

# Chemical Dosing Installations

SWC Guide to Proven Products – October 2018

## Revision History

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# 1 Introduction/Disclaimer

The following tables contain the majority of equipment found within Networks or Treatment Plant chemical dosing installations at Sydney Water sites. These lists have been developed to assist Contractors and Sydney Water employees with identifying equipment that has been found to be suitable and complying to Sydney Water's stringent requirements.

It is to be noted that use of Supplier/Manufacturer equipment not listed on the following tables will be subject to Sydney Water approval.

If any noted equipment is no longer available or superseded, please advise Sydney Water such that the document may be updated.

This document is to be read in conjunction with the current revisions of the Sydney Water Specifications. Where ambiguity exists this shall be raised with Sydney Water.

# 2 General

The following sections cover general requirements regarding chemical installations within Sydney Water. These requirements are in addition to those covered in;

- Sydney Water Technical Specification Part 1: Civil Works
- Sydney Water Technical Specification Part 2: Mechanical Works
- Sydney Water Technical Specification Part 3: Electrical Works
- Sydney Water Instrumentation and Control Standards
- The CDU (ACP0002) and RCP (D0000389) Technical Specifications
- The Project Specific DS100 Technical Specification
- The Sydney Water Generic Chemical Dosing P&IDs.

## 2.1 Spill and Leak Containment

All chemical dosing installations are to be designed to provide a complete containment strategy. This requires the designer to develop a solution for containing chemical spills at any point of a chemical dosing installation.

A double containment piping system should be selected based on the practicalities of the site, and provision of the highest level of safety to plant personnel. Selection should be made in consideration of site specific aspects such as;

- Will the pipe work be buried?
- Access for maintenance/emergency repair.
- Length and bends in pipe runs.
- Proximity of pipe runs to walkways, process units, vehicle operating areas etc.
- Can the outer containment become pressurised?
- Where will a leak in the pipe run be directed to?

It should be noted that all systems have mechanical limitations, with most external containment pipes being de-rated in pressure due to jointing methodologies. The supplier of the selected system should be consulted in this regard.

## 2.2 Chemical Training

The following specific training requirements apply to all personnel working on chemical dosing systems: All project engineers, design engineers, projects managers, supervisors and leading hands specifically working on the chemical dosing systems will attend SWC 's Chemical Dosing Training.

- All personnel installing plastic pipework including uPVC, cPVC and fusion polyethylene will undertake specific supplier or industry training on installation techniques.
- Records/ certificates for this training will be produced when requested by SWC.

## 2.3 Consistency of Installation

Consistent brands/models are to be used throughout all chemical dosing installation. Where possible, equipment should be selected in consideration of what has been used at other installations located at the same site. This is particularly applicable to Treatment Plants.

## 2.4 Material Selection and Standard Chemicals Used

The following chart lists the commonly used chemicals at Sydney Water assets. All chemicals have specific requirements, and as such the following list is to be used as a guide only. Chemicals highlighted in **red** are less common and as such will have specific requirements for materials or fittings not covered within this document.

All pipes are to be painted and/or coloured as specified in Sydney Water Technical Specification Part 2: Mechanical Works.

Chemical	Gasket/Seal Material
Aluminium Sulphate	FPM (Viton)
Hydrochloric Acid	FPM (Viton)
Sulphuric Acid	FPM (Viton)
Citric Acid	FPM (Viton)
Sodium Bisulphite	FPM (Viton)
Calcium Nitrate	FPM (Viton)
Magnesium Hydroxide	FPM (Viton)
Lime Solutions	FPM (Viton)
Potassium Permanganate	FPM (Viton)
<b>Carbon Dioxide Solutions</b>	FPM (Viton)
All forms of Chlorine (incl. Hypochlorite and Chlorine solutions)	FPM (Viton)
Iron Salts (incl. Ferric Chloride, Ferric Sulphate and Ferrous Chloride)	FPM (Viton)
<b>Ammonia Solutions</b>	EPDM
<b>Methanol</b>	EPDM
<b>Ethanol</b>	EPDM
Caustic Solutions	EPDM

## 3 Acceptable Products Lists

**Table 1** Chemical Pipework and Fittings - Acceptable Supplier List

Item Description	Supplier/Model	Supplier/Model	Supplier/Model	Comments/Requirements
uPVC/cPVC Schedule 80 Pipe	Georg Fischer	Total Eden (Ipex)		ASTM D1784 ASTM D1785 <b>NOTE:</b> PN15 is not acceptable.
uPVC/cPVC Schedule 80 Fittings	Georg Fischer	Total Eden (Ipex)		ASTM D1784 ASTM D2467 ASTM D2464 **Unions to be PN16 or better**
uPVC/cPVC Double Containment Pipe Systems	Georg Fischer Double-See™ Schd. 80 x Schd. 80 Schd 80 x Schd. 40	Total Eden (Ipex)	Georg Fischer Contain-It™ Schd. 80 x PE100 **Must specify Sched 80**	Rating of outer containment subject to the containment strategy adopted (can the containment pipe be pressurised). Un-pressurised outer preferred.
PE100 Polyethylene PN16 Pipe with PE100 Polyethylene PN16 Containment Pipe (*PE Use Subject to Approval)	Georg Fischer	-	-	AS4130 AS4131
Polyethylene PN16 Fusion Fittings (*PE Use Subject to Approval)	Georg Fischer	Vinidex/Plasson	-	AS4129 AS4131
PE100 Polyethylene PN16 Pipe with DWV outer containment pipe.	PE – Georg Fischer DWV – Vinidex	-	-	<ul style="list-style-type: none"> <li>• Outer pipe to be coloured and labelled. Buried lines should be identified with tape tracer and coloured.</li> <li>• Internal pipe to be indelibly coloured.</li> </ul>
Solvent Welding Products/System	IPS Weldon 724 System (with P70 Primer)			Fitters to be trained on and use Sydney Water's Solvent Welding procedure. Acceptable training currently conducted by Total Eden or Georg Fischer.
Pipe Support/Clip Systems	Georg Fischer	Unistrut/Ezystrut etc. Loose fitting with suitable isolation material only.	Total Eden (Ipex)	<ul style="list-style-type: none"> <li>• Pipe clips to allow for axial movement.</li> <li>• Allow sufficient spacing off backing boards/concrete for access to unions and fittings.</li> <li>• Consideration to be given to thermal expansion and bends on long runs.</li> </ul>



Item Description	Supplier/Model	Supplier/Model	Supplier/Model	Comments/Requirements
uPVC/cPVC Ball Valves	Georg Fischer Type 546	-	Total Eden (FIP VKD)	Valves must be suitable for chemical use.
uPVC/cPVC Check Valves	Georg Fischer Type 561	-	Total Eden (FIP SXE)	Valves must be suitable for chemical use.
<i>uPVC/cPVC Check Valves (Spring Loaded)</i>	Georg Fischer Type 562	-	Total Eden (FIP SXE)	Any internal spring to be suitable for the chemical used.
uPVC/cPVC Diaphragm Valves	Georg Fischer Type 514	-	Total Eden (FIP VM)	
uPVC/cPVC Butterfly Valves	Georg Fischer	-	Total Eden (FIP VM)	
uPVC/cPVC Motorised Valves	Georg Fischer Type 546 with EA-11 24VDC			Motorised valves to be 24VDC.
uPVC/cPVC Pneumatic Actuated Valves	Georg Fischer	-	-	Pneumatic not preferred for chemical dosing.
uPVC/cPVC Solenoid Actuated Valves	Georg Fischer			Not to be used on main chemical dosing lines.
uPVC/cPVC Strainers	Georg Fischer Type 305	-	Total Eden (FIP RV)	Highest Pressure Rating Available.
uPVC/cPVC Back Pressure Control/Relief Valves, Anti-syphon valve.	Stubbe Reducing – DMV Relief - DHV	Georg Fischer Type 582		Valves to be selected in consideration of process requirements. Anti-syphon applications should be designed to close if a suction effect occurs downstream of the valve.
Camlock Connections	Dixon			Poly/Stainless Steel 316 dependent on chemical.

**Table 2** Mechanical Equipment - Acceptable Supplier List

Item Description	Supplier/Model	Supplier/Model	Supplier/Model	Comments/Requirements
Dilution Water Pumps	Grundfos			Consistent to plant/asset type.
Bund and Unloading Bay Sump Pumps	Tsurumi TM Series			Titanium to be used where any aggressive chemical is used.
Transfer Pumps - General	Iwaki			Magnetic type, suited to the required duty and chemical.
Transfer Pumps – High viscosity (e.g. polymer).	Iwaki	Mono		Progressive Cavity Type to be used for high viscosity materials.
Chemical Dosing Pumps - <b>Digital</b>	Grundfos DME, DDI, DDA	Iwaki		<ul style="list-style-type: none"> <li>• Pumps to be selected in consideration of site control/electrical setup. Profibus to be used where available in preference to hard-wired solutions.</li> <li>• Digital dosing pumps that utilise DC stepper motors are preferred to ensure constant dosing in lieu of a pulse dosing arrangement.</li> <li>• Where possible <b>10 bar</b> dosing pumps are preferred.</li> </ul>
Chemical Dosing Pumps – <b>Conventional</b> (Piston drive with Stroke/Speed Control)	Prominent	Iwaki	Neptune Evoqua (W&T) Doseuro Grundfos	<ul style="list-style-type: none"> <li>• Pumps to be selected in consideration of site control/electrical setup.</li> <li>• Where possible <b>10 bar</b> dosing pumps are preferred.</li> </ul>
Pulsation Dampeners	Blacoh	AccuPulse (rebadged Blacoh)		<ul style="list-style-type: none"> <li>• Include bladder pressure gauge and Schrader valve for hand pump.</li> <li>• Bladder holder to be flanged &amp; bolted.</li> <li>• Solvent Cement Connections. (Flange is the <u>second</u> preference)</li> </ul>
Storage Tank Magnetic Level Indicators	Weka (uPVC/cPVC)			<ul style="list-style-type: none"> <li>• Any fabricated PVC pipework supplied must be constructed by appropriately trained fitters (in the gluing and piping system)</li> </ul>

Item Description	Supplier/Model	Supplier/Model	Supplier/Model	Comments/Requirements
Calibration Cylinders	**KoFlo	Other		<ul style="list-style-type: none"> <li>**Further investigations in progress. Requirement for Schedule 40 minimum PVC clear tube. May require custom fabrication.</li> </ul>
FRP Chemical Storage Tanks	Corrosion Technology Australia	Newel Composites	RPC	BS4994 Category 1. Should be 3 <sup>rd</sup> party verified.
3 <sup>rd</sup> Party Verifiers of FRP Tanks	Oceania Composites	Dennis Southam & Associates		
Polyethylene Rotomoulded Storage Tanks	Dex Australia	Interpak	Strongform Industrial	Generally Networks Installations only.
PVC tanks	Industrial Plastics	Fusion Plastics		
Steel Chemical Storage Tanks				
Backflow Prevention Devices	Pentair RP03			
Safety Showers	Speakman			AS4775 compliant.

**Table 3** Instruments for Chemical Systems - Acceptable Supplier List

Item Description	Supplier/Model	Supplier/Model	NETWORKS SPECIFIC	Comments/Requirements
Pressure Indicating Gauges	Stubbe w/diaphragm			Solvent welded connection.
Pressure Transmitters		Refer to TS01 – I&C Standards		Consistent with site. Drawing of commissioned instrument setup (heights etc.) to be provided. Consistent brand across installation.
Pressure Switches		Refer to TS01 – I&C Standards		
Rotameters	Georg Fischer	Stubbe		
Float Type Level Switches		Refer to TS01 – I&C Standards	Flygt	Consistent with site.
Capacitive Type Level Switches		Refer to TS01 – I&C Standards	IFM Efector	Consistent with site.
Level Transmitters (Ultrasonic)		Refer to TS01 – I&C Standards	Vega – Vegason	Consistent with site. Drawing of commissioned instrument setup (heights etc.) to be provided. Consistent brand across installation.
Flow Transmitters	Refer to TS01 – I&C Standards	ABB Magmaster Endress + Hauser	Siemens	Consistent with site.
Flow Switch		Refer to TS01 – I&C Standards	IFM Efector (Thermal Dispersion)	Consistent with site.

**Table 4** Miscellaneous Other Equipment

Item Description	Supplier/Model	Supplier/Model	Supplier/Model	Comments/Requirements
Mobile Platform Ladder	Bailey FS10863			