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# Neutralization and pH Monitoring of Special Waste Flow Streams

# Neutralization and pH Monitoring of Special Waste for Flow

In addition to being a well-known leader in the manufacture of corrosive waste piping, GF Piping Systems offers a comprehensive line of neutralization tanks and Automatic pH Adjustment/Monitoring systems. In facilities where special waste piping systems are required, pH neutralization and/or monitoring of the special waste discharges are required by many local municipalities or Authorities Having Jurisdiction (AHJs). The GF line of tanks and treatment/monitoring systems provides the proper equipment required to suit this need. Our group of experts will help you choose the right system allowing for one source in providing both special waste piping and neutralization systems.

## Tank size

Molded tanks 5–1,200 gallons

Custom fabricated round or rectangular tanks to 3,000 gallons

## Tank material

Polypropylene (PP) molded and fabricated

Polyethylene (PE) molded

Inlet, outlet and vent connections configurable as required

## Options

Customized one-piece tanks replace requirement for tank with extension section to grade



# Elements of Success

## Fuseal® PP Corrosive Waste

Fuseal PP is resistant to the corrosive action of alkalis, alcohols, acids, solvents and salt solutions. Dilute mineral acids and aqueous solutions of acid salts, which are so destructive to most metals, have no effect on the Fuseal PP system. In general, Fuseal PP is attacked only by strong oxidizing acids and weakened by certain organic solvents and chlorinated hydrocarbons. Fuseal PP will not rust, pit, scale, corrode or be affected by electrolysis.

Fuseal PP piping systems have excellent chemical resistance and physical properties which make the system ideal for handling corrosive waste mixtures of acids, bases and solvents present in laboratory, industrial or food and beverage processing DWV applications.

## Signet Measurement and Instrumentation

Signet transmitters are ideal for monitoring, and controlling various measurements such as flow and pH. The transmitters are available with a display for local readout and can be directly connected to a PLC, metering pump, or actuated valve for advanced monitoring and control.

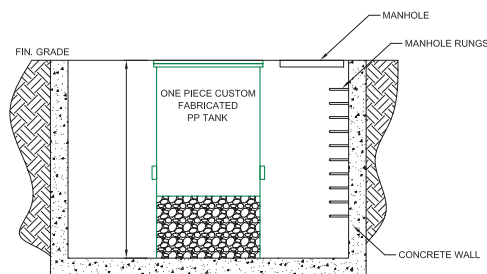
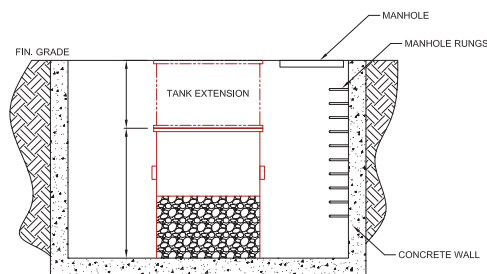
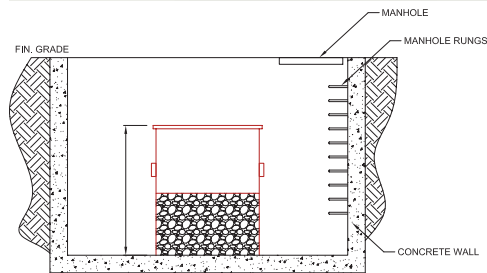
A wide range of measuring devices are available including flow, pH, conductivity, ORP, pressure, turbidity, chlorine, and dissolved oxygen.

## Neutralization Tanks

No matter what might be implied by other manufacturers, a polypropylene or polyethylene limestone neutralization tank should never be directly buried. Tanks that must be installed below grade outside the footprint of a facility should be installed within vaults or other means of protection.

Some manufacturers of polymer neutralization tanks offer extension sections (bolted to tank flange) in order to extend tank up to grade or preferred access height.

GF Piping Systems offers custom one-piece PP fabricated neutralization tanks that allow for easier installation and limit potential infiltration problems with extension connection points.





# Neutralization Tanks/pH Monitoring and Treatment Systems

While code requirements may be directive as to materials used in conveyance of corrosive waste flow streams, there often is no information set forth as to the required treatment of these streams prior to their being tied into (connected to) the building, private or municipal sanitary piping system.

When designing a corrosive waste (special waste) system, one should be aware of the following:

- Facility (on site) protocols for corrosive treatment
- Local, state or federal regulations regarding prohibited discharges into surface waters, piped municipal or private sanitary systems

In the U.S., facilities which discharge their waste flow streams directly to surface waters must be permitted under the EPA NPDES (National Pollutant Discharge Elimination System). With regards to discharge of corrosive wastes, the system designer must refer to The Prohibited Discharge Standards as found in regulation 40 CFR:

Section 403.5 (b) states, "Specific prohibitions. In addition, the following pollutants shall not be introduced into a POTW (Publicly Owned Treatment Works)."

Subparagraph (2) under Section 403.5(b) states, "Pollutants which will cause corrosive structural damage to the POTW, but in no case Discharges with a pH lower than 5.0, unless the works is specifically designed to accommodate such Discharges;"

The pH discharge limit as set forth in Section 403.5(b) is the basis of design for the standard limestone-filled neutralization tanks used to neutralize the acidic (low pH) levels within a facilities corrosive waste drainage system. These tanks must be installed upstream of the tie-in to the sanitary piping system. Most of the specifications written on corrosive waste piping systems require such tanks to be installed. For assistance in specifying the properly-sized tank for a particular facility, please contact your local GF Piping Systems Area Sales Manager or go to [www.gfpiping.com](http://www.gfpiping.com) for design assistance.

The system designer must investigate the discharge requirements of the local authorities having jurisdiction (municipality), DEQ (Department of Environmental Quality), DEP (Department of Environmental Protection), Sewerage District, etc., within the area in which the facility is located.

Although most Authorities Having Jurisdiction (AHJ) sewerage connection permits incorporate Section 403.5 (b)(2) wording directly into their own Prohibited Discharge section, there are many that are also concerned with caustic (high pH) discharges into the municipal or surface water system. These jurisdictions will clearly define a high pH discharge limit (usually around 11 pH) within their prohibitive discharge regulations.

In these cases, the installation of a limestone filled neutralization tank will not be sufficient to meet the discharge parameters as set forth by the authority. The designer will be required to install an automatic injection pH neutralization system which will treat/neutralize both high and low pH levels entering the system tank(s) prior to discharge into the sanitary or surface water system. Should your facility require the design of an automatic injection system, please contact your local GF Piping System Area Sales Manager or go to [www.gfpiping.com](http://www.gfpiping.com) for design assistance.

Many authorities require the facility discharging into their systems to validate the fact their effluent waste stream pH falls within the permitted levels. This requires a monitoring pH probe to be installed downstream of the neutralization tank or system. This pH probe is wired back to a control panel where the effluent levels are recorded for review by the AHJ. There also may be requirements for monitoring the effluent gallons per minute (GPM) discharge flow level to ensure a facility is not exceeding their permitted gallons per day (GPD) discharge level. In this case, a flow sensing device would need to be installed and wired back to a flow controller and recorder for review by the AHJ.

## Important Note Regarding the Design of Corrosive Waste Piping Systems

Certain design professionals receive recommendations to install neutralization systems which require the facilities personnel to, manually or via automated process, discharge un-specified amounts of clean water into said system as a means of meeting discharge permit allowances. The NPDES and all AHJ discharge permits as referenced on previous page clearly state the following with regards to a facility's effluent waste stream treatment prior to discharge:

"Dilution prohibited as substitute for treatment. Except where expressly authorized to do so by an applicable Pretreatment Standard or Requirement, no industrial User shall ever increase the use of process water, or in any other way attempt to dilute a Discharge as a partial or complete substitute for adequate treatment to achieve

compliance with a Pretreatment Standard or Requirement. The Control Authority may impose mass limitations on Industrial Users which are using dilution to meet applicable Pretreatment Standards or Requirements, or in other cases where the imposition of mass limitations is appropriate."

The discharge of clean potable or process water in an attempt to neutralize waste streams within a neutralization tank or building effluent piping system is not allowed under the NPDES or AHJ discharge permits. This added flow stream may affect the design parameters of the neutralization system and/or unnecessarily over burden the municipal or surface water conveyance system(s). Based on this information, local AHJs should be contacted before any type of dilution (volume) tank or neutralization tank where potable or protected water is discharged into the tank at regular intervals through a solenoid valve, is to be installed at the owners' directive.



# Design Of Special Waste Neutralization/Monitoring Systems

The information provided on the previous pages explains the rationale behind the requirements for installation of special waste monitoring or neutralization for facility discharges into municipal or private sanitary systems.

GF Piping Systems offers several different methods of treatment/monitoring for facility special waste discharges to ensure compliance with regulating authority mandates. These systems are outlined via specifications and details shown on the following pages. The information below provides a brief explanation as to when, how and why GF Piping Systems would suggest a particular installation when assisting engineers and/or end-users in system design.

## **GF Series 600TM (Treatment/Effluent Monitoring) with Limestone Neutralizing Media**

When the facility discharge parameters for acceptable pH level show only a limit for acidic (low) pH with no limit for caustic (high) pH level, a limestone-filled neutralization tank should be suitable for installation. The limestone media will only affect (neutralize) the acidic waste of the effluent flow stream. Tank sizing for these applications is based on number of sinks being discharged into the special waste piping system.

Please note the actual volume containment within these tanks is from the outlet pipe invert to the base of the tank.

Most authorities will ask for a means of monitoring the effluent pH level within the special waste piping downstream of the neutralization tank. In order to meet this requirement, GF Piping Systems offers the Series 600TM package which includes a U-Trap Assembly (housing a pH probe) installed in-line with the probe wired back to a control panel.

## **GF Series 600-1R (Round) Or 600-1Rec (Rectangular) Single Tank Neutralization System**

When the facility discharge parameters for acceptable pH levels show a limit for both acidic (low) pH and caustic (high), a limestone neutralization tank will not be acceptable. When both high and low pH discharge levels are regulated, an automatic chemical injection system will be required. Tank sizing for these applications is based on number of fixtures (lab sinks, cup sinks) draining to the

system and GPM flow rates of equipment (sterilizers, rack washers, etc.) draining to the system. GF Piping Systems will provide technical assistance in proper tank sizing.

When the required containment volume for proper treatment is 500–800 gallons or less, we suggest the installation of our Series 600-1 system, which neutralizes influent pH levels via injection and mixing of 50% Sulfuric Acid or 50% Sodium Hydroxide into the system tank when out-of-spec conditions occur. Flow stream treatment is controlled by a pH probe located within the tank, while a pH probe housed in a U-Trap Assembly installed downstream of the tank allows monitoring and recording of the effluent pH levels prior to tie-in to municipal system.

These systems are manufactured with either a round or rectangular tank (depending on allowed design footprint) and may be either skid-mounted as a complete plumbed/wired package or delivered as individual components to be installed/wired in the field.

## **GF Series 600-2R (Round) Or 600-2Rec (Rectangular) Two-Tank pH Neutralization System**

When the facility discharge parameters for acceptable pH levels show a limit for both acidic (low) pH and caustic (high), a limestone neutralization tank will not be acceptable. When both high and low pH discharge levels are regulated, an automatic chemical injection system will be required. Tank sizing for these applications are based on number of fixtures (lab sinks, cup sinks) draining to the system and GPM flow rates of equipment (sterilizers, rack washers, e.g.) draining to the system. GF Piping Systems will provide technical assistance in proper tank sizing.

When the required containment volume for proper treatment is more than 800 gallons, we suggest the installation of our Series 600-2 system, which will neutralize influent pH levels via injection and mixing of 50% Sulfuric Acid or 50% Sodium Hydroxide into the system tanks when out of spec conditions occur. The required containment volume is split into two tanks, a Mix Tank and a Trim Tank (i.e. should 1600 gallons of total containment be required for the system, one 800 gallon Mix Tank and one 800 gallon Trim Tank would be provided. The thought process behind a two tank system is as follows:

- A. It is easier to ensure proper treatment within designed “flow through” time in smaller volumes.

- B. Should special waste influent pH levels be heavier on the acidic end of the scale, the first (Mix) tank may be designed to treat low pH only, while the second (Trim) tank may be designed to treat both high and low pH.

Flow stream treatment is controlled in both tanks by pH probes located within the tanks, while a pH probe housed in a U-Trap Assembly installed downstream of the tank allows monitoring and recording of the effluent pH levels prior to tie-in to municipal system.

These systems will be manufactured with either a round or rectangular tank (depending on allowed design footprint) and may be either skid-mounted as a complete plumbed/wired package or delivered as individual components to be installed/wired in the field.

### **GF Series 600SP (Special Waste Discharge Pump System)**

For certain facilities where, due to the location of the pH Neutralization System:

- A. The special waste piping stream needs to be pumped via pressure waste to the system.
- B. The effluent special waste stream from the system needs to be pumped up to gravity discharge elevation.

We can provide our GF Series 600SP special waste discharge sump pump station. GF Piping Systems will provide technical assistance in sizing the sump tank, sump pump capacities, and proper level controls. These systems can be manufactured as a stand-alone skid mounted assembly (for pumping to pH System location), or as a component of the entire pH System (when system effluent is required to be pumped up to gravity discharge elevation).

**NOTE:** Always contact your local GF Piping Systems LLC Area Sales Manager or Specification Representative prior to commencement of system design.



# GF Series 600TM (Treatment/Effluent Monitoring) with Limestone Neutralizing Media

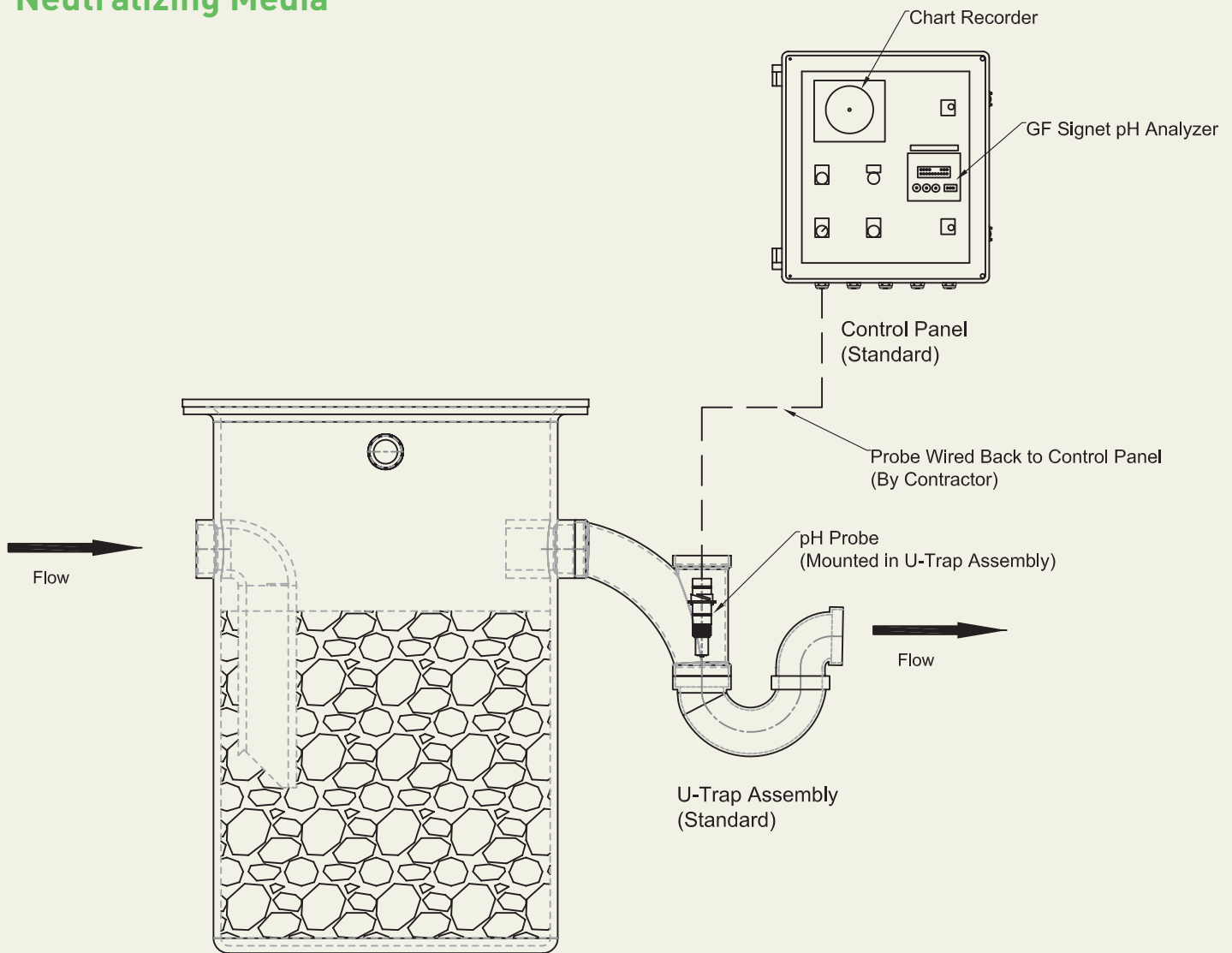
## 2.14 pH Monitoring System (Series 600TM)

- A. pH Monitoring System equipment shall be Series 600TM as manufactured by GF Piping Systems, Irvine CA, or approved equal.
- B. System shall include the following:
  - 1. Neutralization Tank (NDT- XXX )
    - a. Tank shall be constructed of ½" thick polypropylene with flanged cover. Tank shall have a holding capacity of approximately XXX gallons with dimensions as shown on the drawings and shall be fitted with inlet, outlet and vent connections. Tank cover shall be fitted with a threaded man-way for access. Tank shall be filled to the outlet invert with limestone chips (by others). Chips shall be 1½" to 3" diameter with 90% calcium carbonate content.
  - 2. pH Sensor
    - a. The pH sensor shall be differential measurement type Signet Model No. 2724 compatible with receiver/analyzer or controller. The electrodes shall be protected by encapsulation with integral automatic temperature compensation. The sensor shall have a measuring range of 0–14 pH and be installed in conjunction with Signet Model 2750 pH Transmitter with sensitivity to 0.001 pH unit and an input impedance factor of  $>10^{11}\Omega$ . All with DryLoc® pH sensor electronics. Connection back to pH receiver/analyzer located in control panel to be via a three conductor shielded cable.
  - 3. pH Receiver/Analyzer
    - a. pH receiver/analyzer shall accept any 4–20 mA signal. Unit to have a digital display and be designed to receive a signal from the pH sensor. Unit shall have a measuring range of 0–14 pH, two alarm relays, relay indicators, system error LED, push button controls. Unit shall provide a 4–20 mA output signal to the chart recorder. Shall be Signet Model 9900.
  - 4. Chart Recorder
    - a. Chart recorder shall be a circular type with maximum 10" diameter charts, housed in the system control panel. Chart recorder shall receive a signal from the pH receiver/analyzer and record the system effluent pH levels.
  - 5. Control Panel and Components
    - a. The control panel shall be completed pre-wired, pre-assembled and pre-tested prior to delivery. The cabinet shall be a NEMA IV type enclosure ready for wall mounting. The panel front shall be hinged and locked. The panel components shall be as follows:
      - i. pH receiver/analyzer
      - ii. Circular chart recorder
      - iii. pH out of spec high/low alarm
      - iv. System on/off switch w/light
      - v. Alarm test and silence buttons
      - vi. Alarm horn
    - b. Panel power requirements shall be 120 V single phase, 20 Amp.
  - 6. U-Trap Assembly
    - a. U-Trap Assembly shall be manufactured of Fuseal polypropylene pipe and fittings joined by the heat fusion method, sized as shown in the drawings. Tank (inlet) side of the trap is to have an extended section which will house the effluent pH probe. The purpose of this unit is to maintain a pocket of effluent which allows the pH probe to remain wet while ensuring the flow stream passes by the probe. The inlet and outlet sides of the unit shall be provided with flanged connections.
  - 7. Installation
    - a. All components and instrumentation shall be furnished, ready for installation from a single source.
    - b. The monitoring system shall be installed in strict accordance with the manufacturers' recommendations and drawings and in compliance with job specifications and local codes.



- c. System calibration and start-up shall be included in the package provided by the manufacturer. The manufacturer shall also be responsible for conducting a training seminar for the site facility's personnel prior to placing the system on line.
  - d. Manufacturer shall provide a point-to-point wiring diagram.
8. Warranty
- a. All components and instrumentation of the system shall be warranted against defects in workmanship and materials for a period of one year from the date of delivery.
9. System Wiring
- a. Under CSI Division 16 or 26, the site electrician shall be responsible for mounting and providing the power supply to the control panel. The electrician shall also be responsible for wiring pH probe back to the panel from the U-Trap Assembly.

## GF Series 600TM (Treatment/Effluent Monitoring) with Limestone Neutralizing Media



Neutralization Tank with Limestone Chips  
(Not included with GFS 600 pH Monitor  
Package. Purchased Separately)

# GF Series 600-1R (Round) Or 600-1Rec (Rectangular) Single Tank Neutralization System

## 2.14 pH Neutralization System (Series GF600-1)

- A. pH Neutralization System equipment shall be Series GF600-1 as manufactured by GF Piping Systems, Irvine, CA, or approved equal.
- B. System shall include the following:
  - 1. Mix Tank (PPTANK- XXXX) Rectangular (or Round)
    - a. Tank shall be constructed of polypropylene with minimum ½" thick sidewalls, ¾" thick base and 1" thick cover. Cover shall be bolted and gasketed (three inch wide bolting flange all around). Tank outside dimensions shall be shown on the drawings. Tank shall have an actual holding capacity of ### gallons (below outlet pipe invert) and shall be fitted with all necessary connections to accept all required instrumentation, as well as #" inlet, #" outlet and #" vent flanged connections. Side of tank walls (internal) shall be fitted with four anti-vortex baffles welded in place. Tank cover shall be fitted with a 15" diameter threaded man-way for access, and a sealed mixer shaft enclosure which acts like a water trap, thus sealing the mixer shaft opening. See details on drawings for locations and sizes of connections.
  - 2. pH Sensors (Two Required)
    - a. The pH sensors shall be differential measuring type Signet Model No. 2724 compatible with receiver/analyzer or controller. The electrodes shall be protected by encapsulation with integral automatic temperature compensation. The sensor shall have a measuring range of 0-14 pH, and be installed in conjunction with Signet Model No. 2750 pH Transmitters with sensitivity to 0.001 pH unit and an input impedance factor of >10<sup>11</sup>Ω. All with DryLoc® pH sensor electronics. Connection back to pH analyzer/controller located within control panel to be via a three conductor shielded cable. Sensors shall be installed a) in Mix Tank b) in U-Trap Assembly.
  - 3. Mixer (One Required)
    - a. The direct drive mixer (mounted on Mix Tank cover) shall be not more than #HP, ### volt, # phase. All wetted parts shall be type 316 stainless steel. Shaft lengths shall be suitable for required tank depth. Mixer shall be controlled by the following means:
      - HO/A Switch located on the panel.
      - In Hand position, mixer runs constantly
      - In Automatic position, mixer will operate:
        - Via 24hr/7 day timer set for normal hours of lab operation
        - Via signal from pH Monitors during out of spec tank conditions
  - 4. Chemical Metering Pumps (Two Required)
    - a. The chemical metering pumps shall be 115VAC and have a 100:1 output through independently variable stroke length and stroke frequency controls. All electronics shall be encapsulated and isolated within a chemical resistant glass reinforced polypropylene housing. Liquid ends shall contain a combination anti-siphon/pressure relief valve. Pump shall be rated for a minimum capacity of ## GPH.
  - 5. pH Monitor (Two Required)
    - a. The pH monitor will accept any 4-20 mA signal. Unit to have a digital display and be designed to receive a signal from the pH sensor and relay a proportionally controlled power signal to the chemical reagent pumps. Unit shall be manufactured as to be provided with Radio Frequency Interference (RFI) protection. Unit shall have a measuring range of 0-14 pH, two control relays, one alarm relay, relay indicators, system error LED, push button controls, automatic on line operation return, sensitivity to 0.1% of span and 0.5 second response time. Monitors to be housed in the system control panel. Shall be Signet Model 9900.
  - 6. Chart Recorder (One Required)
    - a. Chart recorder to be circular type with 12 inch diameter charts, housed in the system control panel. Recorder shall receive a signal from the effluent pH analyzer and record the system effluent pH levels (0-14). Recorder

shall draw its own pre-programmed charts on blank circular charts. Entire recording system is pre-programmable for monitoring records, hours/days of chart duration, etc. Shall be Honeywell Trueline or approved equal.

7. Reagent Tanks (Two Required)

- a. Reagent tanks shall be constructed of polyethylene in standard 55 gallon capacity. Tanks shall have markings on sidewall delineating gallons of containment. Covers shall be designed for easy mounting of reagent pumps.

8. Control Panel and Components

- a. The control panel shall be U.L. listed, completely pre-wired and pre-assembled, as well as pre-tested prior to delivery. The cabinet shall be NEMA IV type enclosure ready for wall mounting. The panel front shall be hinged and locked. The panel components shall be as follows:
  - i. pH monitors (2)
  - ii. Circular chart recorder (1)
  - iii. pH out of spec high/low alarm
  - iv. Mix tank mixer HO/A switch and light
  - v. PLC unit for complete system control
  - vi. System on/off switch
  - vii. Alarm test and silence buttons
  - viii. Mix tank acid pump on light
  - ix. Low level mix tank acid reagent alarm/light
  - x. Mix tank caustic pump on light
  - xi. Low level mix tank caustic reagent alarm/light
  - xii. Alarm horn
- b. Panel power requirements shall be ### V, # phase, ## amp.

9. U-Trap Assembly

- a. U-Trap Assembly shall be manufactured of Fuseal polypropylene pipe and fittings joined by the heat fusion method, sized as shown in the drawings. Tank side of trap is to have an extended section which will house the system effluent pH probe. The purpose of this unit is to maintain a pocket of effluent flow, which allows the pH

Signet DryLoc® 2724 pH electrode



Signet 9900 Multi-parameter Transmitter



probe to remain wet and, ensures the flow stream passes by the sensor. The inlet and outlet ends of the unit shall be provided with flanged connections. Unit shall be shipped to the site with un-fused joints allowing for trap to be configured to best suit existing conditions.

10. Reagent Containment Station

- a. The station shall be fabricated of 1/2" thick polypropylene. The two reagent tanks shall be set in place within this unit. The station shall be 62" long x 30" deep. The front and sidewalls shall be 30" high. The back wall of the station shall be 48" high and be fitted with a polypropylene reagent pump shelf. The base of the unit shall be divided into two equal compartments of 30" each, one compartment for each reagent tank.

11. Installation

- a. All components and instrumentation shall be furnished, ready for installation from a single source. Mix Tank, Containment Station, U-trap Assembly and Control Panel shall be shipped to the site as individual components.
- b. The neutralization system shall be installed in strict accordance with the Manufacturer's recommendations and drawings and in compliance with the project specifications and local codes.
- c. System calibration and start-up shall be included in the package provided by the manufacturer. The manufacturer shall also be responsible for conducting a training seminar for the site facilities personnel prior to placing the system on line.
- d. Manufacturer shall provide a point to point wiring diagram as part of their shop drawing submittal.
- e. Upon project completion no fewer than five (5) sets of O&M manuals shall be provided to the Owner by the system manufacturer.

12. Warranty

- a. All components and instrumentation for the system shall be warranted against defects in workmanship and materials for a period of one year from the date of delivery to the site.

13. System Wiring

- a. Site electrician to be responsible for providing power supply to the control panel. All required system wiring from the control panel to the reagent station and Mix Tank shall also be the responsibility of the site electrician under CSI Division 16 or 26 of the contract documents including:
  - Mounting and power wiring connection to control panel
  - Wiring from control panel terminal strip to chemical reagent station
    - wiring to two duplex receptacles
    - two wiring feeds for reagent tank low level sensors



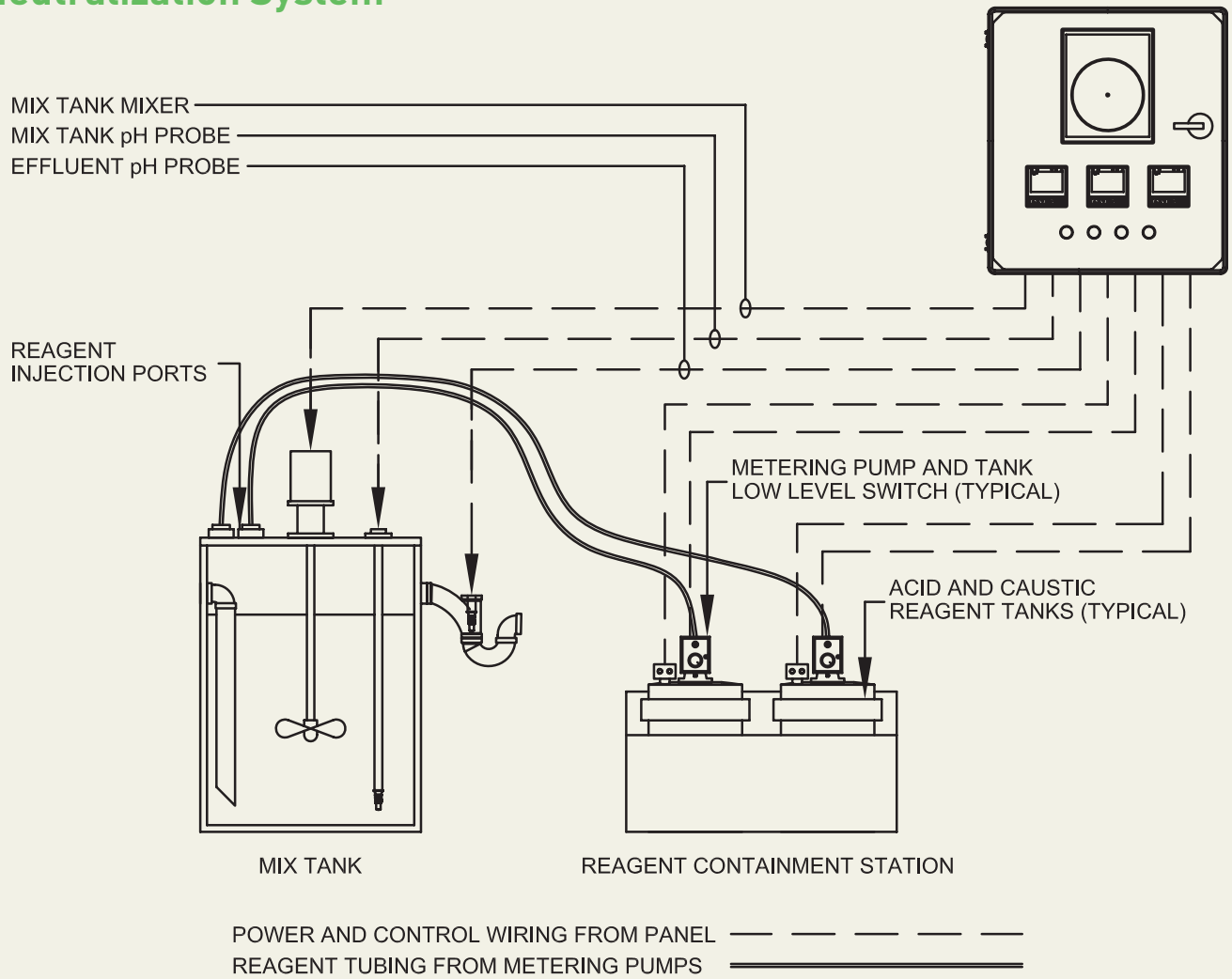


- ## V # phase wiring from control panel terminal strip to mixer located on Mix Tank cover
- Two 3 conductor shielded cable runs from control panel terminal strip to pH probe junction boxes located
  - a) on Mix Tank cover
  - b) on U-Trap assembly extension.

14. Chemicals

- a. Contractor, not manufacturer, shall be responsible for providing start-up chemicals and placing same within reagent tanks.
  - 55 Gallons sulfuric acid (50%)
  - 55 Gallons sodium hydroxide (50%)
- b. Contractor shall be responsible for pulling two 3/8" OD polyethylene tubing runs from reagent pumps located in the building to the reagent injection ports located on the Mix Tank cover. Tubing shall be run within 2" PVC conduit.

## GF Series 600-1R (Round) Or 600-1Rec (Rectangular) Single Tank Neutralization System



# GF Series 600-2R (Round) Or 600-2Rec (Rectangular) Two Tank pH Neutralization System

## 2.14 pH Neutralization System (Series GF600-2)

- A. pH Neutralization System equipment shall be Series 600R-2 as manufactured by GF Piping Systems, Irvine, CA, or approved equal.
- B. System shall include the following:
  - 1. Mix Tank (PPTANK- XXXX) Round (or Rectangular)
    - a. Tank shall be constructed of polypropylene with minimum 1/2" thick sidewalls, 3/4" thick base and 1" thick cover. Cover shall be bolted and gasketed (three inch wide bolting flange all around). Tank outside dimensions shall be as shown on the drawings. Tank shall have an actual holding capacity of ### gallons (below outlet pipe invert) and shall be fitted with all necessary connections to accept all required instrumentation, as well as #" inlet, #" outlet and #" vent flanged connections. Inlet, Outlet, and Vent flanged stubs shall be installed on side of tank where shown on the contract drawings (location and invert height up from bottom of tank). Side of tank walls (internal) shall be fitted with four anti-vortex baffles welded in place. Tank cover shall be fitted with a 15" diameter threaded man-way for access, and a sealed mixer shaft enclosure which acts like a water trap, thus sealing the mixer shaft opening. See details on drawings for locations and sizes of connections.
  - 2. Trim Tank (PPTANK-XXX) Round (or Rectangular)
    - a. Tank shall be constructed of polypropylene with minimum 1/2" thick sidewalls, 3/4" thick base and 1" thick cover. Cover shall be bolted and gasketed (three inch wide bolting flange all around). Tank outside dimensions shall be ##" diameter x ##" deep. Tank shall have an actual holding capacity of ### gallons (below outlet pipe invert) and shall be fitted with all necessary connections to accept all required instrumentation, as well as #" inlet, #" outlet and #" vent flanged connections. Inlet, Outlet, and Vent flanged stubs shall be installed on side of tank where shown on the contract drawings (location and invert height up from bottom of tank). Side of tank walls (internal) shall be fitted with four anti-vortex baffles welded in place. Tank cover shall be fitted with a 15" diameter threaded man-way for access, and a sealed mixer shaft enclosure which acts like a water trap, thus sealing the mixer shaft opening. See details on drawings for locations and sizes of connections.
  - 3. pH Sensors (Three Required)
    - a. The pH sensors shall be differential measuring type Signet Model No. 2724 compatible with receiver/analyzer or controller. The electrodes shall be protected by encapsulation with integral automatic temperature compensation. The sensor shall have a measuring range of 0-14 pH, and be installed in conjunction with Signet Model No. 2750 pH Transmitters with sensitivity to 0.001 pH unit and an input impedance factor of >10<sup>11</sup>Ω . All with DryLoc® pH sensor electronics. Connection back to pH analyzer/controller located within control panel to be via a three conductor shielded cable. Sensors shall be installed within Mix Tank, Trim Tank and U-Trap Assembly.
  - 4. Mixer (Two Required)
    - a. The direct drive mixers (one mounted on each tank cover) shall be not more than #HP, ## volt, # phase. All wetted parts shall be type 316 stainless steel. Shaft lengths shall be suitable for required tank depth. Mixers shall be controlled by the following means:
      - HO/A Switch located on the panel.
      - In Hand position, mixer runs constantly
      - In Automatic position, mixer will operate:
        - Via 24hr/7 day timer set for normal hours of lab operation
        - Via signal from pH Monitors during out of spec tank conditions
  - 5. Chemical Metering Pumps (Four Required)
    - a. The chemical metering pumps shall be 115VAC and have a 100:1 output through independently variable stroke length and stroke frequency controls. All electronics shall be encapsulated and isolated within a chemical resistant glass reinforced polypropylene housing. Liquid ends shall contain a combination anti-siphon/pressure relief valve. Pump shall be rated for a minimum capacity of ## GPH.

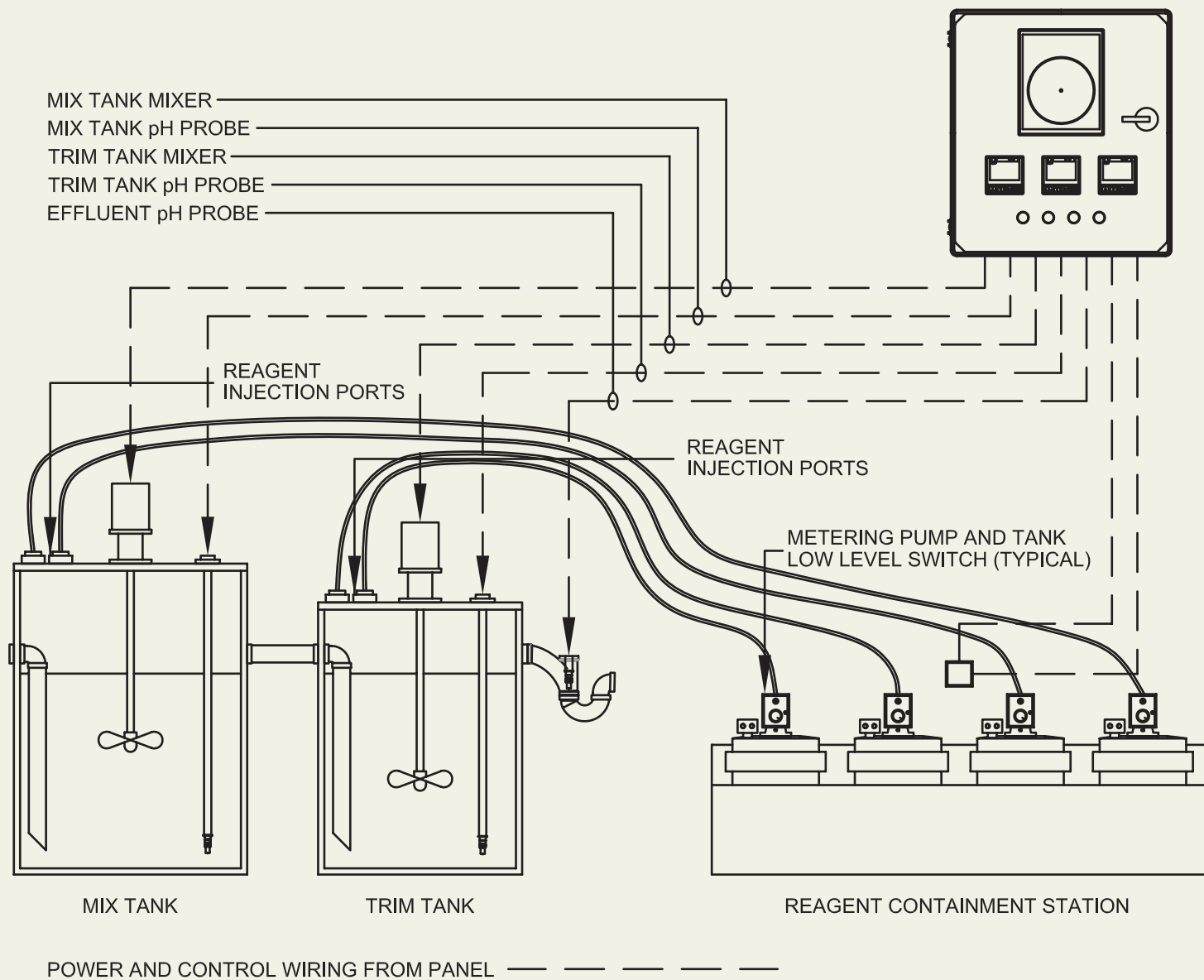
6. pH Monitor (Three Required)
  - a. The pH monitor will accept any 4–20 mA signal. Unit to have a digital display and be designed to receive a signal from the pH sensor and relay a proportionally controlled power signal to the chemical reagent pumps. Unit shall be manufactured as to be provided with Radio Frequency Interference (RFI) protection. Unit shall have a measuring range of 0–14 pH, two control relays, one alarm relay, relay indicators, system error LED, push button controls, automatic on line operation return, sensitivity to 0.1% of span and 0.5 second response time. Monitors to be housed in the system control panel. Shall be Signet Model 9900.
7. Chart Recorder (One Required)
  - a. Chart recorder to be circular type with 12 inch diameter charts, housed in the system control panel. Recorder shall receive a signal from the effluent pH analyzer and record the system effluent pH levels (0–14). Recorder shall draw its own pre-programmed charts on blank circular charts. Entire recording system is pre-programmable for monitoring records, hours/days of chart duration, etc. Shall be Honeywell Trueline or approved equal.
8. Reagent Tanks (Four Required)
  - a. Reagent tanks shall be constructed of polyethylene in standard 55 gallon capacity. Tanks shall have markings on sidewall delineating gallons of containment. Covers shall be designed for easy mounting of reagent pumps.
9. Control Panel and Components
  - a. The control panel shall be U.L. listed, completely pre-wired and pre-assembled, as well as pre-tested prior to delivery. The cabinet shall be NEMA IV type enclosure ready for wall mounting. The panel front shall be hinged and locked. The panel components shall be as follows:
    - i. pH monitors (3)
    - ii. Circular chart recorder (1)
    - iii. Effluent pH out of spec high/low alarm
    - iv. Mix tank mixer HO/A switch and light
    - v. Trim tank mixer HO/A switch and light
    - vi. PLC unit for complete system control
    - vii. System on/off switch
    - viii. Alarm horn
    - ix. Alarm test and silence buttons
    - x. Mix tank acid pump on light
    - xi. Low level mix tank acid reagent alarm/light
    - xii. Trim tank acid pump on light
    - xiii. Low level trim tank acid reagent alarm/light
    - xiv. Mix tank caustic pump on light
    - xv. Low level mix tank caustic reagent alarm/light
    - xvi. Trim tank caustic pump on light
    - xvii. Low level trim tank caustic reagent alarm/light



- b. Panel power requirements shall be ### V, # phase, ## amp.
10. U-Trap Assembly
- a. U-Trap Assembly shall be manufactured of Fuseal polypropylene pipe and fittings joined by the heat fusion method, sized as shown in the drawings. Tank side of trap is to have an extended section which will house the system effluent pH probe. The purpose of this unit is to maintain a pocket of effluent flow, which allows the pH probe to remain wet and, ensures the flow stream passes by the sensor. The inlet and outlet ends of the unit shall be provided with flanged connections. Unit shall be shipped to the site with un-fused joints allowing for trap to be configured in vault to best suit existing conditions.
11. Reagent Containment Station
- a. The station shall be fabricated of ½" thick polypropylene. The four reagent tanks shall be set in place within this unit. The station shall be 124" long × 30" deep. The front and sidewalls shall be 30" high. The back wall of the station shall be 48" high and be fitted with a polypropylene reagent pump shelf. The base of the unit shall be divided into four equal compartments of 30" each, one compartment for each reagent tank.
12. Installation
- a. All components and instrumentation shall be furnished, ready for installation from a single source. Mix Tank, Trim Tank, Containment Station, U-Trap Assembly and Control Panel shall be shipped to the site as individual components.
  - b. The neutralization system shall be installed in strict accordance with the Manufacturer's recommendations and drawings and in compliance with the project specifications and local codes.
  - c. System calibration and start-up shall be included in the package provided by the manufacturer. The manufacturer shall also be responsible for conducting a training seminar for the site facility's personnel prior to placing the system on line.
  - d. Manufacturer shall provide a point to point wiring diagram as part of their shop drawing submittal.
  - e. Upon project completion, no fewer than five (5) sets of O&M manuals shall be provided to the Owner by the system manufacturer.
13. Warranty
- a. All components and instrumentation for the system shall be warranted against defects in workmanship and materials for a period of one year from the date of delivery to the site.
14. System Wiring
- a. Site electrician to be responsible for providing power supply to the control panel. All required system wiring from the control panel to the reagent station and Mix Tank shall also be the responsibility of the site electrician under CSI Division 16 or 26 of the contract documents including:
    - Mounting and power wiring connection to control panel in building
    - Wiring from control panel terminal strip to chemical reagent station in building
      - wiring to four duplex receptacles
      - four wiring feeds for reagent tank low level sensors
    - ### V # phase wiring from control panel terminal strip to mixers located on Mix Tank and Trim Tank covers
    - Three 3 conductor shielded cable runs from control panel terminal strip to pH probe junction boxes located
      - a) on Mix Tank and Trip Tank cover
      - b) on U-Trap assembly extension.
15. Chemicals
- a. Contractor, not manufacturer, shall be responsible for providing start-up chemicals and placing same within reagent tanks.
    - 110 Gallons sulfuric acid (50%)
    - 110 Gallons sodium hydroxide (50%)
  - b. Contractor shall be responsible for pulling two ¾" OD polyethylene tubing runs from reagent pumps located in the building to the reagent injection ports located on the Mix Tank cover within the vault. Tubing shall be run within 2" PVC conduit.



# GF Series 600-2R (Round) Or 600-2Rec (Rectangular) Two Tank pH Neutralization System



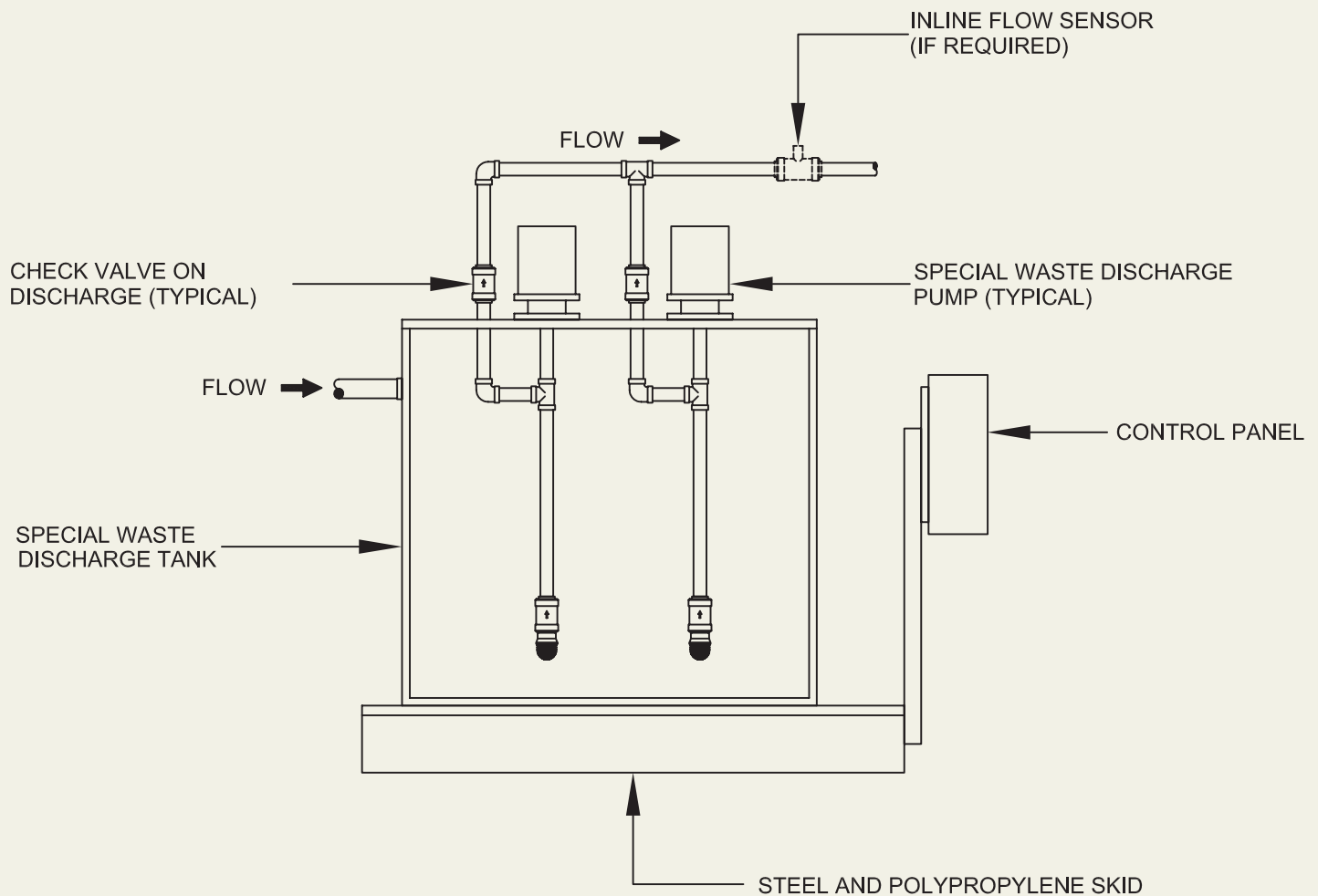
# GF Series 600SP (Special Waste Discharge Pump System)

## 2.14 Special Waste Discharge System (GF Series 600 SP)

- A. pH Neutralization System equipment shall be Series 600SP as manufactured by GF Piping Systems, Irvine, CA, or approved equal.
- B. System shall include the following:
  - 1. Special Waste Discharge Sump Tank
    - a. Tank shall be constructed of polypropylene with flanged bolted and gasketed cover. Tank shall have a holding capacity of XXX gallons below inlet pipe invert elevation on tank sidewall. Tank dimensions shall be as shown on the drawings. Tank cover shall be fitted with polypropylene mounting system for discharge sump pump supports. Cover shall also be fitted with an opening for the flow switch assembly which will be inserted into the tank for pump control, and a 15" diameter threaded manway for access. See details on drawings for locations and sizes of connections.
  - 2. Special Waste Discharge Pumps (Duplex)
    - a. Special waste discharge pumps shall be seal-less immersible type with polypropylene wetted parts. Enclosed impellers shall be dynamically balanced. Pumps shall be mounted on Special Waste Sump Tank support brackets with suction end of pump extended into the tank. Pump inlets shall be provided with foot valves properly sized to pump inlet connection port. Pumps shall be installed and piped per the manufacturers' written documentation. Pump motors shall be wired back to the system control panel. Pumps shall be sized per the system discharge requirements.
    - b. Pump Level Control system shall be manufactured of polypropylene wetted components and be installed within the special waste sump tank with full access through the tank cover. Control switches shall be set at proper elevations within the tank and control "Pump Off," "Pump On," and "High Water Alarm" set points. Level control shall be wired back to the system control panel. Pumps shall be operated on Run/Lag basis (alternating cycle). In the event of a tank "High Water Alarm" condition, both sump pumps will be placed into operation.
    - c. Discharge Piping shall be flame retardant polypropylene Fuseal® as manufactured by GF Piping Systems, joined by electro-fusion method. Discharge piping shall carry a 50 psi pressure rating. A Check Valve shall be installed within the discharge piping of both Special Waste Discharge Pumps.
  - 3. Effluent Flow Monitoring (If Required)
    - a. If required, system shall include one Inline Paddlewheel Flow Sensor which shall be Signet Model 2537 Paddlewheel Type installed within the Special Waste Sump Pump discharge piping. Sensor body shall be manufactured of polypropylene. Sensor rotor shall be manufactured of black PVDF material. 4–20mA signal wiring shall be run back to the Flow Transmitter located within the system control panel.
    - b. Panel-mounted Flow Transmitter shall be Signet Model 9900. The transmitter shall have digital readout for flow in GPM and flow totalizer GPMs discharged. Unit shall be calibrated, programmed and maintained via push button configuration located on transmitter face. Transmitter shall be designed to receive a 4–20mA signal from the paddlewheel flow sensor. Provide 4–20mA outlet Signet for connection to Panel Chart Recorder.
  - 4. Control Panel and Components
    - a. The control panel shall be U.L. listed, completely pre-wired and pre-assembled, as well as pre-tested prior to delivery. The cabinet shall be NEMA IV type enclosure ready for wall mounting. The panel front shall be hinged and locked. The panel face components shall be as follows:
      - i. System on/off disconnect switch with light
      - ii. Sump pump no. 1 HO/A switch with light
      - iii. Sump pump no. 2 HO/A switch with light
      - iv. Sump discharge tank high water alarm (audio/visual)
      - v. Flow transmitter (if required)
      - vi. Alarm test and silence buttons

- b. Panel power requirements shall be ###V, # phase, ## amp.
  - c. Control Panel shall operate pumps on a Run/Lag (alternating cycle) basis.
5. Installation
- a. All components and instrumentation shall be furnished, ready for installation from a single source. All components of the Discharge Tank and Control Panel shall be mounted on a pre-piped and pre-wired polypropylene and steel skid unit.
  - b. The Special Waste Discharge System shall be installed in strict accordance with the Manufacturer's recommendations and drawings and in compliance with the project specifications and local codes.
  - c. System calibration and start-up shall be included in the package provided by the manufacturer. The manufacturer shall also be responsible for conducting a training seminar for the site facility's personnel prior to placing the system on line.
  - d. Manufacturer shall provide a point to point wiring diagram.
6. Warranty
- a. All components and instrumentation for the system shall be warranted against defects in workmanship and materials for a period of one year from the date of delivery to the site.
7. System Wiring
- a. Site electrician to be responsible for providing power to the skid mounted panel and connecting all system compounds under CSI Division 16 or 26.

## GF Series 600SP (Special Waste Discharge Pump System)



GF Piping Systems

# Contact us

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