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| Version | Date | Description of Revisions |
| 1 | August 30, 2006 | Approved final document. |
| 2 | September 22,2009 | Insertion of the pre-approved suppliers/manufacturers names and review/update of document cross-references |
| 3 | May 1, 2013 | Final Draft – Consolidated Comments Spec Update Project |
| 4 | June 17, 2013 | Finalized for Legal Review. Incorporation of new Commissioning and Computerized Maintenance Management System Data Requirements Specification cross references. |
| 5 | May 28, 2014 | Revised to incorporate Legal Services’ comments and additional operational refinements (AV) |
| 6 | July 15, 2014 | Amended to reflect changes related to commissioning specification and name change (AV) |
| 7 | September 24, 2014 | Updated, Finalized Specification – Reference eDOCS #1029455-v5 (AV) |
| **8** | **March 2, 2015** | **Updated, Finalized Specification – Legal Reference eDOCS #5043360 v12 (AV)** |
| 9 | January 13, 2017 | Changed some wording to make it consistent with the rest of the specifications. (CPD PMO) |
| 10 | February 15, 2017 | Updated standards references. Updated acceptable manufacturers (CPD PMO, OMM) (AV) |
| 11 | March 1, 2017 | Updated reference for NSF 372. (AV) |
| 12 | June 13, 2022 | 2.4 Added reference to Section 01080 – Process Equipment Location Tagging (BM) |

NOTE:

This is a CONTROLLED Document. Any documents appearing in paper form are not controlled and should be checked against the on-line file version prior to use.

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**The on-line copy is the current version of the document.**

# GENERAL

## Description

### This Section covers the supply and installation of non-positive displacement diaphragm chemical metering pumps, controller and appurtenances. For positive displacement diaphragm type pumps, refer to Section 11240 – Chemical Metering Pumps. [Chemical feed pumps may include peristaltic pumps, gear pumps, solenoid pumps and other types of pumps. The specifications shall be amended by the Consultant to reflect the type of designed chemical feed system]. This Section also covers all aspects of the chemical feed system to ensure that the chemical delivery process is accomplished in a fully automatic and accurate method. Liquid chemical feed systems shall be commissioned in accordance with Section 01810 – Equipment Testing and Facility Commissioning.

## Scope of Work

### The work of this Section covers the complete supply, installation, testing and commissioning of chemical feed equipment and accessories, as specified herein and as shown on the Contract Drawings. All chemical feed equipment and accessories shall be fully compatible with the chemicals used at the chemical strengths utilized by the Region. The work includes, but is not limited to, the sodium hypochlorite feed system. *[Consultant to list chemical systems for specific project].*

## Related Sections

*[Under "Related Sections", identify other Sections that are related to, and/or dependent on, the work results or information specified elsewhere. The list should be limited to Sections with specific information that the reader might expect to find in this Section, but is specified elsewhere. For example, if hardware for aluminum entrances is specified in the aluminum entrance Section, a cross-reference would be appropriate in the finish hardware Section. The purpose of this cross-referencing is for information only, to aid in finding those other requirements—not to define the scope of the Section.*

*Cross-referencing here may also be used to coordinate assemblies or systems whose components may span multiple Sections and which must meet certain performance requirements as an assembly or system.*

*This Section is to be completed/updated during the design development by the Consultant. If it is not applicable to the section for the specific project it may be deleted.]*

*[List Sections specifying installation of products supplied but not installed under this Section and indicate specific items.]*

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Execution requirements for ...[item]... specified under this Section.

*[List Sections specifying products installed but not supplied under this Section and indicate specific items.]*

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: Product requirements for ...[item]... for installation under this Section.

*[List Sections specifying related requirements.]*

### Section [\_\_\_\_\_\_ – \_\_\_\_\_\_\_\_\_\_\_\_]: [Optional short phrase indicating relationship].

### Section 01080 – Process Equipment Location Tagging

### Section 01300 – Submittals

### Section 01425 – Computerized Maintenance Management System Data Requirements

### Section 01430 – Operation and Maintenance Data

### Section 01780 – Contract Closeout

### Section 01810 – Equipment Testing and Facility Commissioning

### Section 11010 – Equipment General Requirements

### Section 11240 – Chemical Metering Pumps

### Section 16900 – Instrumentation and Control

### Division 13 SCADA & Instrumentation – [insert applicable sections]

### Division 15 – Mechanical [insert applicable sections]

## References

### Comply with the latest edition of the following statutes, codes, and standards, and all amendments thereto:

#### NSF International (NSF)

##### ANSI/NSF Standard 60: Drinking Water Treatment Chemicals

##### ANSI/NSF Standard 61: Drinking Water System Components – Health Effects

##### NSF 372-2011: Drinking Water System Components – Lead Content

#### Occupational Health and Safety Act, RSO 1990

#### National Electrical Manufacturer’s Association (NEMA)

##### NEMA, 4X Type Enclosures

## Definitions

### RTU: Remote Terminal Unit

### RPU: Remote Processing Unit

### PAC: Programmable Automation Controller (equivalent to PLC – Programmable Logic Controller)

### LCD Liquid Crystal Display

### LED Light Emitting Diode

### EPDM: Ethylene Propylene-Diene Monomer

### PTFE: Polytetrafluoroethylene

## Dimensions

### Prior to ordering materials and proceeding with the work, check and confirm that the dimensions indicated on the Contract Drawings agree with the dimensions of equipment specified.

### Notify the Consultant of any discrepancy in dimensions and obtain clarification. Correct the dimensions as instructed.

## Submittals

### Submit shop drawings in accordance with Section 01300 – Submittals for all chemical feed metering equipment (as applicable) including, but not limited to, the following:

#### General pump layout.

#### Pump anchor details.

#### Motor terminal box location.

#### Control panel layout.

#### Pressure relief valves.

#### Back pressure valves.

#### Calibration tubes.

#### Foot valves.

#### Chemical flow meter(s).

#### Injection assemblies.

## Maintenance Data

### Submit manuals and parts lists in accordance with Section 01780 – Contract Closeout. All data on equipment and parts as defined by Section 01430 – Operation and Maintenance Data shall be in an electronic format suitable for upload to the Region’s CMMS (Maximo). Refer to Section 01425 – Computerized Maintenance Management System Data Requirements for additional requirements.

## Certification

### Obtain written certification from the chemical pump supplier that all wetted parts of the system are compatible with the chemicals being conveyed. Components and materials in contact with potable water systems must be NSF 60 and/or 61 and/or NSF 372 approved as required by the Contract Documents. For potable water system applications, lubricants that could enter the process train by seal, diaphragm or other component failure must be NSF 60 certified or food grade quality.

## Measurement and Payment

*[Choose one of the following payment language provisions that best suits the individual project.*

*If this Section is not specifically referenced by an item in the Bid Form, please use the following language:*

.1 The work of this Section will not be measured separately for payment. All costs associated with the work of this Section shall be included in the Contract Price.

*OR If this Section is specifically referenced in the Bid Form, use the following language and identify the relevant item in the Bid Form:*

.1 All costs associated with the work of this Section shall be included in the price(s) for Item No(s). \_\_\_ in the Bid Form.

*If the work of this Section is to be measured and paid for by several different methods, please amend the standard wording given above to reflect the different methods of measurement and payment.]*

# PRODUCTS

## Pumps Required

### The following table lists the conditions of service, the number of pumps required, flow and head conditions and special Contract features:

#### *[Consultant to provide schedule for chemical feed pumps].*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Pump Tag No. | Duty | Pumping Capacity (L/hr) | Maximum Pumping Head (kPa) | 4-20mA Flow Paced Control Req’d | 4-20mA  Stroke Length  Control Req’d | Pressure Relief Valve Setting  (kPa) | Motor  Driven or  Solenoid |
| - | - | - | - | - | - | - | - |
| - | - | - | - | - | - | - | - |

### Provide chemical metering pumps (all from one supplier) with the following features and accessories:

#### Reciprocating positive displacement type.

#### Anti-siphon valve.

#### Self de-aerating/de-gasing head.

#### Foot valve *[delete if piped to suction header]*.

#### Pump to be controlled by a RTU/PAC.

#### 10:1 stroke volume adjustment and a 120:1 stroke frequency adjustment.

#### LCD display of stroke and speed.

#### Chemical flow meter appropriate for the flow characteristics of the chemical pump employed. *[Consultant to determine one flow meter per chemical feed pump or one flow meter per chemical feed pipe header.]*

#### All data on equipment as defined by Section 01430 - Operation and Maintenance Data. The data shall be in a format capable for upload to the Region’s CMMS (Maximo). Refer to Section 01425 - Computerized Maintenance Management System Data Requirements.

### Acceptable Manufacturers:

#### ProMinent Fluid Controls Ltd.

#### GRUNDFOS Canada Inc. (Alldos).

#### Approved Equivalent.

## Calibration Cylinder

### Provide a calibration cylinder as indicated on the Contract Drawings. Calibration cylinders are to be constructed from material suitable for the intended chemical use and accurate in volume.

### Supply a calibrated for accuracy graduated [1,000 ml] cylinder complete with isolation valve as both supplied by Chemline Plastics Limited.

### All associated feed pump components shall be from the same equipment supplier and properly matched to the feed equipment in order to perform its base function. *[Consultant to confirm capacity of calibration cylinders]*

## Control Panel

### Provide control panels with the following features and accessories:

#### Wall mounted fibre glass reinforced plastic NEMA 4 x rated enclosure large enough to house controls for each set of chemical metering pumps.

#### Refer to Section 16900 – Instrumentation and Control.

#### Provide power to each pump complete with a local disconnect.

#### Provide selector switches to indicate local/remote control.

## Pulsation Damper (if applicable)

### Provide chemically compatible diaphragm or bladder type pre-charged pulsation dampers with an air pressure gauge. *[Consultant to confirm requirement for pulsation dampers]*

### The Contractor shall size all pulsation dampers by analyzing all piping configuration, sizing, feed rates (refer to the requirements set out in Division 13 - SCADA and Instrumentation and the Process Narratives/Process Control Narratives included in the SCADA appendices).

### Provide pulsation dampers constructed from materials suitable for the service intended.

### Each pulsation damper shall be individually tagged in accordance with Section 01080 – Process Equipment Location Tagging with reference to the chemical service conditions.

### Provide a recharging apparatus for the bladder as applicable.

### All associated feed pump components shall be from the same equipment supplier and properly matched to the feed equipment in order to perform its base function.

## Backpressure Valves

#### Provide backpressure valves for each metering pump with the following features:

#### The valves shall be constructed of materials suitable for the chemical type, strength and conditions of service.

#### Each valve shall be individually tagged with reference to the chemical service.

#### Factory preset at [345] kPa. *[Consultant to confirm]*

#### Pressure gauge and diaphragm to suit.

#### PVC body.

#### Socket-weld connections, complete with true union type fittings.

#### All associated feed pump components shall be from the same equipment supplier and properly matched to the feed equipment in order to perform its base function.

## Pressure Relief Valves

### Provide pressure relief valves for each chemical metering pump with the following features:

#### The valves shall be constructed of materials suitable for the chemical conditions of service

#### Each valve shall be individually tagged with reference to the chemical service.

#### Factory preset at [ ] kPa. *[Consultant to determine value]*

#### Adjustable pressure settings.

#### *[Consultant to insert details regarding screwed/flanged ends, body type and seal type].*

#### All data on equipment as defined by Section 01430 - Operation and Maintenance Data. The data shall be in a format capable for upload to the Region’s CMMS (Maximo).

#### All associated feed pump components shall be from the same equipment supplier and properly matched to the feed equipment in order to perform its base function.

## Foot Valves

### Provide foot valves with the following features:

#### PVC construction.

#### Strainer.

#### All data on equipment as defined by Section 01430 – Operation and Maintenance Data. The data shall be in a format capable for upload to the Region’s CMMS (Maximo). Refer to Section 01425 - Computerized Maintenance Management System Data Requirements.

#### Sized for conditions of service. [Consultant to confirm construction material is suitable to conditions of service].

#### All associated feed pump components shall be from the same equipment supplier and properly matched to the feed equipment in order to perform its base function.

## Valves

### Valving for chemical suction/discharge piping shall be as follows:

#### Ball valves shall be PVC compound Type 1, Grade 1, true union ball valves with EPDM seals, teflon ball seats with socket wild ends or as otherwise specified by the Consultant for designed application.

#### Pump tubing must be fully compatible with the chemical being pumped and the tubing shall be of sufficient strength and durability to minimize potential for leak, rupture or other failure.

#### All associated feed pump components shall be from the same equipment supplier and properly matched to the feed equipment in order to perform its base function.

## Injection Assemblies

### Supply and install 12 mm corporation stop and nozzle assemblies complete with PVC ball check.

#### Location of the injection assemblies shall be as shown on the Contract Drawings.

#### Insertion tube should extend up to 1/3 of the pipe diameter.

#### Corporation stop shall have a safety chain attached to the insertion tube.

#### Insertion tube shall be removable from the pipe while under pressure.

#### All associated feed pump components shall be from the same equipment supplier and properly matched to the feed equipment in order to perform its base function.

## Chemical Feed Pipe and Fitting Assembly

### All pipe and fitting joints shall be socket weld type or flanged and conforming to the applicable Sections of Division 15 – Mechanical (as directed by the Consultant).

### Threaded fittings are to be approved by the Consultant prior to assembly.

## Motor Driven Metering Pump Controllers

### Provide each chemical metering pump with the following accessories and features and mount them in the control panel as indicated in the Contract Documents:

#### Dedicated 120V feeds to each chemical metering pump and associated controllers with individual rail-mount circuit breakers (sized to suit).

#### Individual interior compartments for each pump’s equipment isolated by FRP barriers (specifically for spill containment purposes).

#### Provide an automatic stroke length position controller with the following features:

#### LOCAL / OFF / REMOTE selector switch with 120V dry contact for REMOTE mode indication.

#### REMOTE MODE: Plant RPU initiates RUN / STOP (see Division 13 - SCADA and Instrumentation) and sends a remote isolated 4-20mA stroke position signal. LOCAL MODE: Stroke length controlled by panel mounted potentiometer or keypad.

#### Provide an automatic speed controller with the following features:

#### Accepts 120VAC single phase power.

#### LOCAL / OFF / REMOTE speed controller selector switch with 120V dry contact for REMOTE mode indication. REMOTE MODE: Plant RPU via digital output (DO) dry contact initiates RUN / STOP (ENABLE / DISABLE) control of the speed controller and stroke controller and sends a remote isolated 4-20mA flow proportional speed control signal. LOCAL MODE: Speed controlled by panel mounted potentiometer or keypad.

#### Linear isolated 4-20mA stroke length position feedback to remote RPU/PAC.

#### Linear isolated 4-20mA speed feedback via a motor mounted tachometer to remote RPU/PAC.

#### Local LED speed display.

#### Local LED stroke length display.

#### Potentiometer for speed control, 20;1, when in local mode.

#### Potentiometer for stroke length control when in the LOCAL mode.

#### Designed such that upon power failure and resumption of normal power, manual resetting of any equipment etc., is not required.

#### [Designed such that pump control is by compound loop control.]

#### All I/O to be telemetered to the PAC and SCADA systems with appropriate programming and graphics displays configured.

#### Refer to the instrumentation drawings for further details and requirements. *[Consultant to edit above section to suit level of control required].*

## Solenoid Driven Pumps

### Provide metering pumps with the following features:

#### NEMA 4 glass fibre reinforced plastic enclosure.

#### Solenoid driven.

#### Wetted parts suitable for the conditions of service.

#### Double ball check valves on suction and discharge sides.

#### Provide flow signal wiring terminal connections inside each metering pump. If wiring terminal connections cannot be provided inside the pump provide a loose EEMAC/NEMA 4 PVC junction box complete with wiring terminals and connecting cables.

#### Stroke length adjusting knob.

#### Accepts linear 4-20mA flow pacing signal for automatic speed control.

#### Power cord and plug.

#### Accepts 115 VAC 60 Hz power.

#### MANUAL / OFF / AUTO selector switch. AUTO MODE: Speed paced by external 4-20mA flow signal. MANUAL MODE: Stroke speed controlled locally at the pump via adjustment knob.

#### All wetted parts to suit service.

#### 10:1 stroke position turndown.

#### 25:1 speed turndown.

#### Manufacturer shall be the same as the manufacturer of the motor driven metering pumps except as indicated in subsection 2.12.2 below.

### Solenoid pumps are to be Prominent Gamma series pumps or an Approved Equivalent.

# EXECUTION (NOT USED)

**END OF SECTION**