

HYDRO-GUARD®

a MUELLER brand

100 SERIES COLD CLIMATE PROGRAMMING (KR-BL) ATMOSPHERIC DISCHARGE DEVICE

Suggested Specifications

AUTOMATIC WATER DISTRIBUTION FLUSHING EQUIPMENT WITH BLUETOOTH (KR-BL) CONTROLLER

1. GENERAL DESCRIPTION

- 1.1** The equipment furnished under this Section shall be automatic water distribution flushing equipment designed to be permanently or semi-permanently installed on water distribution lines.
- 1.2** The primary purpose of this equipment shall be to automatically flush the desired amounts of water from water distribution systems for the purpose of improving and/or maintaining water quality.

2. PERFORMANCE

- 2.1** This equipment shall be connected to a water distribution line as required by the plans or standard installation detail. The self-contained device is designed for automatic flushing of the water distribution line through the opening of a control valve that is an integral part of the device.
- 2.2** This equipment shall be capable of being programmed to activate up to 24 times daily on the days desired at a minimum of one (1) minute to six (6) hour increments (on a continually rotating 7-day cycle or on an interval between every 1 to 30 days).
- 2.3** All programming shall be accomplished by means of an integrated programmer module that is powered by a single 9-volt battery and a Bluetooth equipped smart phone.
- 2.4** The Bluetooth controlled programmer must be capable of receiving management data transmissions from up to 25 feet, line of sight.
 - 2.4.1** The Bluetooth controller must be capable of being programmed up to 24 times per day and offer flush durations of one minute to 24 hours per event.
 - 2.4.2** The Bluetooth controller must be capable of providing up to 5,000 separate on/off functions over the life of a single 9-volt Alkaline battery.
 - 2.4.3** The Bluetooth controller must be capable of being programmed by a standard Android or iOS smart phone and the K-Rain and password protected App.

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3. ACCEPTABLE MANUFACTURERS

- 3.1** Automatic water distribution flushing equipment to be supplied under this specification shall be **Hydro-Guard®** as manufactured by Mueller.
- 3.2** The automatic water distribution flushing system is comprised of the self-contained automatic flushing device with a dechlorination system, sampling quick connect, and freeze protection upgradeability.
- 3.3 Controller/Programming**
- 3.3.1** Programming for the 100 Series Cold Climate Atmospheric Discharge Device shall be managed by a KR-BL Bluetooth controller with a single 9-volt battery and an iOS or Android App-based management system.

4. AUTOMATIC FLUSHING DEVICE

The automatic flushing device shall be a single device consisting of the major components described below:

- 4.1 Integral Piping and Control Valve** – The piping and control valve components shall include the following:
- 4.1.1** Device must be certified by Underwriters Laboratories (UL) as meeting or exceeding the criteria of NSF-372.
- 4.1.2** The device's internal control valve shall be capable of being activated by a single 9-volt battery-controlled programming interface that is managed by a Bluetooth equipped smart phone (Android or iOS).
- 4.1.3** 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.
- 4.1.4** The device's standard internal piping shall be schedule 80 PVC with the option to upgrade the material to low lead brass.
- 4.1.5** The device's internal piping and control valve shall have an operational rating of 200 psi.
- 4.1.6** Internal piping and control valve shall be capable of being removed from the housing by means of a quick-disconnect cam-lock release system that is comprised of easy-access handles located near the top section of the flushing device that engage and disengage a quick disconnect at the service line entry point located in the bottom of the flushing device; a minimum of two centering stars/guides that allow for ease of alignment during installation and removal of the flushing device's internal components; an insulation pad constructed from medium density foam for the protection of the flushing device's critical water management components; and stainless-steel rods and fasteners. The use of multiple O-ring push-in connections to the service line will not be permitted.
- 4.1.7** 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.
- 4.1.8** The valve shall include a single piece EPDM diaphragm.
- 4.1.9** The valve must be actuated by a 9-volt latching solenoid. Solenoid must be pressure rated between 0 - 10 bar (0 to 145.037738 psi). Wetted parts must be stainless-steel 400 or Polyamide. Leads must be 0.32 mm² x 80 cm².
- 4.1.10** The device shall be supplied with a standard 2-inch male NPT water supply connection.

The Mueller logo consists of the word "MUELLER" in a bold, black, sans-serif font, enclosed within a red rectangular border with rounded corners.

4.2 Housing

- 4.2.1** The components shall be designed to dissipate the energy and distribute the flow of pressurized water leaving the water distribution system in a circular pattern inside of the device's protective exterior, above-grade, housing and discharging to atmosphere. The discharged water must be capable of passing through an energy dissipating vented shield at the top of the exterior of the device's above-ground protective housing. The energy dissipating shield shall be slotted and capable of discouraging intrusion by reptiles. The shield shall be constructed of a UV resistant Geon, injection molded, plastic material.
- 4.2.2** The discharged water shall be directed downward, through the energy dissipating shield, onto a ground-level splash pad directing the flow of water horizontally onto the surrounding area in a manner that does not promote erosion in adequately prepared areas.
- 4.2.3** The self-contained device shall be supplied with a below-grade bottom-vented protective base that shall protect the internals of the flushing device; provide stability; and provide anti-buoyancy capabilities. The protective base shall be constructed of Schedule 40 PVC (ASTM D2241, grade 1120) with a minimum diameter of 15 inches. The below-grade base shall feature a full debris shield that is affixed to the bottom of the base; a drain with filter fabric must be included with the debris shield to allow water to exit the base while preventing debris from entering the base; and the debris shield must include a male cam-lock quick connect to allow for the internals of the flushing device to easily connect to the utility service line.
- 4.2.4** The device's above-grade components shall be constructed of a non-corrosive maintenance-free material and shall be permanently colored light green to blend with typical residential and commercial environments. The material shall be specifically designed for direct exposure to the sun and weather and have a minimum life expectancy of 15 years.
- 4.2.5** All mounting brackets and hardware shall be stainless-steel, 5052 aluminum or anodized aluminum.

4.3 System Sampling (Required)

The device must be equipped with a fully functional sampling system that shall draw water quality samples from ahead of the 2-inch control valve and the sample collection point must be easily accessible from the top of the device. The sampling system shall include the following features:

- 4.3.1** The sampling system shall be constructed of polyethylene or other material with equal or greater resistance to bacterial regrowth and be connected with low lead brass or stainless-steel fittings.
- 4.3.2** The sampling system shall be designed in such a way to reduce the potential for contamination of the sampling system by allowing access and inspection of the internal piping compartment and components without disassembly or depressurization of the sampling system.
- 4.3.3** The sampling system shall draw water for water quality sampling from the inlet side of the two-inch (2") adjustable control valve and be tapped into the service piping of the device no more than 18 inches (18") from the utility's service connection to the device. This positioning is essential in order to allow for a sample to be an accurate representation of the utility's water quality at the point of entry into the flushing device.
- 4.3.4** Connection to the device's sampling system shall be by means of a stainless-steel quick connect that can be mated with a portable sample valve assembly which can be utilized to obtain samples from an unlimited number of such flushing devices. The sampling tip of the portable sample valve shall be constructed from medical grade polyethylene tubing, stainless-steel or low lead brass. The device's sampling connection shall be housed in a secure weather-tight area to minimize contamination of the sampling connection. The sampling connection itself shall be provided with a protective sanitary cover.

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

- 4.4.1** All programming shall be accomplished by means of an integrated programmer module that is powered by a single 9-volt battery and a Bluetooth equipped smart phone.
- 4.4.2** The Bluetooth-equipped device must be powered by a single 9-volt Alkaline battery that can power up to 5,000 on/off events over the life of the battery.
- 4.4.3** The Bluetooth-equipped device must allow for up to 24 flush events daily with durations of one minute to 24 hours.
- 4.4.4** The Bluetooth controller interface shall be capable of being managed from a maximum distance of 25 feet (line of sight/no obstructions) by way of a standard Android or iOS smart phone.
- 4.4.5** The Bluetooth controller interface module must be password protected to prevent unauthorized operation.
- 4.4.6** Offer 24 flushing program events per day.
- 4.4.7** Be leap-year compatible, automatically accounting for February 29th every four years.
- 4.4.8** Incorporate LCD readout of clock and programming functions on a removable handheld programmer.
- 4.4.9** No onsite programming functions shall be possible without the utilization of a handheld programmer, or a smart phone, thus providing an added level security against unauthorized program changes.
- 4.4.10** Offer manual on and off functions
- 4.4.11** Be secured and water-resistant.
- 4.4.12** Offer a percentage increase/decrease option that will allow the operator to make monthly adjustments by increasing or decreasing the flush durations by a percentage without the need to reset flush duration times.
- 4.4.13** Have heavy-duty power cable with an inferred connection that shall correspond with an inferred antenna on a programming module that shall be integrated into the flushing device.
- 4.4.14** Use an integrated 9-volt or greater latching solenoid to operate the control valve.
- 4.4.15** The solenoid must be able to be threaded directly into the two-inch (2") adjustable control valve without the use of secondary adaptors.

4.5 Winterization (Required)

- 4.5.1** As per the local ordinance, the device shall be constructed either with a self-draining double check valve freeze protection assembly designed to evacuate water remaining within the device's stand pipe subsequent to, but not during, the flushing process.
- 4.5.2** The self-draining double check valve freeze protection assembly must be located no less than 2 inches above the solenoid actuated control valve and must be constructed of low lead brass or stainless-steel.
- 4.5.3** The self-draining double check valve freeze protection assembly must be capable of preventing the intrusion of ground water in the event ground water were to submerge the self-draining double check valve freeze protection assembly.

4.6 OEM Installed Dechlorination System (Required)

- 4.6.1** A tablet feed Dechlorination System shall be designed to accommodate 2 5/8th-inch sodium sulfite or ascorbic acid tablets and it shall be installed inside of the device upon delivery. 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.

4.7 Maintenance and Security of Device

- 4.7.1** Disassembly and reassembly of the devices must be accomplished by way of unique security wrenches. The security wrenches must be capable of removing the security screws used to secure the ground splash plate to the below-grade base and the cap that protects the device's programming module and sampling port.

4.8 Execution

- 4.8.1** 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 device or be absorbed by the surrounding soil as prevent pooling.
- 4.8.2** Remove debris that might create uneven pressure on the device from the bottom of the hole. Compact the bottom of the hole to minimize settling after installation.
- 4.8.3** Install a four-inch (4) lift of non-compacted sand or similar bedding material into the bottom of the hole.
- 4.8.4** 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 device is level after each lift.
- 4.8.5** The area 36 inches (36") around the automatic flushing valve shall be prepared in order to prevent erosion.
- 4.8.6** The automatic flushing valve shall be disinfected in accordance with ADH and AWWA standards.