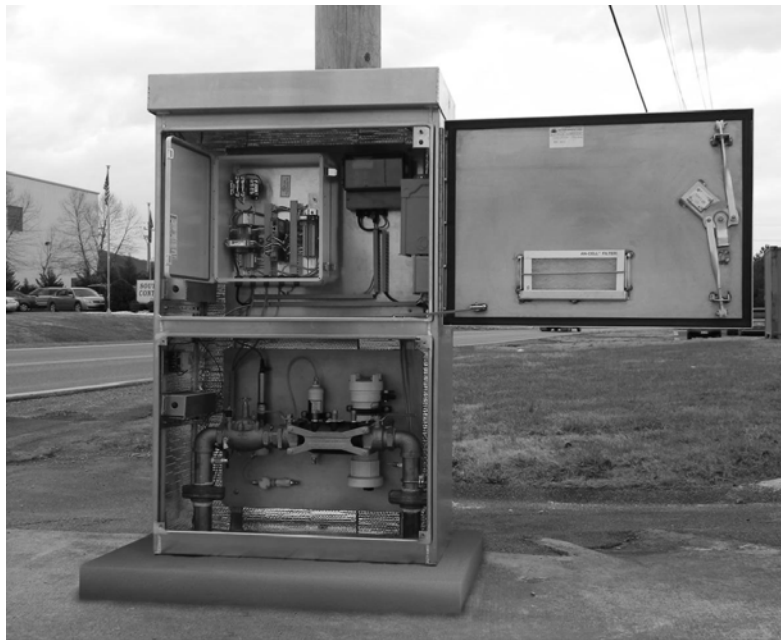




Hydro-Guard® S.M.A.R.T. Flushing System
(System Management and Remote Telemetry)
Direct Discharge Unit for Remote
Water Quality Monitoring and Distribution Flushing
Construction Specification



**S.M.A.R.T. Remote Water Quality Monitoring
and Distribution Flushing Equipment**

General: The equipment furnished under this Section shall be automatic water distribution flushing equipment designed to be utilized in a permanent or semi-permanent manner for monitoring of water quality conditions; recording water quality results; and automatically flushing of potable water distribution lines when select water quality conditions fail to meet Federal, State and Local water quality standards. The primary purpose of this equipment shall be to automatically flush the desired amounts of water from the water distribution system for the purpose of improving and/or maintaining water quality. Secondly, this equipment is engineered to allow water quality and utility managers to receive and send critical field data from the remote monitoring/flushing station so that they may periodically ascertain current water quality conditions and establish a cost effective and system efficient flushing response program.

Performance: This equipment shall be connected to a water distribution line as required by the plans or standard installation detail. The self-contained unit is designed for automatic flushing of the water distribution line through the opening of a control valve that is an integral part of the unit. This equipment shall be capable of being programmed to activate when chlorine or chloramine residual levels fall below acceptable standards determined by the operator/end-user and/or be capable of being programmed to flush up to 10 times daily on the days desired in 1 minute to 24 hours increments (on a continually rotating 7-day cycle). All programming shall be accomplished by means of an integrated telemetry based PLC with proprietary programming logic that will consistently analyze the water quality readings taken by the integrated chlorine (total or free) analyzer. The system will be powered by 120VAC (alternative power supply options may be available for certain models and installation locations).

Acceptable Manufacturers: The two-way communication (SCADA compatible) remote telemetry based automated flushing and water quality management equipment to be supplied under this specification shall be **Hydro-Guard®** as manufactured by the Mueller Company.

Automatic Water Distribution Flushing System Components: The remote water quality monitoring/management and water distribution flushing system is comprised of a premium grade chlorine analyzer (total or free); low lead brass construction; inline double check valve for backflow prevention; multi-function PLC with proprietary system management logic for the control of three or more independent water quality condition analyzers (with the potential for future expansion); dechlorination system for both flushed water and water utilized by the analyzing equipment; system heaters, cooling fan and lighting; an optional tamper sensor for entry notification; an optional flow switch for flow / no-flow condition notification; and an optional integrated flow (GPM and Totalized Flow Conditions) valve.

Automatic Flushing Unit: The advanced system management/monitoring and flushing station shall be a single unit consisting of the major components described below:

1. Integral System Management Control Hardware and Software

The S.M.A.R.T. System management and monitoring components shall include the following:

- a. The unit's internal control system shall allow for up to three independently operating condition assessment / water quality analyzers (i.e., chlorine, pH, flow, temperature; turbidity, UV254, etc.)
- b. The unit's internal control system shall be programmable via both a remote interface and/or an on-site Ethernet port.
- c. The unit's internal control shall be capable of being managed via Windows® Internet Explorer® (or other web browsers) and a proprietary interface software
- d. The unit's internal control shall be equipped with a unique IP address and shall utilize WebForm viewer software to protect against unauthorized usage
- e. The unit's internal controller shall be capable of two way communication, in real-time if so desired, via such communication methods as cellular (GSM or CDMA), WiFi, Ethernet, BlueTooth®, or other methods
- f. The unit's internal controller must be capable of sending and receiving data packages, as well as storing information on-site for up to 30 days

- g. The unit's internal controller must be capable of sending alarm codes in the event of a probe failure; the device's protective enclosure is accessed (when equipped with the entry detection option); or when a flow or no-flow condition occurs in contrast with what the device's controller has initiated
- h. Wiring of the unit's internal control panel shall be UL certified
- i. The unit's internal controller must be SCADA compatible and be capable of communicating with SCADA networks via MODBUS

2. Integral Piping and Control Valve

The piping and control valve components shall include the following:

- a. The unit's internal 2-inch control valve shall be capable of being activated by a 24VAC solenoid
- b. The control valve shall be a globe valve type design capable of passing sand and other debris up to 5/8" in diameter without obstructing the valve's throat.
- c. The unit's standard internal and external piping shall be brass or Schedule 80 PVC (customer preference)
- d. The unit's internal piping and control valve shall have an operational rating of 200 psi (where consistent pressures range above 110 psi it is recommended that a Pressure Reducing Valve be utilized ahead of the automatic flushing system for the protection of the device and its critical components).
- e. Internal piping and control valve shall be capable of being removed from the housing by means of a flange coupling allowing for quick disassembly, permitting easy maintenance and repairs.
- f. The control valve shall be constructed of a non-corrosive glass-reinforced nylon, or equal, and shall be fitted with stainless steel hardware. The valve shall be of the type that can be easily rebuilt.
- g. The unit shall be supplied with a 2-inch modular double check valve backflow prevention system that can be removed from its cradle system for annual checks without being disassembled from the piping of the device
- h. The unit shall be a directed discharge system, utilizing flange connections, to connect the inlet and outlet piping to the utility's service lines and discharge piping; optional designs can discharge to atmosphere

3. Housing

The self-contained unit shall be supplied with an above-grade, environment-resistant, vented cabinet to provide stability and protection for the internal components of the device. The cabinet shall be constructed of high grade, heavy gage aluminum.

- a. The enclosure shall offer optional, thermostatically controlled, heaters for protection against freeze damage
- b. The enclosure shall be equipped with insulation for temperature control
- c. The enclosure shall be equipped with a cooling fan for temperature control
- d. The enclosure shall be equipped with lighting
- e. The enclosure shall be equipped with a UL rated circuit breaker box
- f. The enclosure shall be lockable
- g. The enclosure shall be equipped with stainless steel hardware

4. Sampling System

The sampling system shall include the following features:

- a. The sampling system shall be constructed of polyethylene or stainless with equal or greater resistance to bacterial regrowth and be connected with brass or stainless fittings
- b. The sampling system shall be designed in such a way to reduce the potential for sampling system contamination by allowing access and inspection of the internal piping compartment and components without disassembly or depressurization of the sampling system
- c. Connection to the unit's sampling system shall be by means of a quick access sample valve located at the top of the device for ease of access. The unit's sampling connection shall be housed in a secure weather-tight area to minimize contamination of the sampling connection
- d. The sampling system must allow water quality samples to be obtained on-site with the flushing device in either a flushing or non-flushing state

5. Electrical/Electronic System

The Electrical/Electronic System shall include the following features and capabilities:

- a. Be capable of storing instructions and data for a minimum of 30 days via an integrated programmer and capable of operating the unit's internal control valve using a 120VAC power supply.
- b. Offer continuous monitoring of water quality conditions and 12 flushing program events per day
- c. Capable of transmitting data to a remote site in real-time or on a periodic basis determined by authorized operators
- d. Capable of receiving data from a remote site in real-time or on a periodic basis determined by authorized operators
- e. Offer downloadable data transfers that can be saved as TXT files for use in management spreadsheets
- f. Offer both graphical and running text logs for data viewing and management
- g. Must feature on-site Ethernet and RS-485 2-wire serial communications interfaces to allow for on-site access to data and system management controls
- h. Incorporate LCD readout for the chlorine analyzer
- i. Offer optional manual on and off functions on-site with remote on/off functionality via remote management software
- j. Be secured and water-resistant.
- k. Use an integrated 24-volt solenoid to operate the control valve that directly turns into a 2-inch control valve

6. Dechlorination (Optional depending on local ordinance)

A tablet feeder designed to accommodate 2 5/8th inch sodium sulfite or ascorbic acid tablets shall be installed on the unit. A portion of the water being flushed shall be directed through the tablet feeder in the creation of a concentrated solution of the dechlorinating agent. The directly treated, concentrated solution shall be introduced to the non-directly treated discharge on the device's splash plate resulting in a homogenous mixture effectively treating the entire discharge. Depending upon the level of neutralization required, as many as five tablet feeders may be installed on a single flushing device.

7 Execution

- a. Prior to the installation, the drainage patterns for the intended installation location shall be viewed to ensure that any discharged water will not create hazardous conditions for pedestrian or vehicular traffic. The selected location's drainage pattern shall also permit discharged water to flow away from the automatic flushing valve or be absorbed by the surrounding soil as prevent pooling.
- b. Remove debris that might create uneven pressure on the unit from the bottom of the hole. Compact the bottom of the hole to minimize settling after installation.
- c. Install a 4" lift of non-compacted sand or similar bedding material into the bottom of the hole.
- d. Backfill the hole around the automatic flushing valve with clean fill, #57 stone and/or a combination of other appropriate materials. Backfilling shall be accomplished in 6" lifts. Use a level to ensure the unit is level after each lift.
- e. The area 36" around the automatic flushing valve shall be prepared in order to prevent erosion.
- f. The automatic flushing valve shall be disinfected in accordance with ADH and AWWA standards.



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