

Engineering Standard

M-SPE-STD-012

Chemical Dosing Pumps

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Version History

Rev	Date	Description	Author	SME	Owner	Approver
2	18/05/2022	Amended Version				
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1 Purpose

This Engineering Standard provides the minimum requirements for Seqwater works relating to the design, supply and installation of new or upgraded chemical dosing pumps. It shall be used in conjunction with the project documentation and other documents it references to assist in ensuring a fit for purpose asset.

This Engineering Standard is not intended to be relied upon solely for design and supply; advice from specialist engineers and/or manufacturers may be required on a case by case basis.

This Engineering Standard is applicable to all diaphragm and peristaltic chemical dosing pumps that are used to control and meter the transfer of chemicals from bulk storage systems to the treatment point. Chemical dosing pump applications include, but are not limited to, water, sewerage and environmental treatment plants and network dosing facilities for potable, recycled and irrigation water where chemical dosing is required.

This Engineering Standard applies to, but is not limited to, the dosing of the following chemicals:

- Aluminium Sulphate (Alum)
- Ammonia
- Ascorbic Acid
- Calcium Hydroxide (Lime – slurry/water)
- Hydrochloric Acid
- Polyacrylamide (Poly)
- Potassium Permanganate (Pot Perm)
- Powder Activated Carbon (PAC - slurry)
- Sodium Carbonate
- Sodium Fluoride solution
- Sodium Fluorosilicate
- Sodium Hydroxide (Caustic – up to 50% w/w solution)
- Sodium Hypochlorite (Hypo)
- Sulphuric Acid

Where a chemical, not referenced above, is used within a dosing application, the requirements of this Engineering Standard shall apply as far as reasonable.

Unless otherwise referenced, this Engineering Standard is not intended to cover:

- Dosing Skids
- Supply and discharge tanks, pipes, valves, and nozzles.
- Bunding
- Electronic Control system/s
- Gauges, displays or instrumentation that is not specifically detailed within.
- Dosing system specific ancillary equipment that is not specifically detailed within.

Refer to the applicable standards, reference or P&ID documents for these details.

This Engineering Standard forms the minimum requirements for the selection of preferred equipment for chemical dosing pumps for use within Seqwater assets. The preferred equipment will be developed through one or more open market procurement processes with the resultant selection listed in *X-LST-STD-001, Seqwater Preferred Equipment List*. Seqwater's Commercial Manager will approve the recommended preferred equipment that results from the open market procurement process.

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2 Application of Engineering Standard

This Engineering Standard applies to all Seqwater employees, suppliers, contractors 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.

Deviation from the requirements in this Engineering Standard requires written agreement from Seqwater as per the deviation process detailed in X-PRO-STD-008 Asset Standards Management and Application. This process includes completion of an Asset Standards Deviation Request Form and submission via the Seqwater Project Representative (for external parties) or via Seqwater's Engineering Mailbox (engineering@seqwater.com.au) (for internal parties).

Where noted in this Engineering Standard that Seqwater approval or acceptance shall/must be sought, approval or acceptance must be gained through the Seqwater Asset Standard deviation process, as identified above.

Responsibility for ensuring compliance with Seqwater Engineering Standards lies with those engaged in the management and execution of design, construction and maintenance activities on Seqwater assets. This Engineering Standard must be used in conjunction with other relevant Asset Standards and project specific documents to define the technical requirements for asset design and construction.

The Contractor maintains responsibility for a fit for purpose design and compliance with all relevant Australian Legislation, Standards, Codes and Guidelines (including those produced by WSAA). Where no Australian Standard exists for a particular application, work must conform to the most current version of an industry accepted international standard.

In the case that it is identified that a specific requirement within this Engineering Standard does not meet the requirements of project specific documents, another Seqwater Asset Standard or Australian Legislation, Standards, Codes or Guidelines, the conflict must be brought to the attention of the Seqwater Principal, Engineering Standards and Assurance (or their delegate) via the Engineering Mailbox, and written agreement must be gained prior to application of the requirement.

Advice must be sought from Seqwater to clarify any ambiguities regarding this Engineering Standard.

Seqwater undertakes regular updates of Asset Standards. Before utilising this Engineering Standard, the complete list of Seqwater Asset Standards should be reviewed, to ensure currency and applicability of standards applied to the works.

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3 Definitions

The following definitions apply to this Engineering Standard.

Table 3-1 – Definitions

Term	Definitions
Seqwater approval / acceptance	Written sign-off gained via the deviation process, as detailed in X-PRO-STD-008 Asset Standards Management and Application.
Contractor	An entity engaged by Seqwater to undertake work in accordance with an agreed contract and defined scope of work.
Manufacturer / Supplier / Vendor / Original Equipment Manufacturer (OEM)	The entity that manufacturers or supplies equipment to meet the specifications of the Contractor.
Owner / Principal / Seqwater	The entity that manufacturers or supplies equipment to meet the specifications of the Contractor.
Pump, Pump's or Pumps	Refers to the singular and plural form of Chemical Dosing Pumps
REX	Seqwater Electronic Document and Records Management System.
Shall / must	Indicates a mandatory requirement
Should	Indicates a recommendation
Scope of Works	The scope of works document forming part of the contract including supporting design documentation
Seqwater Representative	The person empowered by Seqwater to administer the contract, or their nominated representative
This Engineering Standard	Engineering Standard <i>M-SPE-STD-012 Chemical Dosing Pumps</i>
Transfer Pump	A pump used to transfer chemicals between tanks on site.

4 Abbreviations

The following abbreviations apply to this Engineering Standard.

Table 4-1 – Abbreviations

Abbreviation	Description
AS	Australian Standard (published by Standards Australia)
DN	Nominal diameter
ESA	Engineering Standards and Assurance
PN	Nominal pressure
WSAA	Water Services Association of Australia

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5 Reference Documents

The documents listed in

Table 5-1 and Table 5-2, including the requirements therein, are relevant to this Engineering Standard. In their latest editions, these documents form a part of this Engineering Standard. Note that this is not an exhaustive list of documents relevant to the works.

Table 5-1 – Reference Seqwater Documentation

Asset Standard Document number	Document Title	Controlled Documents Reference
B-SPE-STD-003	Commissioning Requirements	SPE-00346
B-SPE-STD-009	Liquid Chemical Storage and Dosing	SPE-00445
B-SPE-STD-011	Polymer, PAC, Pot Perm, and Soda Ash systems	SPE-00481
B-SPE-STD-012	Lime Storage, Mixing and Dosing system	SPE-00496
B-DWG-STD-011	Standard Drawing - Minimum Requirements, P&ID, Caustic Soda, Sulphuric Acid & Hypo Unloading, Storage and Dosing – Sheet 1 of 2	D19/166691
B-DWG-STD-012	Standard Drawing - Minimum Requirements, P&ID, Caustic Soda, Sulphuric Acid & Hypo Unloading, Storage and Dosing – Sheet 2 of 2	D19/166682
B-DWG-STD-013	Standard Drawing – Minimum Requirements, P&ID, Aqueous Ammonia Unloading, Storage and Dosing Sheet 1 of 2	D19/166684
B-DWG-STD-014	Standard Drawing – Minimum Requirements, P&ID, Aqueous Ammonia Unloading, Storage and Dosing Sheet 2 of 2	D19/166685
B-DWG-STD-015	Standard Drawing – Minimum Requirements, P&ID, Liquid Chemical Transfer Pumps	D19/166686
B-DWG-STD-016	Standard Drawing – Minimum Requirements, P&ID, Liquid Chemical Ring Main Dosing System	D19/166687
B-DWG-STD-021	Standard Drawing - Piping and Instrumentation Diagram (P&ID), Lime Storage, Mixing/Batching and Dosing System, Sheet 1 of 6 (Lime Storage and Mixing/Batching)	D21/173117
B-DWG-STD-022	Standard Drawing - Piping and Instrumentation Diagram (P&ID), Lime Storage, Mixing/Batching and Dosing System, Sheet 2 of 6 (Lime Saturator System)	D21/173119
B-DWG-STD-023	Standard Drawing - Piping and Instrumentation Diagram (P&ID), Lime Storage, Mixing/Batching and Dosing System, Sheet 3 of 6 (Lime Water Dosing System)	D21/173108
B-DWG-STD-024	Standard Drawing - Piping and Instrumentation Diagram (P&ID), Lime Storage, Mixing/Batching and Dosing System, Sheet 4 of 6 (Lime Slurry Pumped Dosing System)	D21/173110
B-DWG-STD-025	Standard Drawing - Piping and Instrumentation Diagram (P&ID), Lime Storage, Mixing/Batching and Dosing System, Sheet 5 of 6 (Lime Slurry Eductor Dosing System)	D21/173112

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Asset Standard Document number	Document Title	Controlled Documents Reference
B-DWG-STD-027	Standard Drawing – Minimum Requirement, P&ID – Polymer, PAC, Pot Perm, and Soda Ash, Storage, Batching and Dosing System, Sheet 1 of 2	D21/153
B-DWG-STD-028	Standard Drawing – Minimum Requirement, P&ID – Polymer, PAC, Pot Perm, and Soda Ash, Storage, Batching and Dosing System, Sheet 2 of 2	D21/151
E-SPE-STD-001	Electrical Design and Construction	SPE-00352
I-SPE-STD-015	Instrumentation	SPE-00353
I-SPE-STD-013	Control System Design and Construction	SPE-00361
M-PRO-STD-001	Commissioning of Electromagnetic Flow Meters for Potable Water Supply Procedure	PRO-01845
M-SPE-STD-001	General Mechanical	SPE-00367
M-SPE-STD-004	Protective Coatings	SPE-00348
M-SPE-STD-009	Flow Meters	SPE-00434
M-SPE-STD-010	Chemical Dosing Skids	SPE-00435
M-TMP-STD-003	Electromagnetic Flow Meter Commissioning ITP Template	TEM-00153
X-LST-STD-001	Seqwater Preferred Equipment List	REG-01074
X-PRO-STD-001	Asset Standards Document Classification and Naming Structure	PRO-01873
X-PRO-STD-002	Engineering Drawing Number Procedure	PRO-01872
X-PRO-STD-004	Development and Review of Asset Standards	PRO-01874
X-PRO-STD-006	Asset and Equipment Identifier Procedure	PRO-02190
X-PRO-STD-007	Drawing & Spatial Data Standards	PRO-02187
X-PRO-STD-008	Asset Standards Management & Application	PRO-02205
X-PRO-STD-009	Engineering Design, Construction, Operation and Maintenance	PRO-01617
X-TMP-STD-022	Asset Standards Deviation Request	TEM-00224

Table 5-2 – Reference External Standards, Specifications and Codes

Standard/Specification	Document Title
AS 1110	ISO metric hexagon bolts and screws
AS 1112	ISO metric hexagon nuts
AS 1237	Plain washers for metric bolts, screws and nuts for general purposes
AS 1318	Industrial safety colour code
AS 1319	Safety signs for the occupational environment
AS 1359.107	Rotating electrical machines - Part 7: Classification of types of construction, mounting arrangements and terminal box position (IM Code)
AS 3000	Electrical Installations. (Wiring Rules)
AS 4087	Metallic flanges for waterworks purposes
AS 4312	Atmospheric Corrosivity Zones in Australia

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Standard/Specification	Document Title
AS 60529	Degrees of protection provided by enclosures (IP Code)
E.P Act	Environment Protection Act (QLD)
WHS Act	Work Health and Safety Act
WSA 03	Water Supply Code of Australia
WSA 109	Industry standard for flanged gaskets and O-rings

6 Technical Requirements

6.1 General

Refer to *M-SPE-STD-001* for general requirements related to mechanical assets.

This Engineering Standard provides guidance on standard operating and physical requirements of chemical dosing pumps, and their constituent components. The chemical dosing pumps shall be suitable for the intended application and have a proven record of reliable operation in that application. The specific application details include, but are not necessarily limited to, operational and maintenance requirements, operating environment, chemical quality and water / chemical quality. Refer to **Appendix 1: Chemical Compatibility Guide**, for recommended dosing and transfer pump types for each chemical to be dosed.

In the case that it is identified that a specific requirement within this Engineering Standard would lead to installation of an unsuitable system for the application, an alternative shall be specified and brought to the attention of the Principal Engineering Standards and Assurance, or their delegate, for a deviation approval.

The pump design shall be robust and practicable, having regard to all constraints. It shall be designed for a high degree of mechanical reliability, minimal maintenance, no spillage, and minimal containment release during servicing. The designs shall be carried out using current water industry best practice design procedures in common use in Australia.

The dosing pumps shall be made up of components commonly used for the application. Spare parts shall be readily available in Australia for components which may reasonably require replacement. Lead time for the delivery of spare parts to a nominated Seqwater site will be a maximum of three working day after receipt of order.

All components within the dosing pump and associated fittings must be compatible with the dosing chemical as specified in the project scope of works. Refer to Appendix 1: Chemical Compatibility Guide, for guidance on material compatibility for each dosing chemical. Where materials are not nominated within this Engineering Standard, the Contractor shall select materials best suited for the operating conditions and pumped chemical.

External pockets on the associated equipment that facilitate moisture ponding are not permitted.

If lifting attachments are installed, they shall be in accordance with the *Provisions for Handling Plant* section of *M-SPE-STD-001*.

All components and ancillary equipment shall be designed to withstand washdown with a handheld, mains pressure water hose.

6.2 Design Life

The required design life of dosing pumps is specified in *M-SPE-STD-001*. The selection of all associated equipment must reflect the specified design life. It is understood that Dosing Pumps may require overhaul / maintenance to achieve the specified asset life.

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6.3 Operating Conditions

All components must be suitable for the design, maximum flow, pressure, temperature, duty cycle and other operating conditions. They must have long term compatibility and suitability with the specific dosing chemical specified in the project specific scope of works. All wetted parts shall be designed using corrosion and wear resistant materials suitable for the specific dosing chemical specified.

All components must be suitable for the external environment, including exposure to any potential or gaseous chemical. At a minimum, all components must be capable of operating within an open, roofed environment (no walls) with ambient operating temperatures of -5 to 50°C and relative humidity of 10 to 100%. More extreme environmental conditions may need to be assigned on a case-by-case basis.

The pump will be required to operate continuously at full duty, 24 hours per day, 7 days a week under the defined operating conditions.

Digital dosing pumps must be designed to be remotely started after power supply interruption.

6.4 Safety in Design

Seqwater's expectations relating to safety in design are outlined in the *Safety in Design* section of *X-PRO-STD-009*.

All equipment must be designed to perform its intended duty safely and without being attended. Wherever practicable, health and safety risks shall be fully mitigated ("designed out") during the design phase for both the construction and end use phases.

If identified as a credible risk for a specific site, design considerations for Dosing Pumps must include adequate controls for leak detection and prevention.

Where pumps are being installed in a Classified Hazardous area, the pump must comply with the requirements of the *Hazardous Area Application* section of *E-SPE-STD-001*, and the *Hazard Management* section of *M-SPE-STD-001*.

All pump installations must include a suitable external, adjustable Pressure Relief Valve.

6.5 Drinking Water Compatibility

Dosing pumps must conform to the Potable Water Compatibility section of *M-SPE-STD-001*.

6.6 Physical and Operating Requirements

6.6.1 General Installation and Operating Environment

The system layout and requirements of assets upstream and downstream of the dosing pump must comply with the requirements of *M-SPE-STD-010* as well as any other relevant specification.

Unless otherwise specified, refer to the *Standard Drawing – P&ID Minimum Requirements*, referenced in

Table 5-1, for the minimum standard dosing system requirements for each respective dosing system/chemical.

6.6.2 Mechanical Requirements

The dosing pump(s) must have long term compatibility and suitability with the specific dosing chemical specified and sized according to the required dosing capacity and pressure specified in the specific project scope of works.

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The pump must be capable of achieving the project specific scope's dosing requirement with a maximum flow rate at least 10% greater than specified maximum flow and a dosing accuracy repeatability of +/- 1.5% maximum over the pumps full specified turndown ratio.

The pump shall be capable of the specified minimum flow condition as specified in the project specific scope.

The driving motor shall have sufficient power to drive the pump under all operating conditions and speeds, including starting under full load and the drive components shall not fail under a stalled motor condition.

Pumps with abrasion resistant linings are preferred unless otherwise stated.

Peristaltic pump pressing shoes or rollers shall be adjustable. The housing must include a lubrication level indicator and a port for a hose failure sensor. The outcome of a formal project risk assessment to determine the risk to potable water of a hose failure, will determine the requirement for a leak/level sensor.

The pump's Net Positive Suction Head Required (NPSHR) shall be at least one metre less than the Net Positive Suction Head Available (NPSHA)

The pump speed shall be locally, and remotely adjustable while the pump is in operation. In addition, when a diaphragm pump is fitted with a stroke servo, the pump stroke shall also be locally, and remotely adjustable while the pump is in operation.

Each dosing pump must be capable of being flushed free of all chemical residue using only clean water (where appropriate) circulating through the pump. Flushing must be completed without the need to remove or dismantle any part of the pump or installed components.

Diaphragm dosing pumps must contain a secondary sealing system to separate any lubricant, gear box oil or similar from the dosing chemical to avoid potable water contamination.

The dosing pump(s) must be supplied with fittings on the suction and discharge sides to enable connection with the applicable application's pipe work. The fittings must be suitable for the design, maximum flow, pressure, temperature and other duty conditions. They must have long term compatibility and suitability with the specific dosing chemical specified in the project specific scope of works.

Flanges must be in accordance to AS 4087 and shall be full faced with suitable backing plates where required. Suitable gaskets, compliant with WSA 109, shall be supplied and used on all flange joints.

6.6.3 Electrical Requirements

The equipment must comply with the requirements of AS 3000 and operate on a single phase, or 3 phase power supply without the need for transformers to modify the supply power source. All electrical requirements must comply with the requirements of E-SPE-STD-001, *Electrical Design and Construction* Specification.

The dosing pump must be supplied via a single, switched, Special Purpose Outlet where permissible by the design or hard wired with a local isolation switch.

The dosing pump may provide local indication of the Dose Rate Setpoint, the Current Dose Rate and the current Control Mode

The dosing pump must support a hardwired (digital and analogue) electrical interface with the facilities PLC system.

The dosing pump may include an additional wired communications interface. However, this interface can only be utilised if the dosing pump supports remote write protection, (also called read-only or parameter locking), and the communications protocol is supported by the PLC.

In all cases, the use of a communications protocol shall not replace the hardwired control signals described below.

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Remote Monitoring

- Dosing Rate or Pump Speed (Analogue)
- Local Isolator or SPO closed (Digital)
- Dosing Pump Running (Digital)
- Pump Fault alarm (Digital)

If the pump is fitted with a local control interface, then the following additional signals are required:

- Local Control Selected (Digital)
- Remote Control Selected (Digital)

Remote Control

All dosing pumps must support the following hardwired signal interface:

- Dose Rate or Pump Speed Setpoint (Analogue)
- Remote Run (Digital)
- Remote Stop (Digital – optional)
- Remote Reset (Digital)

The facility control system can emit both maintained and pulsed commands.

A maintained command is held for as long as the effect is required. E.g. if the equipment is sent a maintained run command, it will operate for as long as the run signal is held.

A pulse command triggers a change in state. E.g. if the equipment receives a pulsed run command, it will continue to run until it receives a subsequent stop command.

Which type of command signal is used depends on the interface supported by the equipment. Where both are supported, maintained commands are preferred.

6.7 Protective Coatings

All protective coatings shall be as per *M-SPE-STD-004, Protective Coatings*. Equipment shall generally be coated and tested to the appropriate original equipment manufacturers (OEM) high performance paint specification. The OEM paint specification is to be assessed for suitability for the specific application.

The protective coating shall be suitable to achieve the design life (refer Section 6.2), without the need for re application. A minimum C3-Medium corrosivity category (as per AS 4312), will apply for all external surface protection requirements. A C4-high or C5-very high corrosivity category shall be assigned to equipment that will be installed in the specific environments, including those specified by *M-SPE-STD-004, Protective Coatings*.

6.8 Markings

In addition to the manufacturers name plate, labelling in accordance with the Labelling and Nameplates section of *M-SPE-STD-001*, and *X-PRO-STD-006, Equipment Naming convention* will be added when the pump is installed.

7 Execution

All approvals, supply, assembly, testing, submission, installation and commissioning requirements shall be as *M-SPE-STD-001, General Mechanical* and *B-SPE-STD-003, Commissioning Requirements*.

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8 Changes from Previous Version

Changes made from

This Engineering Standard will be regularly reviewed and updated, including the consideration of requested alterations, in accordance with Seqwater Procedure *X-PRO-STD-004 Development and Review of Asset Standards*. Changes from the previous version of this document are summarised in *Table 8-1 – Changes from previous version* Table 8-1 below.

Table 8-1 – Changes from previous version

Section Number	Change
All	Format updated to the current template. Minor amendments throughout to clarify and remove ambiguity/uncertainty.
1 and 2	Updated to the current standard wording.
Table 4-1	MTBF abbreviation definition deleted due to section 6.3 being deleted.
Table 5-1	B-STD-SPE-006, B-TMP-STD-007 and D-SPE-STD-001 deleted as not relevant or obsolete.
6.1	WSA 03 and D-SPE-STD-001 removed as not relevant to this standard.
6.3	Design Reliability Target section deleted as not relevant and ambiguous. Section updated to allow hard wiring with local isolation switch.
6.6	Drinking water compatibility updated to reference M-SPE-STD-001
6.9	GDE-00235 obsolete and replaced with X-PRO-STD-006
Appendix 2	Appendix 2 added to provide recommended pump type for each chemical.

9 Verification

Compliance with this document may be verified by internal audit.

10 Further Information

For further information please contact the owner of this document.

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Appendix 1: Chemical Compatibility Guide

Chemical Compatible Guide for Pumps.

Chemical	Metal	Non-metallic
Aluminium Chlorohydrate (ACH)	Titanium, Hastelloy	FKM, EPDM, CSM, PVC, PP, PE, PTFE, PVDF, Ceramic, glass, Noryl, FRP
Aluminium Sulphate (Alum)	Titanium, 316SS	FKM, EPDM, CSM, PVC, PP, PE, PTFE, PVDF, Ceramic, glass, Noryl, FRP
Ammonia Aqueous	316SS, 304SS, Hastelloy	EPDM, CSM, PVC, PP, PE, PTFE, PVDF, Ceramic,
Ascorbic Acid	Titanium, 316SS, 304SS, Hastelloy	EPDM, CSM, PVC, PP, PE, PTFE, Ceramic, glass, Noryl,
Citric Acid	Titanium, 316SS, Hastelloy	FKM, EPDM, CSM, PVC, PP, PE, PTFE, PVDF, Ceramic, glass, Noryl, FRP
Fluoride (Sodium Fluorosilicate)	Titanium, 316SS, Hastelloy	FKM, EPDM, CSM, PVC, PP, PE, PTFE, PVDF, Ceramic, glass, Noryl,
Fluoride (Sodium fluoride)	Titanium, 316SS, Hastelloy	FKM, EPDM, CSM, PVC, PP, PE, PTFE, PVDF, Ceramic, glass, Noryl,
Hydrochloric Acid	Titanium, Hastelloy	EPDM, CSM, PVC, PP, PE, PTFE, PVDF, Ceramic, glass, Noryl, FRP
Lime	Titanium, 316SS, 304SS, Hastelloy	FKM, EPDM, CSM, PVC, PP, PE, PTFE, PVDF, Ceramic, glass,
Magnasol	Titanium, 316SS, 304SS, Hastelloy	FKM, EPDM, CSM, PVC, PP, PE, PTFE, PVDF, Ceramic, glass, Noryl, FRP
PolyDADMAC	Titanium, 316SS, 304SS, Hastelloy	FKM, EPDM, CSM, PVC, PP, PE, PTFE, PVDF, Ceramic, glass, Noryl, FRP
Polymer	Titanium, 316SS, 304SS, Hastelloy	FKM, PP, PE, PVC, PTFE, Ceramic, glass, FRP
Potassium Permanganate	Titanium, 316SS, Hastelloy	EPDM, CSM, PVC, PP, PE, PTFE, PVDF, Ceramic, glass, Noryl,
Powder activated Carbon	Titanium, 316SS, Hastelloy	FKM, EPDM, CSM, PVC, PP, PE, PTFE, Ceramic, glass, Noryl,
Sodium Carbonate	Titanium, 316SS, 304SS, Hastelloy	FKM, EPDM, CSM, PVC, PP, PE, PTFE, PVDF, Ceramic, glass, Noryl,
Sodium Hydroxide	Titanium, 316SS, Hastelloy	EPDM, CSM, PVC, PP, PE, PTFE, Noryl, PVDF
Sodium Hypochlorite	Titanium, Hastelloy	FKM, CSM, PVC, PE, PTFE, glass, Noryl, PVDF
Sodium Bisulphite	Titanium, 316SS, 304SS,	EPDM, CSM, PVC, PP, PE, PTFE, PVDF, Ceramic, glass, Noryl, FRP
Soda Ash	Titanium, 316SS, 304SS, Hastelloy	FKM, EPDM, CSM, PVC, PP, PE, PTFE, PVDF, Ceramic, glass, Noryl, FRP
Sulfuric Acid	Hastelloy	FKM, PVC, PTFE, PVDF, Ceramic, Noryl,

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Appendix 2: Preferred Dosing Pump type by Chemical

Chemical Dosing Pump Guide for chemical dosing and transfer application.

The following table can be used as a guide for dosing pump selection for the chemicals and application listed. The pump selection guide is based on current Seqwater practice and experience for each of the chemicals listed. Where a chemical is not listed, the designer must select the most appropriate pump for the application.

Where the preferred pump is listed as a diaphragm pump, digital diaphragm pumps are preferred, however they are limited in dosing capacity. For high dosing capacities, standard diaphragm pump can be used.

Note: both progressive cavity and centrifugal pumps are not specified within this standard.

Chemical	Application	Preferred Dosing Pump
Aluminium Chlorohydrate (ACH)	Dosing	Diaphragm pump
Aluminium Sulphate (Alum)	Dosing	Diaphragm pump for small and medium plants. Centrifugal pumps for large plants with recirculation dosing system
Ammonia Aqueous	Dosing	Diaphragm pump
Ascorbic Acid	Dosing	Diaphragm pump
Citric Acid	Dosing	Diaphragm pump
Fluoride (Sodium Fluorosilicate)	Transfer	Progressive Cavity pump or Diaphragm pump
	Dosing	Progressive Cavity pump or Diaphragm pump
Fluoride (Sodium fluoride)	Dosing	Progressive Cavity pump, Peristaltic pump or Diaphragm pump
Fluoride (Fluorosilicic acid)	Dosing	Diaphragm pump
Hydrochloric Acid	Dosing	Diaphragm pump
Lime (Slurry)	Transfer	Peristaltic pump
	Dosing	Peristaltic pump
Lime (Water)	Transfer (slurry) Dosing	Peristaltic pump Progressive Cavity pump, Diaphragm pump or Centrifugal pump for large plants
Polymer	Transfer	Progressive Cavity pump
	Dosing	Progressive Cavity pump
Potassium Permanganate	Dosing	Diaphragm pump
Powder activated Carbon (Slurry)	Transfer	Peristaltic pump
	Dosing	Peristaltic pump
Sodium Hydroxide	Dosing	Diaphragm pump
Sodium Hypochlorite	Dosing	Diaphragm pump or Peristaltic pump
Sodium Bisulphite	Dosing	Diaphragm pump
Soda Ash	Transfer	Peristaltic pump
	Dosing	Peristaltic pump
Sulfuric Acid	Dosing	Diaphragm pump

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