# PART 1 - GENERAL

## 1. WORK INCLUDED:

1. Pipe and Pipe Fittings
2. Valves
3. Domestic Water Piping System

## 2. REFERENCES:

1. AWWA C601 – Standard Methods for the Examination of Water and Waste Water
2. [Lubrizol.com](#_REFERENCES:) for all FlowGuard Gold approvals

## 3. QUALITY ASSURANCE:

Valves: Manufacturer’s name and pressure rating marked on valve body

## 4. SUBMITTALS:

1. Submit product data under provisions of General Conditions and Supplementary General Conditions
2. Include data on pipe materials, pipe fittings, valves, and accessories.

## 5. DELIVERY, STORAGE, AND HANDLING:

1. Deliver, store and protect products on site under provisions of General Conditions and supplementary General Conditions
2. Deliver and store valves in shipping containers with labeling in place

## 6. CONTRACTOR QUALIFICATIONS:

Contractor shall be trained and certified in the installation of FlowGuard Gold and Corzan CPVC systems. Training shall be conducted by a FlowGuard Gold Representative or Manufacturer Representative prior to the onset of construction at no expense to the district or contractor.

## 7. WARRANTY:

A minimum ten (10) year warranty shall be provided by CPVC pipe manufacturer to ensure that all piping is free of manufactured defects. In the event that defect(s) are discovered, manufacturer shall replace, with no cost to the Owner, the defected section of pipe. The defected section shall be replaced in its entirety and connected to unaffected piping. Prior to field replacement, the extent of proposed replacement piping shall be schematically submitted to Owner and Engineer for review and approval. Replacement length of pipe shall include all fittings and transitions.

# PART 2 - PRODUCTS

## 1. SILICON IRON WASTE AND VENT PIPE (SCIENCE CLASSROOM WASTE PIPING)

1. Piping used for laboratory acid waste disposal, above and below slab, shall be Corzan HP compound as manufactured by Lubrizol. CPVC drain, waste and vent pipe shall be dimensioned to meet ASTM F441 and pipe compound used for pipe up to 8” in diameter shall meet cell class 24448 as defined by ASTM D1784.
2. Fittings shall conform to NSF Standard 14 and drainage pattern per ASTM D3311. Fittings shall be from Corzan HP CPVC Type IV, Grade 1 compounds ASTM Cell Classification 23447 for fittings.
3. All pipe & fittings shall be certified by NSF International for use in chemical waste drain systems.
4. Corzan HP systems are intended for use in non-pressure chemical waste applications with a maximum working temperature of 230 degree F.
5. Acceptable manufacturers:
6. IPEX
7. Harvel Plastics, Inc.

## 2. DOMESTIC WATER PIPING, BELOW GRADE (TO 5 FEET OUTSIDE BUILDING)

1. Copper Tubing: ASTM B88, Type K, continuous tubing.
2. Fittings 5 feet outside of building shall be ANSI/ASME B16.29, wrought copper. Joints ANSI/ASTM B32 solder, Grade 95TA.
3. Fittings are not permitted below floor. Fittings at equipment shall be compression type.

## 3. DOMESTIC WATER PIPING, BELOW SLAB (INSIDE BUILDING)

NOTE: FOR USE ON ISLAND FIXTURES and TRAP PRIMERS ONLY

1. Copper Tubing: ASTM B88, Type K, continuous tubing.
2. Fittings 5 feet outside of building shall be ANSI/ASME B16.29, wrought copper. Joints ANSI/ASTM B32 solder, Grade 95TA.
3. Fittings are not permitted below slab.

## 4. DOMESTIC WATER PIPING, ABOVE GRADE

1. Pipe Sizes 2" and Smaller: FlowGuard Gold CTS CPVC compound as manufactured by Lubrizol. CPVC shall be manufactured in accordance with ASTM D2846. The FlowGuard Gold CPVC pipe compound shall meet cell class 24448 as defined by ASTM D1784 and be certified by NSF International.
2. CPVC Socket Fittings: ASTM F 439 for Schedule 40
3. CPVC Piping System: ASTM D 2846/D 2846M, SDR 11, pipe and socket fittings
4. CPVC Tubing System: ASTM D 2846/D 2846M, SDR 11, tube and socket fittings
5. FlowGuard Gold CTS CPVC pipe & fittings approved manufacturers:
6. Charlotte Pipe and Foundry Co.
7. Harvel Plastics, Inc.
8. Crestline Plastic Pipe Company, Inc.
9. Genova Products
10. Bow Plastics
11. All FlowGuard Gold approved manufacturers

B. Pipe Sizes 2½” and Larger: Copper Tubing: ASTM B88, Type L hard drawn; Fittings: ANSI/ASME Bl6.23, cast brass, or ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B32, solder, Grade 95TA.

## 5. SOLVENT CEMENTS:

1. Solvent Cements for Joining CPVC Piping and Tubing: ASTM F 493

1) Use CPVC solvent cement that has a VOC content of 490 g/L or less   
when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2) Solvent Cement and primer shall be listed by NSF International for use with potable water and approved for use with the specified piping systems.

3) Solvent cement shall be of the one step type approved for use by piping manufacturer.

4) The age of solvent cements used shall not exceed two years from date of manufacture.

## 6. VALVES-GENERAL:

1. Materials for all valves shall be bronze.
2. Acceptable Manufacturers-Valves:
3. Crane
4. Grinnell
5. NIBCO
6. Milwaukee
7. Ball Valves:
8. Up to 2 Inches: Bronze body, stainless steel ball, Teflon seats and stuffing box ring, lever handle, solder, or threaded ends.
9. Valves constructed of 100% plastic are not acceptable.
10. Swing Check Valves:

Up to 2 Inches: Bronze 45 degree swing disc, solder ends. Valves 2-I/2" and larger shall be iron body brass mounted and with ends to suit pipe. Working pressure for check valves shall be 125 pounds.

1. Water Pressure Reducing Valves

Up to 2 Inches: Bronze body, stainless steel and thermoplastic internal parts, fabric reinforced diaphragm, strainer, and single union.

1. Gate valves and globe valves are not acceptable.

## 7. TRANSITION FITTINGS:

1. All fittings shall be reviewed and approved by the Owner prior to installation. A special meeting shall be arranged, if needed, to instruct the installing contractor of the approved materials.
2. General Requirements:
3. Same size as pipes to be joined
4. Pressure rating at least equal to pipes to be joined
5. End connections compatible with pipes to be joined
6. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
7. Plastic-to-Metal Transition Fittings and Unions:
8. Fittings shall be FlowGuard Gold CPVC and shall meet the requirements of ASTMD2846.
9. Plastic-to-Metal Transition Fittings and Unions approved manufacturers:
10. Sioux Chief
11. Charlotte Pipe and Foundry Co.
12. NlBCO, Inc.
13. Genova Products
14. Bow Plastics
15. All FlowGuard Gold approved manufacturers
16. Fitting Description: One-piece fitting shall be forged brass or copper. All fitting shall be compatible with FlowGuard Gold piping system and all components (i.e. pipe, one-step solvent cement, fittings).
17. Swivel fittings are not acceptable
18. Push-fit fittings are not acceptable
19. Fittings constructed of 100% plastic are not acceptable
20. Stainless Steel (S/S) fittings are not acceptable

E. Fixture and Appliance Supply Stub-Outs

Fitting shall be pre-formed, type L copper, stub-out elbow as manufactured by Sioux Chief, or equal.

1. Square O strap crimp onto tube for CPVC connection
2. Minimum 1 ¼” radium bend. Stub-out shall be one piece, combining elbow and cap
3. Stub-out shall be one piece, combining elbow and cap

# PART 3 - EXECUTION

## 1. PIPING INSTALLATION:

1. All CPVC piping shall be installed hidden from view and protected by the building elements unless specifically indicated by the contract documents. In instances where concealment is impractical, i.e. such as equipment rooms and service areas, the piping shall be protected by other means.
2. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls in a neat and competent/skillful manner. Diagonal runs are prohibited unless specifically indicated otherwise.
3. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
4. Install piping adjacent to equipment and specialties to allow service and maintenance.
5. Install piping to permit valve servicing.
6. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.
7. Install piping free of sags and bends that are excessive for CPVC piping systems.
8. Install fittings for changes in direction and branch connections.
9. Install unions in metallic tubing at final connection to each piece of equipment, machine, and specialty.
10. Route piping in orderly manner and maintain gradient.
11. Install piping to conserve building space and not interfere with use of space.
12. Provide non-conducting dielectric connections wherever joining dissimilar metals.
13. Group piping whenever practical at common elevations.
14. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
15. Provide clearance for installation of insulation and access to valves and fittings.
16. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with General Contractor.
17. Slope water piping and arrange to drain at low points.
18. Install ball valves for shut-off and to isolate equipment, part of systems or vertical risers.
19. No rigid fasteners shall be used for CPVC installation. All fasteners shall be approved by FlowGuard Gold.
20. All exposed piping in finished areas, such as mechanical room, shall be metallic. This shall include piping, fittings, and valves.

## 2. JOINT CONSTRUCTION:

1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
2. Remove scale, slag, dirt, solvents, oils, and debris from inside and outside of pipes, tubes, and fittings before assembly.
3. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. All CPVC solvent cement joints shall be made with solvent cement certified to the requirements of ASTM F493. One-step solvent cement (no primer required) shall be permitted on copper tube size CPVC pipe and fittings ½” through 2”.
4. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements. Apply primer.
5. CPVC Piping: Join according to ASTM D 2846/D 2846M Appendix.
6. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

## 3. DISINFECTION OF DOMESTIC WATER PIPING SYSTEM:

1. Prior to starting work, verify system is complete, flushed, and clean.
2. Ensure pH of water to be treated is between 7.4 and 7.6 by adding alkali or acid.
3. Inject disinfectant, free chlorine in liquid, powder, tablet, or gas form, throughout system to obtain 50 to 80 mg/L residual.
4. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
5. Maintain disinfectant in system for 24 hours.
6. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
7. Flush disinfectant from system until residual equal to that of incoming water.
8. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C601.

## 4. MANUFACTURER'S FIELD INSPECTION:

Contactor shall make site available for CPVC piping installation inspections by a FlowGuard Gold Representative or Manufacturer Representative.

## END OF SECTION