Sydney WATER

Supplement to the WSA 201 Manual for Selection and Application of Protective Coatings

Technical Specification

Table of contents

Tables

1 Introduction

1.1 Sydney Water's Supplement

This document is Sydney Water's supplement to WSA 201 Manual for Selection and Application of Protective Coatings version 2.1 published by Water Services Association of Australia (WSAA) in July 2017. This manual is available from WSAA.

WSA 201 and this supplement shall be used for all works involving selection and application of protective coatings in Sydney Water.

This document contains Sydney Water's:

- Amendments to WSA 201;
- Approved protective coating products; and
- Recommended standard colours for various assets.

Where there are contradicting requirements between WSA 201 and this document, the requirement specified in this document shall take precedence. In the case of any omissions or ambiguities in the WSA 201 or this document, seek clarification and instruction from Sydney Water.

1.2 Alignment with WSAA National Codes and Standards

Sydney Water supports Water Services Association of Australia (WSAA) national codes standards initiative. It is directed at developing a series of national standard documents covering design and construction of water and wastewater infrastructure. In September 2013, WSAA published a new document called WSA 201 Manual for Selection and Application of Protective Coatings.

Over the years, many Sydney Water's standards have been replaced with WSAA national codes and standards. However, given regional differences in matters such as legacy conditions, operating licence constrains, topographical and meteorological conditions, environmental and other legislation, individual water agencies will continue to have amended versions or supplementary documents, such as this document.

2 Amendments to WSA 201

Table 1 List of amendments to WSA 201 (2017-2.1 edition)

<table>
<tr><th>Reference</th><th>Amendments</th></tr>
<tr><td>Page 37, Table 5.3, Internal</td><td>Replace the recommended systems for Reservoir roof framing, roof supporting structures, roof cladding undersides with:
EHB-SF, EHB-SB, GAL</td></tr>
<tr><td>Page 39, Table 5.5, Internal</td><td>Replace the recommended coating systems for Pipes, tunnels, maintenance structures with concrete substrates (row 4) with:
<table>
<tr><td rowspan="3">Pipes, tunnels, maintenance structures</td><td>New and old concrete</td><td>Immersion & buried</td><td>Not required[5&6]</td></tr>
<tr><td>New concrete</td><td>Extreme</td><td>CPL, NOV</td></tr>
<tr><td>Old concrete</td><td>Extreme</td><td>CAC, NOV</td></tr>
</table></td></tr>
<tr><td>Page 39, Table 5.5, NOTES</td><td>Add the following notes:
5. Concrete areas that are continuously immersed in sewage or buried in non-corrosive soil are not subjected to corrosion, hence they do not require additional protection.
6. Maintenance holes of gravity sewer systems that are located upstream and received fresh or chemically dosed sewage are typically not subjected to corrosive environment. Verify with the Water Agency.</td></tr>
</table>

<table>
<tr><th>Reference</th><th>Amendments</th></tr>
<tr><td>Page 40, Table 5.6</td><td>Replace the recommended coating systems for various concrete substrates (rows 5 to 8 of the first column) with:
<table>
<tr><td rowspan="3">[Internal surfaces of:]
Wet-wells, inlet & discharge MH, emergency storage tanks[6&8].</td><td>New and old concrete</td><td>Immersion & buried</td><td>Not required[4&5]</td></tr>
<tr><td>New concrete</td><td>Extreme</td><td>CPL</td></tr>
<tr><td>Old concrete</td><td>Extreme</td><td>CAC, EUH, PUE</td></tr>
<tr><td rowspan="3">[External surfaces of:]
Tanks, vessels, bins, hoppers, thickeners, clarifiers, grit chambers, digesters, walls.</td><td rowspan="2">Steel</td><td>Moderate</td><td>GAL, PUR-B, IZS</td></tr>
<tr><td>High</td><td>PUR-A, EHB-A</td></tr>
<tr><td>Concrete</td><td>Low to high</td><td>Not required</td></tr>
<tr><td rowspan="2">[Internal surfaces of:]
Tanks, vessels containing water or treated/quiescent sewage e.g. clarifiers, primary sedimentation tanks</td><td>Steel</td><td>Immersion</td><td>EHB-SF</td></tr>
<tr><td>Concrete</td><td>Low to Immersion</td><td>Not required[4]</td></tr>
<tr><td rowspan="4">[Internal surfaces of:]
Tanks, vessels containing agitated sewage, e.g. grit chambers, inlet works, digesters</td><td>Steel</td><td>Extreme</td><td>EUH, VES, NOV</td></tr>
<tr><td>New and old concrete</td><td>Low to Immersion</td><td>Not required[4&5]</td></tr>
<tr><td>New concrete</td><td>Extreme</td><td>CPL, NOV</td></tr>
<tr><td>Old concrete</td><td>Extreme</td><td>CAC, NOV</td></tr>
</table></td></tr>
<tr><td>Page 41, Table 5.6, NOTES</td><td>Add Note 8 as follows:
Leaf SPSs wet wells and inlet MHs do not require coating, provided that:
their catchment is predominantly residential,
flow to SPS is by gravity only,
no trade waste, private pumped systems of low-pressure systems discharges into SPS catchment,
flow in wet well and inlet MH controlled to minimise turbulence and release of H_2S,
wet well detention time is not too excessive (max. 2 hours at ADWF),
wet well and inlet MH provided with proper natural ventilation,
the above conditions not expected to change during the life of the asset,
wet well and inlet MH are designed to exposure ‘Class C” in accordance with AS 3735.</td></tr>
</table>

<table>
<tr><th>Reference</th><th>Amendments</th></tr>
<tr><td>Page 42, Table 5.7</td><td>Replace the recommended systems for Sodium hypochlorite for Reinforced concrete bunds with:
EPM, PUE, PUR-B</td></tr>
<tr><td>Page 47, Section 6.2.5.4</td><td>Add the following sentences after the first sentence of the first paragraph:
Sound substrate typically has pH level of 9 or greater. A pH indicator solution may be used to indicate sound concrete.</td></tr>
<tr><td>Page 47, Section 6.2.5.5</td><td>Replace the first sentence of second paragraph with:
Unless otherwise specified by the coating Manufacturer and approved by the Water Agency, concrete surface profile shall be CSP3 or coarser. This requirement overrides concrete surface profile requirements in Section 8.</td></tr>
<tr><td>Page 50, Section 6.3.3</td><td>Delete the third paragraph</td></tr>
<tr><td>Page 72, Section 8.13</td><td>Replace the Primer for concrete substrate with:
Concrete epoxy primer [P4] (200 µm nominal)</td></tr>
<tr><td>Page 73, Section 8.14</td><td>Replace the Primer note for concrete, other metals, timber plastics, previous coatings substrates with the following:
Consult supplier</td></tr>
<tr><td>Page 79, Section 8.20</td><td>Replace the primer note for concrete substrate with the following:
Epoxy mortar [P7] (20 mm nominal)
Delete the requirements for First coat and Intermediate coat for Concrete Substrate</td></tr>
<tr><td>Page 90, Section 8.30</td><td>Replace the coating thickness requirements (rows 5 to 8 of the table) with the following:
<table>
<tr><th>Item</th><th>Nominal DFT</th><th>Minimum DFT</th><th>Maximum DFT</th></tr>
<tr><td>Primer</td><td>-</td><td>-</td><td>-</td></tr>
<tr><td>Intermediate Coat</td><td>500 µm</td><td>375 µm</td><td>750 µm</td></tr>
<tr><td>Topcoat</td><td>500 µm</td><td>375 µm</td><td>750 µm</td></tr>
<tr><td>Total DFT</td><td>1000 µm</td><td>750 µm</td><td>1500 µm</td></tr>
</table></td></tr>
<tr><td>Page 97, Section 10.3.12</td><td>Replace the first sentence with the following:
At the completion of the coating for any given area, the level of adhesion of the coating to the substrate shall be determined as described in Section 6.2.6.1.</td></tr>
</table>

3 Approved Protective Coating Products

A list of approved protective coating products can be found in this section. These coatings have been assessed to:

- have satisfactory long-term track records;
- originate from quality assured manufacturers and/or suppliers;
- be part of a global product range; and
- have relevant products certifications issued by 3rd party accreditation bodies.

In the case of all listed products are not available, other products that can be demonstrated to have at least equal performance to the ones specified in the list may be used, subject to prior approval from the Sydney Water.

All products used within a selected coating system should originate from a single supplier where possible. Importantly, they must be compatible with each other and applied strictly in accordance with WSA 201 and the Supplier's specification.

Sydney Water reserves the right to make any changes to the content of the list at any time without giving notice or explanation.

Table 2 List of Approved Protective Coating Products

Code	Description	International	Jotun	Dulux	Wattyl	Carboline / Altex	Others
P1	Zinc rich epoxy primer	Interzinc 72 Interzinc 52	Barrier Barrier Plus	Zincanode 402 Zincanode 202	Galvit EP100	Carbozinc 858	
P2	Epoxy zinc phosphate primer	Intercure 200	Penguard Special Jotaprime 510	Duremax GPE Zinc Phosphate Durepon EZP	Epinamel PR360ZP	Carboguard 504 ZP	
P3	Non-inhibitive / holding epoxy primer	Interline 982 Intergard 269	Jotaprime 505	Luxepoxy 4 White Primer	Epinamel PR250	Carboguard 504 Buff Phenoline 311	
P4	Concrete epoxy primer	Ceilcote 680	Penguard ClearSealer	Durebild STE Luxafloor LGE	Epinamel CP502	Carboguard 1340	Chesterton ARC 797 Synthofloor 8016
P5	Waterborne acrylic primer/sealer	Intercryl 853		Acrylic Sealer Undercoat	Acrylic Sealer Undercoat	Resene Quick Dry	
P6	Vinyl ester primer	Ceilcote 380					Chesterton ARC NVE PC Aqa V725
P7	Epoxy mortar						Sikadur 31 Sikadur 41
P8	Alkyd zinc phosphate metal primer	Interprime 198	Jotaprime 250	Metalshield HB	Duranamel PR9	Multiguard GP5	
P9	Galvanised iron primer		Jotun Galvanite	Galvanised Iron Primer	Solver Galva-Link	ECZ Cold Galvanizing	
P10	Inorganic zinc silicate			Durezinc i90	Galvit ES600	Carbozinc 11 WB	
P11	Silane / Siloxane						Sikagard 705L
C1	Surface tolerant epoxy	Interplus 356 Interplus 1180	Jotamastic 87 Jotamastic 90	Durebild STE	Epinamel DTM680 Epinamel DT985	Carbomastic 615	
C2	High build epoxy	Interplus 1180	Jotacote 605	Duremax HBE	Epinamel DT985	Carboguard 690	
	High build epoxy (drinking water use)	Interline 850	Jotacote 605	Duremax GPE	Epinamel DT985	Carboguard 690 (N53 White)	
C3	High build solvent free epoxy	Interzone 954	Tankguard 412		Epinamel TL770SF	Phenoline 341	
	High build solvent free epoxy (drinking water use)	Interline 975	Tankguard 412		Epinamel TL770SF	Phenoline 341	Chesterton ARC S1PW
C4	Ultra high build epoxy	Interzone 396	Jotacote UHB	Luxepoxy UHB	Epinamel UHB1000	Carboguard 696 UHBE Plastite 4500	
	Ultra high build epoxy (drinking water use)	Interline 975	Jotacote UHB	Luxepoxy UHB		Carboguard 696 UHBE	
C6	Ultra high build vinyl ester	Interline 871 Ceilcote Flakeline 242				Plasite 4110 Plasite 4310	Chesterton ARC S7 Aqa V770
C7	High build chlorinated rubber			Luxachlor HB			
C8	Ultra high build epoxy / polyurethane mortar	Polibrid 705E					Fernco Ultracoat Hychem TL5 Epirez 733 UHB
C9	Water based epoxy			Duration P23		Altra~Shield WB-V	
C10	Alkyd aluminium leafing grade	Intertherm 891		Industrial Aluminium		Multiguard GP14	

Code	Description	International	Jotun	Dulux	Wattyl	Carboline / Altex	Others
C11	Polymer modified bitumen						VersEseal
C12	Calcium aluminate cement						MasterEmaco S 880 Sewpercoat Renderoc CAC Quadex Aluminaliner Plus Extrema-Dur S1 & S3
C13	Anti-abrasion ceramic filled epoxy/polyurethane						Belzona 1321 CeramAlloy CL Chesterton ARC SD4i
	Anti-abrasion ceramic filled epoxy/polyurethane (drinking water use)						Belzona 1341 Chemclad XC Chesterton ARC S1PW
T1	Gloss 2-pack acrylic polyurethane	Interthane 990 Interthane 870 (MIO)	Imperite 300 Hardtop AS	Weathermax HBR Luxathane SPX	Poly U400 Poly U775 MIO	Carbothane 134HG	
T2	Polysiloxane	Interfine 979			ValXL 800	Carboxane 2000	PSX 700
T3	Waterborne gloss acrylic	Intercryl 853	Jotun Acrylic Gloss	Weathershield	Wattyl Solagard	Resene Hi-Glo	
~~T4~~	~~Flexible high build acrylic~~						
T5	Anti-graffiti topcoat	Interfine 1080	Imperite 300	Quantum Clearcoat	Poly U400 Anti-Graffiti Clear	Carbothane 130 + Easy~Clean SX	PSX 700
T6	Alkyd enamel	Interlac 665		Super Enamel	Duranamel BR22	Multi_Gard GP14	
T7	Epoxy novolac	Ceilcote Flakeline 662				Phenoline 353 LTE Plastite 4550	Sikagard-63N Belzona 4311 Chesterton ARC CS4
T8	HDPE / PVC liner						BlueSeal AKS Humes Plastiline Agru Ultra Grip
T9	Petrolatum / bitumen / visco-elastic tape wrap					Carbowrap Petrolatum Tape	Denso Tape PetroGard Tape Densopol Tape Stopaq Wrappingband
T10	Heat shrinkable polyolefin coatings						Denso Premier 30 ST Canusa Wrapid Tape
T11	Polyurea						ERA Polymer AL 950

4 Standard Colours

Unless specified elsewhere, asset and equipment shall be painted with the following colour scheme.

Table 3 Recommended colours for asset and equipment

Item	Colour to AS 2700	
Buildings	G66	Environmental Green
Compressors/receivers	Y44	Salmon Pink
Cranes, gantry	Y14	Golden Yellow
Hand rails, ladders, platforms, bollards [if required to be painted and not galvanised]	Y14	Golden Yellow
Mechanical/electrical equipment	T45	Cootamundra
Motors, pumps, gear boxes – non-immersed	T45	Cootamundra
Pipes, valves and fittings – above ground in networks where aesthetic blending is required	G66	Environmental Green
Pipes, conduits and ducts in treatment facilities	-	See Table 4
Steelworks [if required to be painted and not galvanised]	N24	Silver grey
Tanks and vessels • External • Internal	 G66 N14	 Environmental Green White

Table 4 Colour scheme for pipes, conduit and ducts in treatment facilities

Content	Colour to AS 2700	
Chemicals		
• Acids	P11	Magenta
• Alkalis	G25	Olive
• Oxidising agents including chlorine gas	Y14	Golden yellow
• Reducing agents and other hazardous chemicals	R25	Rose pink
• Polymer solutions and non-hazardous chemicals	N52	Mid grey
Water		
• Drinking water	B24	Harbour blue (dark blue)
• Recycled water	P23	Lilac (bright purple)
• Clean water (raw, backwash, cooling/heating, stormwater)	G21	Jade
• Dirty water (sewage, wastewater, sludge, centrate)	-	Black
• Fire services	R13	Signal red
Oils, flammable and combustible liquids	X53	Golden tan (brown)
Gases	Y44	Sand
Air	B25	Aqua (light blue)
Steam	N24	Silver grey

Notes:

1. Labelling is the primary means of identification and shall be in accordance with AS 1345.
2. The colour identification system can be implemented by either pipework pigmentation during manufacture, painting or colour banding at regular intervals.
3. Stainless steel pipework is to be colour banded only (i.e. not painted) at regular intervals.
4. Chemical carrying pipes shall be fully coloured/painted and labelled. Refer to list of common pipework contents in Table 5.
5. PVC and ABS pipes that are exposed to UV shall be fully painted.
6. Refer to Sydney Water Technical Specification Part 3 – Electrical Works for electrical and communication conduits and insulation or covering of conductors used as fixed wiring.
7. Clean water is categorised as suitable for skin contact (but not ingestion). Dirty water is categorised as not suitable for skin contact.

Table 5 Common chemicals and contents and their designated pipework colours

Chemical	Type	Colour to AS 2700	
Acetic acid (glacial)	Acid	P11	Magenta
Aluminium sulphate	Acid	P11	Magenta
Citric acid	Acid	P11	Magenta
Ferric chloride	Acid	P11	Magenta
Ferric sulphate	Acid	P11	Magenta
Ferrous chloride	Acid	P11	Magenta
Hydrochloric acid	Acid	P11	Magenta
Hydrofluorosilicic acid & sodium silicofluoride (bulk fluoride powder)	Acid	P11	Magenta
Sulphuric acid	Acid	P11	Magenta
Ammonium hydroxide (ammonia solution)	Alkali	G25	Olive
Lime (slurry or hydrated)	Alkali	G25	Olive
Magnesium hydroxide (bulk slurry)	Alkali	G25	Olive
Soda Ash	Alkali	G25	Olive
Sodium hydroxide	Alkali	G25	Olive
Calcium Nitrate	Oxidising agent	Y14	Golden yellow
Chlorine (liquified Cl_2 gas)	Oxidising agent	Y14	Golden yellow
Potassium permanganate	Oxidising agent	Y14	Golden yellow
Sodium hypochlorite	Oxidising agent	Y14	Golden yellow
Sodium bisulphite	Reducing agent	R25	Rose pink
Polyacrylamide polymers	Polymer solution	N52	Mid grey
PolyDADMAC polymers	Polymer solution	N52	Mid grey

Salt /Brine	Non-hazardous	N52	Mid grey
Raw water	Clean water	G21	Jade
Filtered water	Clean water	G21	Jade
Industrial water	Clean water	G21	Jade
Reclaimed Effluent	Clean water	G21	Jade
Filter backwash water	Clean water	G21	Jade
Supernatant return (WFPs)	Clean water	G21	Jade
Cooling water	Clean water	G21	Jade
Stormwater	Clean Water	G21	Jade
Sewage	Dirty Water	Black	
DOOF WWTP Filtered Effluent (FE)	Dirty Water	Black	
Grit	Dirty Water	Black	
Raw Sludge	Dirty Water	Black	
Digested Sludge	Dirty Water	Black	
WFP Sludges	Dirty Water	Black	
RAS	Dirty Water	Black	
WAS	Dirty Water	Black	
Centrate	Dirty Water	Black	
Supernatant (WWTPs)	Dirty Water	Black	
Process Drainage	Dirty Water	Black	
Digester gas	Flammable	X53	Golden tan
Ethanol	Combustible liquid	X53	Golden tan
Methanol	Combustible liquid	X53	Golden tan

5 Document control

5.1 Ownership and approval

BMIS number: ACP0166

	Name	Position title
Prepared by	Jerry Sunarho	Senior Engineer
Reviewed by	Milan Rubcic Robert Loncar	Lead Engineer Lead Engineer
Approved by	Norbert Schaeper	Manager, UD&E

5.2 Change history

Version	Date	Description of change	Approved by
1	23/12/2010	First issue	JC
2	11/10/2013	Converted to Sydney Water's supplement to WSA 201	PG
3	19/09/2017	Modification of the approved products list Change of electrical cabinets colours Adding amendments for WSA 201	KW
4	17/09/2019	Adding further amendments for WSA 201 Modification of the approved products list Change of recommended colours for electrical cabinets and chemical pipework.	NS