

**HG-1 FLUSHING SYSTEM WITH BUILT-IN  
(NODE) or BLUETOOTH PROGRAMMING  
CONSTRUCTION****HYDRO-GUARD****Automatic Water Distribution Flushing Equipment****Controller Preferences (Select One)**

- Built-In Node
- Bluetooth (KR-BL)

**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.
- 2.2 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 unit.
- 2.3 This equipment shall be capable of being programmed to activate up to 12 times daily on the days desired in 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).
- 2.4 All programming shall be accomplished by means of an integrated programmer (Built-In) or Bluetooth.
- 2.5 Where the Built-In style programming is required, the flushing device must be capable of being powered by a single 9-volt alkaline battery with the ability to install a secondary 9-volt alkaline battery for redundancy and extended life.
- 2.6 The Built-In style programmer shall be capable of being programmed to activate up to 12 times daily on the days desired in one (1) minute to six (6) hours increments (on a continually rotating 7-day cycle or on an interval between every 1 to 30 days). The Removable style programmer shall be capable of being programmed to activate up to 24 times daily on the days desired in one (1) minute to six (6) hours increments (on a continually rotating 7-day cycle or on an interval between every 1 to 30 days).
- 2.7 The Bluetooth controlled programmer must be capable of receiving management data transmissions from up to 25 feet, line of sight.
  - a. 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.
  - b. 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.
  - c. 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.
- 2.8 All programming, Built-in or Bluetooth shall be accomplished by means of an integrated programmer module that is powered by at least a single 9-volt battery or a Bluetooth equipped smart phone.

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- 2.9 Additional programming capabilities shall include monitoring and flush activation by means of a S.M.A.R.T. Management controller with the capacity to flush the associated distribution line at the installation point when the chlorine (total or free) disinfectant residual level falls below the user-defined acceptable level and must offer a minimum of ten (10) independent flush events with a minimum range of one minute to 24 hours per event. Additionally, the S.M.A.R.T. management controller shall be capable of monitoring a minimum of two additional water quality parameters with the potential to be expanded to five additional water quality monitoring parameters. The S.M.A.R.T. management controller must also be capable of being upgradable to flush on multiple water quality conditions.

**3. ACCEPTABLE MANUFACTURERS**

Automatic water distribution flushing equipment to be supplied under this specification, hereby known as the HG-1, shall be **Hydro-Guard®** as manufactured by the Mueller Company.

**4. AUTOMATIC WATER DISTRIBUTION FLUSHING SYSTEM COMPONENTS**

The automatic water distribution flushing system shall be comprised of a self-contained automatic flushing unit that shall be equipped with a dechlorination tablet feeder that shall hold a minimum of six (6) three-inch ascorbic acid or sodium sulfite tablets. The device shall include a sample quick connect that can be mated with a portable sample valve. The quick connect shall be protected from contaminants by way of a protective cap. The device shall feature a protective stainless-steel diffuser screen that shall serve to diffuse water energy from the water being flushed from the device and shall serve to reduce the potential that animals, reptiles etc. can nest inside of the device. The device shall be upgradable to include freeze protection.

**5. AUTOMATIC FLUSHING UNIT**

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

- 5.1 **Integral Piping and Control Valve** – The piping and control valve components shall include the following:
- a. The device's internal control valve shall be capable of being activated controller powered by either a single 9-volt battery (Built-In) with the ability to add a second like battery for extended life, unless equipped with a S.M.A.R.T. management system or a Bluetooth equipped smart phone (Android or iOS).
  - b. The control valve shall be a globe valve type design with a straight-through pass cavity (no internal wall construction inside valve body) 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 piping shall be Schedule 80 PVC or Brass.
  - d. The unit's internal piping and control valve shall have a recommended operational rating of up to 200 psi. However, where pressures are likely to be sustained at or above 120 psi a pressure reducing valve shall be installed in line with the device.
  - e. Internal piping and control valve shall be capable of being removed from the housing by means of a quick disconnect, permitting easy maintenance and repairs. All internal piping, control valve sub-assembly must be completely removable by way of a single point of disconnect.

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- 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 using a single EPDM rubber diaphragm. The valve must be upgradable to a brass control valve option.
- g. The unit shall be supplied with either a standard 2" (inlet size is determined by customer preference for the site where the flushing device will be located) male NPT threaded water supply connection.

**5.2 Housing**

- a. 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 bottom of the exterior of the device's above-ground protective housing. The energy dissipating shield shall be slotted and capable of preventing intrusion by rodents and reptiles. The shield shall be constructed of either stainless-steel (recommended minimum gage: 16).
- b. 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.
- c. The self-contained device shall be supplied with a below-grade bottom-vented base to provide stability and anti-buoyancy capabilities. The base shall be constructed of high to medium density Polyethylene or other non-corrosive, high quality, material.
- d. 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 unless otherwise specified by the owner. The material shall be specifically designed for direct exposure to the sun and weather and have a minimum life expectancy of 15 years.
- e. All mounting brackets and hardware shall be stainless-steel, marine grade polyethylene (minimum thickness of ½-inch), or anodized aluminum.

**5.3 System Sampling – The sampling system shall include the following features:**

- a. The sampling system shall be constructed of copper, stainless-steel, polyethylene, or other material with equal or greater resistance to bacterial regrowth and be connected with brass or stainless-steel 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 stainless-steel quick connection valve. The unit'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.
- d. Sampling system shall include a quick connect that can only be accessed by use of a portable sample valve (PSV).
- e. The Portable Sample Valve must be removable and feature (check preference) a stainless-steel sampling tip \_\_\_\_ and/or a polyethylene sample tube \_\_\_\_.

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- 5.4 Electrical/Electronic System** - The Electrical/Electronic System shall include the following features and capabilities:
- a. Controller must be capable of storing instructions. It shall be either an (Check indicates preference) (\_\_\_) integrated, "Built-In", programmer capable of operating the device's internal control valve using a single replaceable 9-volt alkaline battery with the potential for adding a second like battery; or a Bluetooth-equipped smart phone.
  - b. 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.
  - c. The Bluetooth-equipped device must allow for up to 24 flush events daily with durations of one minute to 24 hours.
  - d. 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.
  - e. The Bluetooth controller interface module must be password protected to prevent unauthorized operation.
  - f. The built-in control option must offer a minimum of twelve (12) flushing programmable events per day. The removable control option must offer a minimum of twenty-four (24) programmable flush events per day.
  - g. Be leap-year compatible, automatically accounting for February 29<sup>th</sup> every four years.
  - h. The built-in option must offer an LCD readout for viewing ease of clock and programming functions. The removable control option must offer a built-in programming interface with an inferred connection point that can be programmed with a single handheld controller. The handheld controller must be capable of programming an unlimited number of like-equipped devices.
  - i. The built-in option must offer manual on and off functions with programmable delays (10 seconds or more) to allow operators to move away from the device prior to the start of a water flush sequence.
  - j. The built-in option must be secured and water-resistant to a minimum of six (6) feet of temporary submersion.
  - k. The built-in option must be constructed using heavy-duty electrical wiring and communication cables. Installation of unprotected cables and communication cables must not be attached to metal surfaces where potential chaffing can occur.
  - l. Use an integrated latching solenoid to operate the control valve. Manufacturer must be able to readily provide replacement parts for the solenoid and valve.

## SUGGESTED SPECIFICATIONS

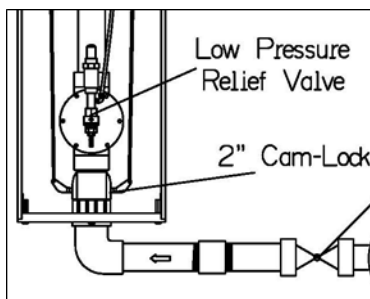
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### 5.5 Winterization

- a. As per the local ordinance the unit shall be constructed either with or without a freeze protection system. One acceptable option is the use of a fully mechanical low-pressure relief/double check freeze protection system (requiring no additional power source).

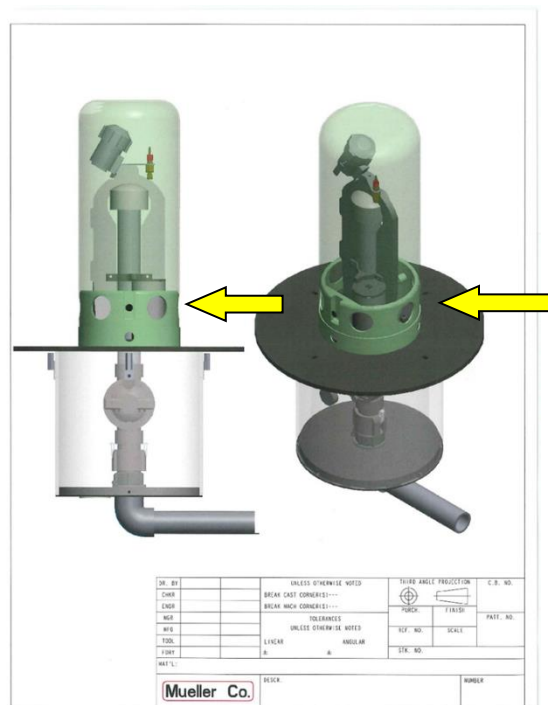
Optional Freeze Protection Upgrade:



- b. The self-draining, double check valve, freeze protection system has been engineered to evacuate water remaining within the unit's stand pipe subsequent to but not during the flushing process. This system must be designed to prevent the possibility of cross contamination of the main service distribution line by means of a double check valve installed in the freeze protection system. This system may not include the use of a spring valve capable of being activated by outside pressure from ground water standing in the flushing unit's protective below grade enclosure.

### 5.6 Dechlorination (Optional depending on local ordinance)

- a. A tablet feeder designed to accommodate up to twelve 2 5/8<sup>th</sup> inch sodium sulfite or ascorbic acid tablets may 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.



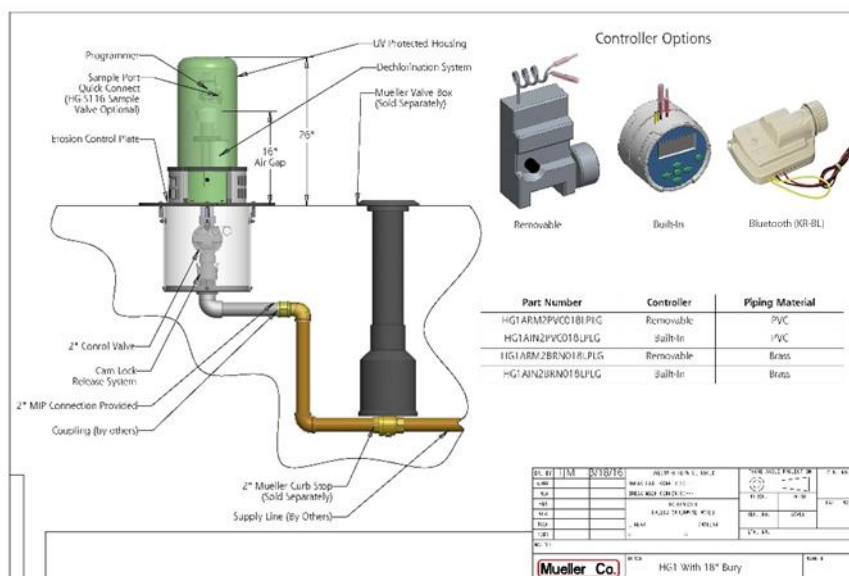
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## 5.7 Execution

- 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.
- 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.
- Install a 4" lift of non-compacted sand or similar bedding material into the bottom of the hole.
- 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.
- The area 36" around the automatic flushing valve shall be prepared in order to prevent erosion.
- The automatic flushing valve shall be disinfected in accordance with ADH and AWWA standards.



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