concrete in extreme exposure class conditions as per WSA 201 Table 5.1. For all other coatings applied to concrete the inspector will hold SSPC CCI Level 1 certification.
 - Initial works inspection: the ITPs and other quality procedures associated with the surface preparation and application of each coat shall, in the first instance, be carried out by the Contractor's inspector in the presence of the Contractor's site supervisor, the nominated Seqwater Representative and the independent coating inspector (as identified above). Note that a technical representative of the Coating Manufacturer may also be engaged for input at this stage. Once the procedure for each stage of the operation has been witnessed and approved, these procedures shall then apply to all similar operations unless variations are subsequently agreed by the Seqwater.
 - Inspections by Seqwater and/or their independent coating inspector: these parties may conduct quality audits and inspect the coated asset throughout the works, e.g. at hold points, after surface preparation, prior to application of each coat, and following final topcoat application. Additional

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inspections may also be conducted after any touch up coats that may be required. Seqwater may, at their discretion, vary the frequency of inspections and/or audits.

- The Contractor is to provide at least five (5) days' notice to Seqwater to organise their representative and or independent coating inspector to attend hold point inspections.
- Inspection by Coating Manufacturer: these inspections/audits would assist Seqwater to ensure the Contractor is performing work in accordance with this Specification, Manufacturer's requirements and any other agreed specifications. Agreement with the manufacturer on the amount of involvement should be undertaken on a case-by-case basis.
- Contractors are required to provide all labour, materials and equipment to undertake defect inspections to assess the performance of the applied coating every 12 months for the length of the contract defects liability period. Should defective areas be identified, that require rectification following this inspection the life of the coating system will be extended to aligned with the original warranty provided and WSA 201 Section 2.8 First Anniversary Inspections.

Any additional inspections and/or audits undertaken by Seqwater, an independent coating inspector or the Coating Manufacturer are in addition to those required by the Contractor and do not remove any of the Contractor's supervision or inspection obligations under this Specification.

5. Technical Requirements

5.1. Life to First Coating Refurbishment Requirements

Coatings shall have a minimum life to first coating refurbishment as stated in Table 1.

Table 1 Coating Life Requirements

Application	Minimum Coating Life (years)
Concrete Coatings	Atmospheric 10 ¹ ; immersed 10 ¹
Steel Coatings	Atmospheric 15 ¹ ; immersed 10 ¹
Galvanised Coatings	Atmospheric 50 ² ;
Pipeline* Internal Coatings	Internal coatings of pipelines shall ensure that the pipeline reaches its required life ³
Pipeline* External Coatings – Buried Service	Internal and external coatings of buried pipelines shall ensure that the pipeline reaches its required life ³

*including valves and appurtenances

Notes:

1. Over the specified period, the colour of the protective coating must not deteriorate. If it is identified by the coating Contractor that it is likely the colour will change over the required life, this shall be submitted to Seqwater in writing for approval.
2. It is acknowledged that galvanised coatings used at coastal sites, and sites subject to significant salt deposition, will likely have a lower life expectancy. Where this is identified, the Contractor shall propose suitable alternatives, or increased galvanising thicknesses, to allow Seqwater to achieve the desired life.

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3. Water Pipeline design life is as per D-SPE-STD-001 Water Supply Networks Planning, Design and Construction section 1.2.6 (100 years).

5.2. Potable Water Compatibility

Any product in contact with drinking water or water that is to become drinking water shall be certified to comply with AS/NZS 4020 by an accredited laboratory and have undergone re-evaluation testing within 3 months of the fifth anniversary of the certification decision. Overseas products that have certification to recognised standards, such as ANSI/NSF 61 or BS 6920, or recognised approvals such as by WRAS (Water Regulations Advisory Scheme, UK), TZW (Technologie Zentrum Wasser, Germany), ACS (Attestation de Conformite Sanitaire, France), TGM (Technologisches Gewerbemuseum, Austria) etcetera may be considered subject to assessment by Seqwater water quality team via the standards deviation process.

Products that require testing include those in contact with drinking water or water that is to become drinking water at any stage of treatment and at any point in the transfer, storage, distribution and reticulation system up to the point of customer connection. Products include those that are immersed in drinking water or water that is to become drinking water, frequently splashed, and where condensation may enter the above-mentioned water. Products used in upstream dams and catchments that are not in the immediate vicinity of a treatment plant intake, are considered to be not in contact with drinking water; but attention should still be given to avoid coatings that could leach products detrimental to the quality of the water and receiving environment (e.g. coatings containing biocides/fungicides etc.).

Attention shall be given to the ratio of surface area to volume at which products comply. The specific ratio of surface area to volume in the test certificate shall be equal to or greater than the actual structure ratio of the surface area to volume applicable in service and currency of relevant certifications must meet Seqwater's re-evaluation requirements at the time of installation. In addition, products must also be individually certified and subjected to an audited overall system of quality control (i.e. ISO 9001);

Conditions under which a product is to be used must also align with those specified on the technical data sheet and any relevant additional conditions listed on the AS/NZS 4020 test report. Such conditions may include but are not be limited to temperature, chemical and physical properties of the water, application thickness, and curing conditions including time. It is important to note that curing time can have a direct impact on a projects critical path and required shutdown windows.

For materials in contact with chemicals that are dosed into drinking water, attention will be given to ensure it will not leach inorganic or organic substances in quantities capable of producing deleterious or injurious effects on the health of those consuming the water produced.

5.3. Surface not to be Coated

The following surfaces and materials shall not be blasted or coated unless specifically directed by Seqwater:

- Stainless steel, brass, copper and titanium surfaces;
- Non-metallic surfaces - other than plastic pipes and concrete surfaces which have been nominated for coating;
- Aluminium surfaces – other than electrical cabinets/switchboards;
- Piping joints which have not been pressure tested – to be coated after pressure testing;
- Electrical cables;

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- Valve stems and grease fittings;
- Instruments and gauges;
- Shafts on running equipment;
- Threads of adjusting screws;
- Machined faces;
- Friction contact surfaces for structural friction bolted joints (Note: friction joint surfaces may be primed with friction joint approved primer);
- Contact surfaces for field welds shall not be primed closer than 50mm to a welding surface unless a weldable primer is used;
- Manufactured of, or coated with, corrosion-resistant materials;
- Machine finished and would normally be left unpainted;
- Nameplates; and
- Other surfaces nominated throughout contract documents or Australian Standards.

All necessary care shall be taken to protect assets not within the coating scope of work from damage or coating application. Any such damage or coating shall be rectified by the Contractor at their cost. All materials used to mask, or otherwise protect areas during these activities, shall be removed upon completion of blasting and painting works.

5.4. Site / Application Corrosivity Categories

5.4.1. General

Corrosion categories shall be determined for sites/applications with consideration being given to each of the references AS 2312, AS 4312 and ISO 9223. Based on this (where applicable), an exposure class shall be determined as per WSA 201 Table 5.1.

Further consideration shall be given to the coating degradation effects of any new or proposed developments (e.g. industrial plants) in the area of the site.

Micro-climates shall be identified and accounted for during coating selection. In addition, different assets will have different requirements for the level of protection required, depending on the asset criticality, the required life and the accessibility for maintenance.

For specific applications, further considerations are required as specified below.

5.4.2. Water Pipelines and Network Assets

Water Pipelines and associated network assets shall be considered in the AS 2312 'C4-High' corrosivity category as a minimum due to criticality, accessibility, cost of maintenance, potential exposure to vegetation build-up and other possible micro-climates.

Water Pipelines traversing creek/gully crossings and the like shall also be given special and individual consideration when determining the coating requirement. Susceptibility to immersion shall be considered and accounted for.

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If this exposure class is considered to be inappropriate by the Contractor, this shall be brought to the attention of the nominated Seqwater Representative for direction.

5.4.3. Water Treatment Plant Sizes

The following section lists the minimum AS 2312 corrosivity category to be used at specific sites where accelerated corrosion has been identified as an issue:

- Amity Point WTP: C4-High
- Dunwich WTP: C5-M-Very High
- Luggage Point AWTP: C5-M-Very High
- North Stradbroke Island WTP: C4-High
- Point Lookout WTP: C4-High
- Tugun Desalination Plant: C5-M-Very High
- Gibson Island AWTP: C4-High

5.4.4. Proximity to Saltwater

Assets within 1km of a saltwater shoreline must be considered on a case-by-case basis as higher salt deposition rates will likely influence the corrosivity category to be higher.

Assets within 100m of a saltwater surf beach shoreline shall be assigned the AS 2312 'CX-Extreme' Corrosivity Category.

5.5. Protective Coatings

5.5.1. General

Protective coating selection and application shall be as per:

- WSA 201 Section 5 Selection of Coatings unless specified otherwise herein, or
- AS 2312 or other relevant standards if outside the scope of WSA 201 Section 5 Selection of Coatings, and
- The Manufacturer's recommendations and requirements, where these exceed above requirements.

Refer to Section 3, for approval guidance regarding coating selection and systems not in accordance with WSA 201 Section 5 Selection of Coatings.

The coating system shall be appropriate for application to, and protection of, the substrate surface considering the full range of expected operating/environmental conditions and loads.

Inaccessible surfaces of steel parts that cannot be coated after assembly (e.g. bolting or welding) shall be coated prior to this work.

Refurbishment coating shall include disassembly of components (if practicable and required) in order to coat normally inaccessible surfaces.

Steel features which are attached to an asset, but no longer required, should be removed and ground to required surface profile following Seqwater approval.

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During the works the Contractor may notice issues with the asset and ancillary structures outside of the agreed scope of works. These issues should be reported to Seqwater. Some common issues include (but are not limited to) missing, damaged or failed bolts and pipeline headwalls.

5.5.2. Surface Preparation

Surface preparation shall be as per:

- WSA 201 Section 6 Surface Preparation, along with any further specifications listed herein (where applicable), or
- AS 2312 or other relevant standard for items outside the scope of WSA 201 Section 6 Surface Preparation, and
- The Product Manufacturer's recommendations and requirements, where these exceed the relevant reference documents.
- SSPC has created four supplementary sets of reference photographs (VIS 1, 3, 4, and 5) that provide illustrations of the degrees of cleanliness defined in the written surface preparation specifications for steel. These illustrations do not replace the written specifications. They are intended for comparison to surfaces encountered in the field before and after cleaning and will assist the Contractor visualise the differences between the cleanliness degrees described by the written specifications.
- Methods of surface preparation as per substrate type are as shown in Table 2 Surface Preparation by Substrate Type.

In addition to the requirements above, abrasive blasting shall be as per:

- The Abrasive Blasting Code of Practice, relevant standards and legislation, and
- The abrasive blasting process shall ensure as low as practicable surface metal loss occurs, whilst achieving all other required specifications.

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Table 2 Surface Preparation by Substrate Type

Standard	Cast Iron or Steel	Galvanised	Aluminium	Plate Metals	Stainless Steel	Non-Ferrous	Plastic PVC/FRP	Concrete	Previously Coated Surfaces
SSPC-SP1 Solvent Clean	✓	✓	✓	✓	✓	✓	✓	✓	✓
SSPC-SP2 Hand Tool Cleaning	✓	✓	✗	✗	✗	✗	✗	✗	✓
SSPC-SP3 Power Tool Cleaning	✓	✓	✗	✗	✗	✗	✗	✓	✓
SSPC-SP11 Power Tool Cleaning	✓	✗	✗	✗	✗	✗	✗	✗	✓
SSPC-SP7/NACE 4 Brush-Off Blast (Whip)	✓	✓	✓	✓	✓	✓	✗	✓	✓
SSPC-SP6/NACE 3 Commercial Blast Cleaning	✓	✗	✗	✗	✗	✗	✗	✗	✓
SSPC-SP10/NACE 2 Near-White Blast Cleaning	✓	✗	✗	✗	✗	✗	✗	✗	✓
SSPC-SP5/NACE 1 White Metal Blast Cleaning	✓	✗	✗	✗	✗	✗	✗	✗	✓
SSPC-SP12/NACE 5 High and Ultra-high Pressure Water Jet	✓	✗	✗	✓	✗	✗	✓	✓	✓
SSPC-SP13/NACE 6 Surface Prep. of Concrete	✗	✗	✗	✗	✗	✗	✗	✓	✗

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The required surface profile of concrete substrates within WSA 201 - 2020 - 2.2 Section 6.2.5.5 Concrete Surface Profile stipulates the following;

- Prepare the concrete surface to achieve the Manufacturer's recommended surface profile in accordance with the International Concrete Repair Institute (ICRI) Guideline No 310.2 "Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays". This document provides guideline for concrete coating thickness and appropriate surface profile.
- ASTM D4259 - Standard Practice for Abrading Concrete - The practice addresses methods for removing material, coatings, and roughening the surface. The methods addressed are the following: mechanical abrasion, water blast cleaning, high pressure water jetting, and dry and wet abrasive cleaning. These methods will not only remove existing coating, but can significantly roughen the concrete substrate in the process to achieve the desired surface profile for coating system application.
- Unless otherwise specified by the coating Manufacturer and approved by the Water agency, concrete surface profile shall be CSP3 or coarser. Surface profile is to be verified using the ICRI replica profiles
- This requirement overrides concrete surface profile requirements in WSA 201 Section 8 Coating System Specification.

Following adequate surface preparation of the concrete substrate the repair of any defects must be undertaken in accordance with WSA 201 Section 6.2.5.6 Concrete Repair. Additional guidance in relation to the repair of concrete can be found within the ACRA HB84:2018 Guide to Concrete Repair and Protection which has been developed in conjunction with CSIRO and Standards Australia. Assistance in the diagnosis and cause of cracking identified within the concrete structure, and effective remedial measures can also be found in the CIA's Concrete Durability Series, CIA Z7/6 Concrete Cracking and Crack Control.

5.5.3. Selected Coating Systems

WSA 201 Section 5 Coatings Selection and specifies recommended coating options for a wide range of applications. It is generally expected that the selected coatings will align with these recommendations.

Where a particular coating system requires multiple applications (e.g. primer, intermediate coat and top coat) then all products used within that system shall originate from a single manufacturer/supplier and be compatible with each other. All coatings must be applied in strict accordance with WSA 201 Section 7 Coating Application and the manufacturer's instructions.

Specific preferred coating systems have been selected for some applications / assets as follows (refer to WSA 201 Section 8 Coating System Specifications for full coating system details as relevant):

- **Water Pipelines external coatings – Atmospheric service:**
 - For new pipeline installations:
 - FPE is preferred.
 - For existing pipeline installations:
 - Where it is agreed that a full blast will be performed, PUR-A is preferred.
 - Where it is agreed that a full blast will not be performed, EPM is preferred where applicable.

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- **Water Pipelines external coatings – Buried service:**
 - Mild Steel:
 - FPE is preferred.
 - TAPE shall generally be accepted for site modifications, spot repairing and air/ground interfaces. Note that the 'Mastic Filler' and/or 'Overwrap' specified in the WSA 201 TAPE system shall be included unless otherwise agree by the nominated Seqwater Representative.
 - Ductile Iron:
 - Installed with polyethylene sleeving installed to AS3681.
- **Aluminium and mild steel electrical cabinets/switchboards:** POW shall be used in all cases.
- **Damage to galvanised surfaces:** repaired as per WSA 201 (system ZRE) as appropriate. This includes damage to surfaces caused by site drilled holes, cutting, welding etc. Note that specific consideration of suitability is required for immersed galvanised surfaces as standard WSA 201 Section 8.3 ZRE treatment may not be appropriate.
- **Crevices between tank/equipment and foundations (where water can settle):** where appropriate, EBS (refer WSA 201) shall be applied at the interface between the bottom of the asset and the concrete.
- **Structural steel:** GAL coating preferred for C3-Medium and C4-High corrosivity category (refer to AS 2312) applications.
- **Concrete vessels:** a protective coating may be specified dependent on the application and the structures operational environment and exposure classification and the service life expectancy of the structure. The selected protective coating system must align with the requirements documented within WSA 201 Section 5.4.6 Coatings for Concrete and WSA 201 Section 8 Coating System Specifications
- **Proprietary equipment (e.g. valves, pumps, motors, gearboxes, couplings):** shall generally be coated and tested to the appropriate original equipment manufacturer's (OEM) high performance paint specification. The OEM paint specification is to be assessed for suitability for the specific application.

The above preferred coating types should be used unless specific approval is sought and gained from Seqwater for deviation from these preferences. The contractor shall provide full justification as to why a particular alternative is believed superior prior to gaining approval. Use of any of the above preferences does not remove the Contractor's responsibility to confirm the coating suitability prior to works.

5.5.4. Colours

Coating colours shall be as follows:

- Visual appearance shall be as defined by AS 2700.
- The marking of physical hazards and the identification of certain equipment and substances shall comply with the requirements of the appropriate standard.
- Where applicable and practicable, colours shall generally be as per Table 3, unless otherwise prescribed within relevant Seqwater documentation.
- For smaller assets where colour specification would incur additional cost or create impractical lead times, standard manufacturer colours are generally acceptable.

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- Colour selection for coating of assets visible to the public shall include consideration of limiting visual pollution as far as practicable and allowable.
- For brownfield work, consideration must be given to whether the colours should match the existing colours.
 - Colour matching is likely to be required if the coating scope is only for part of a particular asset / asset group. For example, patching/maintenance, coating one of three tanks, coating only a portion of a single above ground pipe section, extending a switchboard, etc. Seqwater shall be consulted where the requirement for colour matching is unclear. In general, the colour matching goal is that the asset/facility should not appear unsightly nor, as far as practicable, akin to dilapidation.
- For above ground external Water Pipeline coatings (both new and existing pipelines), intermediate coating colours shall be similar to the top coat such that when weathered, the visual presence of the intermediate coat shall not look unsightly nor, as far as practicable, akin to dilapidation. This particularly applies where the Water Pipeline is visible to members of the public. Where similarity in coating layer colours are cause for concern by the Contractor, the Contractor shall notify Seqwater for approval prior to undertaking works.
- All colours shall be submitted to Seqwater for approval.

Table 3 Seqwater Selected General Colour Preferences

Surface	Colour
Above ground sections of Water Pipelines and associated pipe supports	G54 Mist Green
Steel tanks and vessels • External surface • Internal surface	G54 Mist Green N14 White semi-gloss
External surface of pipes other than Water Pipelines (where coated)	As per AS 1345
Polyethylene sleeves for ductile iron pipes	As per WSA 03 3.1 2011
Hazards – e.g. handrails/guardrails, toe boards, ladders, lifting points, projections, bollards, impact hazards, trip hazards, low doorways, unexpected steps, step nosing, overhead suspended items, guards, moving hazards, hoists, cranes, trolleys	Y15 Sunflower
Steelwork	N42 Storm Grey
Miscellaneous brackets (e.g. for mounting instruments, electrical cabinets, etc.)	N42 Storm Grey
General mechanical and electrical equipment	T45 Cootamundra
Motors	X15 Orange
Non-electrical cabinets (e.g. water quality)	T45 Cootamundra
Electrical cabinets/switchboards – internal and external surfaces • Exterior environment (outside) • Interior environment (inside)	N42 Storm Grey X15 Orange
Cabinet/switchboard equipment mounting panels, gear trays and escutcheons	N14 White

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5.6. Asset / Issue Specific Requirements

The following requirements apply to specific types of assets and/or issues. These requirements are in addition to those detailed within the other sections of this document.

5.6.1. Coating Over Existing Coatings

As specified in WSA 201 Section 6.2.6 Existing Coatings, there are specific considerations required in relation to coating over existing coatings ('maintenance coating'). In addition to requirements within WSA 201 Section 6.2.6 Existing Coatings, the following shall be applied:

- Where Seqwater specifies coating over existing coatings, the Contractor shall advise Seqwater if they believe that this will not achieve the desired outcomes as per this specification. Where the Contractor accepts that coating over existing coatings will achieve the desired outcomes as per this specification, the Contractor shall bear the full risk of failure (including financial).
- Where Seqwater specifies a full surface blast, and the Contractor recommends coating over existing coatings, the Contractor shall bear the full risk of failure (including financial), if Seqwater subsequently accepts this recommendation.

5.6.2. Repair of Damage Coatings

All damaged coatings (e.g. due to localised coating failure, site drilled holes, cutting, welding etc.) shall be repaired in accordance with WSA 201 Section 6.2.6 Existing Coatings and the coating Manufacturer's specifications, in order to meet the required performance. The colour of the repair coating shall match the surrounding coating as much as practicable. Particular attention must be given to correct surface preparation as this will significantly affect the repair integrity.

Penetrations through bund coatings for new fixings shall be appropriately resealed. Sealing shall be provided using the same coating as the bund or appropriate sealant. The coating or sealant shall be chemically resistant to the liquid stored in the bund.

5.6.3. Maintenance Coating

In order to extend the life of a coating it may be possible to coat specific areas of deteriorated or damaged coatings. Such repairs must be completed as per requirements detailed in WSA 201-2020-2.3 Section 5.4.2 and associated references.

5.6.4. Flanges

If a flange sealing surface is coated, this coating shall be suitable for the application and shall allow appropriate sealing.

5.6.5. Above Ground Water Pipelines

The following general requirements apply for coating of any above ground section of Water Pipeline unless otherwise specified by Seqwater:

- Removable features shall be removed prior to blasting and coating of the pipeline and/or particular feature (if practicable) and then reinstated following coatings works.
- Items not within painting scope such as, instruments, cabling and welded/non-removable ancillary assets connected to or close by the pipeline shall be suitably protected prior to blasting and coating.

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- Pipeline fitting branches shall be coated up to and including the pipeline flange.
- Pipeline access hatch with dead plate shall be fully coated, unless otherwise stated.
- In addition to the Section 4 requirements, the frequency of surface cleanliness tests shall not be less than 1 test per 10m chainage for Water Pipelines greater than 500mm outside diameter.

Consideration of coating requirements related to surfaces obscured by supports and the supports themselves (as appropriate) is important. The following shall apply:

- The condition of the pipeline surface obscured by the support should be assessed as far as practicable in order to define the recoating scope of works near supports.
- Coating of mild steel pipeline supports shall be included within coating works.
 - Mild steel supports which are not welded to the pipeline should generally be removed, appropriately coated and reinstated with appropriate compression filler/dielectric barrier between support and pipeline. The pipeline shall be coated prior to support reinstatement. The method of support removal and temporary support be appropriately planned and risk assessed.
 - Mild steel top restraint straps shall be removed, appropriately coated on both sides and reinstated with appropriate compression filler/dielectric barrier between strap and pipeline. The pipeline shall be coated prior to restraint reinstatement.

Two-piece concrete pipeline plinth supports should generally be removed prior to pipeline coating and then reinstated with appropriate compression fillers and hardwood wedges.

6. Application of Coatings

6.1. General

Seqwater require that the coating application shall be performed by competent and experienced personnel with at least five (5) years industry experience. The Contractor shall provide appropriate supervision to ensure the specified standard of surface preparation has been achieved and the coating application requirements are being followed as documented with WSA 201 Section 7 Coating Application.

The Contractor shall record all details of surface preparation, coating application, ambient weather conditions and film thickness measurements on daily inspection reports. As a guide, template of forms are available in AS 3894.10 to 14 inclusive.

6.2. Application Constraints

The Contractor shall ensure that proper and effective control of the environment and conditions during the application and curing stage of all coating layers shall be maintained.

Unless overruled by the coating manufacturer's product data sheet(s) or written instructions, the following constraints at the start of and during application, and curing conditions shall apply. Coating application shall not proceed if one or more of the following conditions exists:

- the relative humidity is above 85%;
- the substrate temperature is less than 3°C above the dewpoint;

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- c. the ambient air temperature is below 10°C or above 35°C;
- d. the surface to be coated is wet or damp (for metallic substrate only); or
- e. where the full prime coat application cannot be carried out before the specified cleanliness of the surface deteriorates

6.3. Concrete Surfaces

Aligned with WSA 201 Section 7.2.2 Concrete Surface, Seqwater require that coating application of concrete structures shall not be undertaken in direct sunlight and/or with rising substrate surface temperatures to reduce the incidence in pinholes and blistering of the applied coatings due to expansion of entrapped air or moisture (out-gassing) in the concrete.

In such cases the Contractor will be required to postpone the application until such time as the surface temperature of the substrate is falling.

The Contractor shall seek written clarification from the Manufacturer for application guidelines specific to temperature conditions and sealer application recommendations to reduce out-gassing or concrete moisture issues.

Further direction is provided within WSA 201 Section 7.2.2 Concrete Surface as outlined below;

- Concrete surfaces that have been in direct sunlight shall be shaded prior to application and remain shaded until the initial cure has been achieved.
- Out-gassing may be minimized by spray application of a primer “mist coat” to allow the concrete to out-gas followed by back rolling and spraying or roller coating the full primer.

7. Inspection and Testing of Applied Coating

7.1. Contractor Inspector and Hold Points Inspections

Inspection and test shall be undertaken by a certified coating Inspector(s) to verify all works performed in accordance with the specification and standards applicable, as documented within WSA 201 Section 2.5 Coating Inspector.

Unless approved by Seqwater in writing prior to commencement of works the Contractor’s nominated coating inspector should not be the Contractor’s work supervisor.

It is imperative that the Contractor undertake an initial inspection of all work and the rectification of defects identified, prior to inviting Seqwater and their appointed independent coating inspector to site to attend a Hold Point Inspection.

Hold points as per the project specification are to be programmed into the schedule of works and clearly documented within the Contractor ITP for each coating system applied.

Seqwater require as a minimum that all inspection and testing is undertaken by the Contractors nominated coating inspector in accordance with the contents of WSA 201 Section 10.3 Inspection and Testing Methods and conducted and recorded as per the relevant standard.

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7.2. Records and Inspection Report

The contractor shall keep detailed records and reports covering all environmental conditions and on-site tests carried out during the surface preparation and coating application as required by the specification and applicable standards.

The following items should be included but not limited to the Contractors Quality Control Records as documented with WSA 201 Section 10.2 Quality Control Records and AS 3894.10 to 14 inclusive.

7.2.1. Ambient Conditions

The ambient conditions report shall contain details of prevailing weather conditions including relative humidity, dew point and general weather observations, before, during and on completion of the application process, in accordance with AS/NZS 3894.10.

7.2.2. Equipment Report

The equipment report shall include details of all production and test equipment during the application and inspection in accordance with AS/NZS 3894.11.

7.2.3. Coating Inspection Report

The Coating Inspection Report shall include details of all coatings applied, the results of quality control testing for all paints, coatings and their component parts including solvents and thinners, for each stage of the work in accordance with AS/NZS 3894.12 All defects shall be recorded, whether they were subsequently repaired and the repair method.

7.3. Coating Inspection Equipment

Coating inspection gauges shall be calibrated in accordance to the equipment manufacturers recommended practices and interval. Calibration certificates shall be witnessed by an Seqwater representative prior to the start of the inspection.

7.4. Inspection and Test Methods

This section documents the Seqwater requirements for inspection and testing during surface preparation and coating application. The Contractor shall ensure that all tests are undertaken in accordance with WSA 201 section 10.3 Inspection and Test Methods and the applicable standard that is documented with further direction provided by Seqwater in certain areas of concern in relation to the inspection and testing undertaken.

7.4.1. Surface Preparation

- Visual Inspection of Surface Preparation - All Substrates
- Adhesion of Existing Coating - All Substrates
- Surface Cleanliness - All Substrates
- Surface Appearance (Blast Class) - Metallic Substrate Only
- Surface Profile (Blast Profile) - Metallic Substrate Only
- Surface Profile (ICRI CSP) - Concrete Only
- Temperature and Relative Humidity - Metallic Substrates Only

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- Moisture Content - Concrete and Masonry Structures Only

7.4.2. Coating Application

- Temperature and Relative Humidity - All Substrates
- Wet Film, Thickness (WFT) - All Substrates
- Visual Inspection of New Coating - All Substrates
- Dry Film Thickness (DFT) - Metallic and Concrete Substrates
- Film Continuity (Holiday Tests) - Metallic and Concrete Substrates
- Adhesion of Applied (New) Coating
- Degree of Cure - All Substrates

7.4.3. Moisture Content Test - Concrete and Masonry Structures Only

Seqwater request that the contractor must test the moisture content of any concrete or masonry surface which requires the application of a protective coating surface.

Prior to coating application, the moisture content of concrete substrates shall be assessed using the plastic sheet method described in ASTM D4263, which involves taping down a 450 mm by 450 mm piece of seventy-five (75) to one hundred and fifty (150) micron thick polyethylene film for a period of sixteen (16) hours. Test every 50 m² with a minimum of one test for each 10 m of vertical rise commencing within 300 mm of the floor.

These tests are to be conducted after application of a rendering material if applicable. Unless otherwise specified by the Coating Manufacturer, coatings shall not be applied if any moisture is found on the backside of the film.

Seqwater advise that the use of Electronic moisture meters to assess the moisture content in concrete will not be accepted.

7.4.4. Visual Inspection of Applied (New) Coating

Seqwater require that the finished coating shall be of uniform thickness, colour, appearance and gloss. It shall be fully cured, insoluble, adherent, coherent and free from mud cracking, inclusions of foreign contaminants, amine blush/bloom, pinholes, holidays, laps, sags, blistering, checking, wrinkling, overspray, patchiness and any other defects that may impair the performance and/or appearance of the coating.

7.4.5. Dry Film Thickness Test (DFT) - Immersed and Extreme Environments

For surfaces that are to be exposed to severe environments such as immersed, buried or subjected to severe chemical or extreme environment, the minimum film thickness specified shall be achieved. This means any area outside specification shall be marked for restoration by the Contractor.

7.4.6. Dry Film Thickness Test (DFT) - Atmospheric Environments

AS 3894.3, SSPC PA2 and SSPC PA9 require the average of the five spot readings taken over 10m² as described above, to be greater than the specified coating thickness. No single point reading should be less than 80% of the specified thickness.

In all cases the minimum specified thickness stated with this specification is the absolute minimum spot thickness in any area measured. A single point reading below the specified but not below 80% of the specified

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thickness may be acceptable so long as the spot measurement (average of 3 single point readings within a 12mm diameter) are above the minimum specified thickness, except for protective coatings that are to be either buried or immersed, where no point or spot reading is acceptable below the specified thicknesses.

If three readings were averaged to produce a point reading, an individual reading may be less than 80% of the coating thickness.

7.4.7. Dry Film Thickness Test (DFT) - Measurement Frequency

The measurement frequency for DFT testing of coating applied to ferrous or non-ferrous structure are as documented in AS 3894.3, SSPC PA2 and SSPC PA9 and shown below in Table 4 Large and Small Surface Area DFT.

Table 4 Large and Small Surface Area DFT

No.	Surface Area of the Structure	DFT Measurement
1	Less than 30m ²	Each 10m ² area
2	Structures not exceeding 100m ²	Three 10m ² areas should be chosen at random.
3	Structures exceeding 100m ²	First 100m ² area should be measured in accordance with Option (2), and for each additional 100m ² area, a 10m ² area should be chosen at random.
4	For critical or small surface areas	More Readings will be required (discretion of Seqwater and the Contractor)
5	For flat areas less than 10m ²	Minimum of three (3) point readings for each m ²
6	Pipework	Based on pipe diameter, 4 or 6 point readings should be taken evenly around the circumference as per Table 5
7	Beams and Angles	One reading should be taken on each flat face less than 300mm width for each linear metre.
8	If total area of pipework, beams and angles exceeds 10m ²	Five separate point readings, evenly spaced throughout, should be made in each 10m ² area examined.

Note: If the coating thicknesses measurement for any 10m² area, chosen in accordance with option (2) or (3) does not meet the required specification, then each 10m² area of surface should be measured.

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Table 5 Number and Locations of Spot Measurements - Pipe Spools

Pipe Diameter	Circumferential Spot Measurements	Interval Spacing
Up to 300mm	4 evenly spaced	3 metres apart
300mm to 600mm	6 evenly spaced	3 metres apart
Greater than 600mm	6 evenly spaced	3 metres apart

7.4.8. Methods of Adhesion Test of Applied Coating

Seqwater require that adhesion testing of the coating shall be carried out in accordance with AS 3894.9 and AS/NZS 1580. There are various methods associated with this standard and can be referenced in Table 6 below. The most commonly used and preferred adhesion test accepted by Seqwater is the Pull-off (dolly) test AS 3894.9 Method C and or AS/NZS 1580 Method 408.5.

Table 6 Methods of Adhesion Test

Methods of Adhesion Test	Australian Standard	Coating Thickness (microns)
Parallel cut method	AS/NZS 1580 Method 408.2 Method A	>100 microns
Intersecting cut Method	AS 3894.9 Method A	Any Thickness
Cross-cut Test	AS 3894.9 Method B	Up to 125 microns
Pull-off (Dolly)	AS 3894.9 Method C	Any Thickness

A test reference panel coated at the same time as the item and or structure can be used for the means of conducting adhesion testing, provided that the test reference panel surface preparation and coating application (with the same batches of coating material and abrasives etc.) are used to prevent any repairs after testing on the recently completed coating system.

If the test reference panel is not prepared and coated at the same time as the item or structure, or if the coating adhesion is either questionable or in any dispute, Seqwater reserve the right to request that adhesion testing be completed on the work piece and or structure and subsequent repairs be conducted at no additional cost to Seqwater.

7.4.9. Adhesion Test of Applied Coating - Pull-off (Dolly)

Pull-off adhesion testing is used to measure the force required to pull a specified diameter of coating away from its substrate. This measured pull-off force provides a direct indication of the strength of adhesion between the coating and the substrate.

The test location and number of test points shall be agreed upon by the Contractor and Seqwater and or their nominated coating inspector prior to the start of attachment of dollies to the substrate or if applicable on the test reference panel. The adhesion test report shall include test results, general failure modes categorised substrate failure, adhesion failure, cohesion failure and glue failure. The mode of failure preferable to Seqwater for coatings on concrete is "substrate failure" and "cohesive failure" for coatings on steel.

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Minimum acceptable adhesion value of epoxy coating or elastomeric polyurethane on concrete and steel shall be 3 MPa and 5 MPa respectively, unless otherwise specified by the Coating Manufacturer.

Coatings that yield unacceptable adhesion test results shall be removed and reinstated at no additional cost to Seqwater. The Contractor shall spot repair all areas subject to adhesion testing, if a test reference panel is not used, and retest upon full cure of the repair coating.

For further details on the theory and requirements of pull-off testing refer ASTM D4541, AS1580, AS3894.9, ASTM D7234 and ASTM C1583/C1583M-20 standards.

Note: References shall be made to the pull-off test requirements of individual coating specifications

7.4.10. Film Continuity (Holiday Tests) - Concrete Substrates

Seqwater require that a fully-cured coating that will be subjected to extreme, immersed or buried environments shall be tested for film continuity and for defects such as pin holes, misses and damage.

There are two methods of continuity testing: (1) Low Voltage & (2) High Voltage.

NACE SP0188 and ASTM D4787 recommends the utilisation of both Low Voltage and High Voltage two test methods depending on the DFT of the applied protective coating.

- Low-Voltage Wet Sponge Testing – for coatings with a DFT < 500 µm
- High-Voltage Spark Testing – for coatings with a DFT > 500 µm

For the high voltage spark testing, there is a table within the NACE SP0188 which recommends the voltage to be applied as determined from the total dry film thickness of the protective coating.

8. Workplace Health and Safety

All relevant national, state, and local health and safety standards and legislation shall be adhered to.

Seqwater has a no smoking policy on all Seqwater sites, all contractors will adhere to Seqwater's corporate and local site policies and procedures where appropriate.

All thinners, solvents, primers and coating materials shall be regarded as hazardous materials and their use, storage and transport shall comply with AS 1940, coating manufacturer's recommendations and Dangerous Goods Regulations.

Lead based coatings are not to be used. If the specification of the existing coatings cannot be determined, testing for lead and/or other hazardous substances shall be carried out before carrying out any work. Any work on lead paint shall be carried out as per the specific requirements in WSA 201.

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9. Environmental Protection

9.1. General

All works shall comply with relevant national, state, and local standards and legislation concerning the preparation and coating of surfaces.

The Applicator shall refer to QLD Workplace and Safety Guide: Spray Painting and WSA 201 Section 4 Environmental Protection for guidance concerning the control of paint emissions, waste management, and public safety for both new and previously painted structures.

9.2. Containment

Supplementary to the WSA 201 Section 4 Environmental Protection, containment requirements, prior to the commencement of the works, the details of the contractor's proposed containment system shall be submitted to Seqwater. It is to be noted that submission of and any implied or explicit acceptance/approval of the system by Seqwater does not in any way constitute acceptance of responsibility for the containment by Seqwater. The contractor shall be fully responsible for the containment.

10. Definitions & Abbreviations

Table 7 Definitions and Abbreviations

Term	Definitions
Coating Warranty	A warranty that is issued by the contractor under a contract of works which covers the workmanship, surface preparation and application of the coating, as well as the warranty of the coating material itself.
Contractor	An entity engaged by Seqwater to undertake work in accordance with an agreed contract with a defined scope of work.
Employees	Means persons employed directly by Seqwater in a permanent, temporary or casual capacity.
Manufacturer / Supplier / Vendor / Original Equipment Manufacturer (OEM)	The entity that manufactures or supplies equipment to meet the specifications of the Contractor.
Owner / Principal / Seqwater	The entity that engages the Contractor to undertake the work and takes custody of the outcome. The Owner may delegate responsibilities to other entities to act on its behalf (e.g. a consultant).
REX	Seqwater Electronic Document and Records Management System.
Scope of Works	Means the scope of works document forming part of the contract particulars including supporting design documentation
Seqwater Approval / Agreement / Acceptance	Written sign-off gained via the deviation process, as detailed in X-PRO-STD-008 Asset Standards Management and Application Procedure.
Seqwater Engineering Standard	Includes Standard Procedures and Standard Specifications and associated supporting documents such as Standard Drawings, Guidelines, Lists, Datasheets, Manuals, Registers, and Templates.

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Term	Definitions
Seqwater Representative	The person empowered by Seqwater to administer the contract, or their nominated representative.
shall / must	Indicates a mandatory requirement.
should	Indicates a recommendation.
Water Pipelines	Critical pipelines for transfer of bulk water (potable), raw water, irrigation or recycled water. The majority of critical pipelines are outside of WTP limits; however large critical pipelines within WTPs shall be included within this category

The following abbreviations (Table 8) apply to this Engineering Standard.

Table 8 Abbreviations

ACI	American Concrete Institute
ACRA	Australasian Concrete Repair & Remedial Building Association
AS	Australian Standard
ASTM	ASTM International
CIA	Concrete Institute of Australia
EBS	Elastomeric polyurethane system.
EHB-A	A high performance three coat, zinc, epoxy and MIO epoxy-based coating system.
EPM	A two-coat surface tolerant epoxy system.
FPE	Fusion bonded medium density polyethylene.
ICRI	International Concrete Repair Institute
NATA	National Association of Testing Authorities, Australia
PCCP	Painting Contractor Certification Program
POW	Thermoset polyester powder coating.
PSL	A two-coat epoxy and polysiloxane based coating system.
PUR-A	A high performance three coat, zinc, epoxy and polyurethane-based coating system.
SSPC	Society for Protective Coatings
TAPE	Petrolatum or bitumen based tape wrapping system (as per WSA 201)
TSI	Technical Support and Improvement
WSAA	Water Services Association of Australia
WTP	Water Treatment Plant
ZRE	A zinc rich epoxy based coating system.

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11. Roles and Responsibilities

Table 9 Roles and Responsibilities

Role	Responsibility
General Manager Engineering Standards & Assurance - P7990	Accountable for implementation and management of this Standard.
Leaders	In addition to the responsibilities of a worker, ensure compliance with this Standard Specification by those they lead.
Principal Engineering Standards and Assurance – P6255	Responsible for implementation and management of this Standard. Accountable and responsible for receipt and management of drawings.
Seqwater Project Manager	Accountable and responsible for implementation of this Standard as a whole. Some works may be delegated as appropriate.
Workers / Employees	Be aware of and comply with this Standard Specification.

12. References and Related Materials

The documents listed in Table 10 below, and the requirements therein, are relevant to this Standard Specification in their latest editions, these documents form a part of this document. Note that this is not an exhaustive list of documents relevant to the works.

Seqwater undertakes regular updates of its Engineering Standards. Before utilising this document, the complete list of Seqwater Engineering Standards should be reviewed to ensure currency and applicability for the proposed works.

Table 10 References and Related Material

Description	Location
PRO-01874 X-PRO-STD-004 Development and Review of Asset Standards	REX
PRO-02205 X-PRO-STD-008 Asset Standards Management and Application	REX
AS 1192 Electroplated coatings – Nickel and chromium Australian and International Standards Web Service	Intertek Inform
AS 1214 Hot-dip galvanised coatings on threaded fasteners (ISO metric coarse thread series) Australian and International Standards Web Service	Intertek Inform
AS 1345 Identification of the contents of piping, conduits and ducts. Australian and International Standards Web Service	Intertek Inform
AS 1580.408.5 Paints and related materials - Methods of test, Method 408.5: Adhesion - Pull-off test Australian and International Standards Web Service	Intertek Inform

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Description	Location
AS 1627 Metal Finishing - Preparation and pre-treatment of surfaces. Australian and International Standards Web Service	Intertek Inform
AS 1789 Electroplated zinc (electro-galvanized) coatings on ferrous articles (batch process) Australian and International Standards Web Service	Intertek Inform
AS 1897 Electroplated coatings on threaded components (metric coarse series). Australian and International Standards Web Service	Intertek Inform
AS 1940 The storage and handling of flammable and combustible liquids Australian and International Standards Web Service	Intertek Inform
AS/NZS 2312 Guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings (Parts 1 and 2) Australian and International Standards Web Service	Intertek Inform
AS 2700 Colour standards for general purposes Australian and International Standards Web Service	Intertek Inform
AS 3681 Application of polyethylene sleeving for ductile iron piping Australian and International Standards Web Service	Intertek Inform
AS 3894.1 Site testing of protective coatings - Non-conductive coatings - Continuity testing - High voltage (brush) method. Australian and International Standards Web Service	Intertek Inform
AS 3894.3 Site testing of protective coatings - Determination of dry film thickness. Australian and International Standards Web Service	Intertek Inform
AS 3894.9 Site testing of protective coatings - Determination of adhesion Australian and International Standards Web Service	Intertek Inform
AS 3894.10 Site testing of protective coatings - Inspection report - Daily surface and ambient conditions Australian and International Standards Web Service	Intertek Inform
AS 3894.11 Site testing of protective coatings Equipment report Australian and International Standards Web Service	Intertek Inform
AS 3894.12 Site testing of protective coatings Inspection report - Coating Australian and International Standards Web Service	Intertek Inform
AS 4020 Testing of products for use in contact with drinking water Australian and International Standards Web Service	Intertek Inform
AS 4312 Atmospheric Corrosivity Zones in Australia Australian and International Standards Web Service	Intertek Inform
AS 4680 Hot-dipped galvanised (zinc) coatings on fabricated ferrous articles. Australian and International Standards Web Service	Intertek Inform

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Description	Location
ASTM C1583 / C1583M - 20 Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method) Australian and International Standards Web Service	Intertek Inform
ASTM D4259 Standard Practice for Abrading Concrete Australian and International Standards Web Service	Intertek Inform
ASTM D4263 Standard Test Method for Indicating Moisture in Concrete by the Plastic Method Australian and International Standards Web Service	Intertek Inform
ASTM D4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers Australian and International Standards Web Service	Intertek Inform
ASTM D4787 Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates Australian and International Standards Web Service	Intertek Inform
ASTM D7234 Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers Australian and International Standards Web Service	Intertek Inform
ISO 8501 Preparation of steel substrates before application of paints and related products – Visual assessment of surface cleanliness Australian and International Standards Web Service	Intertek Inform
ISO 8502 Preparation of steel substrates before application of paints and related products – Tests for the assessment of surface cleanliness Australian and International Standards Web Service	Intertek Inform
ISO 8503 Preparation of steel substrates before application of paints and related products – Surface roughness characteristics of blast-cleaned steel substrates Australian and International Standards Web Service	Intertek Inform
ISO 8504 Preparation of steel substrates before application of paints and related products – Surface preparation methods Australian and International Standards Web Service	Intertek Inform
ISO 9000 Series Quality Management Systems Series Australian and International Standards Web Service	Intertek Inform
ISO 9223 Corrosion of metals and alloys -- Corrosivity of atmospheres -- Classification, determination and estimation Australian and International Standards Web Service	Intertek Inform
NACE SP0188 Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates Australian and International Standards Web Service	Intertek Inform
PCCP PP-D007 Painting Contractor Certification Program Categories and Classes	CSIRO

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Description	Location
SSPC - PA2 Procedure for Determining Conformance to Dry Coating Thickness Requirements Australian and International Standards Web Service	Intertek Inform
SSPC - PA9 Measurement of Dry Coating Thickness Using Ultrasonic Gages Australian and International Standards Web Service	Intertek Inform
SSPC-Paint 20 Zinc-Rich Coating Type II: Organic Australian and International Standards Web Service	Intertek Inform
SSPC-SP1 Solvent cleaning Australian and International Standards Web Service	Intertek Inform
SSPC-SP2 Hand Tool Cleaning Australian and International Standards Web Service	Intertek Inform
SSPC-SP3 Power Tool Cleaning Australian and International Standards Web Service	Intertek Inform
SSPC-SP5/NACE 1 White Metal Blast Cleaning Australian and International Standards Web Service	Intertek Inform
SSPC-SP6/NACE 3 Commercial Blast Cleaning Australian and International Standards Web Service	Intertek Inform
SSPC-SP7/NACE 4 Brush-Off Blast Cleaning Australian and International Standards Web Service	Intertek Inform
SSPC-SP10 Near-white blast cleaning Australian and International Standards Web Service	Intertek Inform
SSPC-SP11 Power Tool Cleaning to Bare Metal Australian and International Standards Web Service	Intertek Inform
SSPC-SP12/NACE 5 High and Ultra-high Pressure Water Jet Australian and International Standards Web Service	Intertek Inform
SSPC-SP13/ NACE 6 Society for Protective Coatings (formerly Steel Structures Painting Council) – Surface Preparation of Concrete Australian and International Standards Web Service	Intertek Inform
SSPC-Vis 1 Visual Standard for Dry Abrasive Blast Cleaning Australian and International Standards Web Service	Intertek Inform
SSPC-Vis 3 Visual Standard for Power and Hand-Tool Cleaned Steel Australian and International Standards Web Service	Intertek Inform
SSPC-Vis 4/NACE Vis7 Visual Standard for Steel Surfaces Prepared by Water Jetting Australian and International Standards Web Service	Intertek Inform
SSPC-Vis 5/NACE Vis9 Visual Standard for Steel Surface Prepared by Wets Abrasive Blast Cleaning Australian and International Standards Web Service	Intertek Inform

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Description	Location
WSA 201:2020 V2.2 Manual for Selection and Application of Protective Coatings	Water Services Association of Australia

13. Changes from previous version

This Standard Specification will be regularly reviewed in accordance with the requirements of the Seqwater Controlled Document Management Procedure. Reviews will include consideration of suggestions for alteration or improvement made in accordance with Seqwater Procedure X-PRO-STD-004 Development and Review of Asset Standards. Changes made from the previous version are summarised in Table 11 below.

Table 11 Changes from previous version

Section Number	Change
All	Updated to latest template and updated table numbers.
1 & 2	Updated to latest wording from Standards Specification template.
5.5.4.	Updated point 3 to reference correct table.
3	Updated to only include a “coating warranty” for period of a minimum of 5 years.
Table 7	Added definition of “coating warranty” to clarify that this includes both the product and workmanship.

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