

**SP-156179
(New)**



**SPECIAL PROVISIONS
FOR
PRESSURE REDUCING VALVE STATION**

**Johnson County
STP-U-3715(666)--70-52**

**Effective Date
March 16, 2021**

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

AA - PRESSURE REDUCING VALVE STATION

PART 1 -- GENERAL

1.1 SUMMARY

This section covers the furnishing of all labor, materials, tools, equipment and performances of all work and services necessary or incidental to construction of the pressure reducing valve vault and manhole as indicated on the drawings or as specified herein.

1.2 SUBMITTALS

Shop drawings of the pressure reducing station construction shall be submitted prior to fabrication.

PART 2 -- PRODUCTS

2.1 PIPE AND FITTINGS

A. Ductile Iron Pipe (DIP)

1. Ductile iron pipe shall conform to the requirements of ANSI A221.51 (AWWA C151) standard specification for centrifugally cast ductile iron pipe for water or other liquids.
2. Ductile iron pipe in exposed locations shall be provided with flanged fittings and in buried locations shall be provided with mechanical joint type ends as shown on the plans. All ductile iron piping shall be ANSI/AWWA thickness Class 52 (minimum).
3. Ductile iron flanges shall conform to ANSI/AWWA C115 standard 125# template and shall be rated for 150 psi. Mechanical joints and push-on joints shall conform to ANSI/AWWA C111 standard for rubber gasket joints for ductile iron and gray iron pressure pipe and fittings.
4. Unless otherwise shown on the plans, ANSI/AWWA short-body ductile iron fittings shall be furnished. Short body fittings shall conform to ANSI/AWWA C110. Flanged long radius elbows, reducing on-the-run tees, side outlet fittings eccentric reducers and laterals shall conform to ANSI B16.1 standard specification for flanged fittings and flanges. All fittings shall be ductile iron.

2.2 BOLTS AND ANCHOR BOLTS

All hardware interior to the vault shall be 304 or 316 stainless steel, including anchor bolts, bolts used for wall sleeve link seals, and bolts used for pipe flanges.

2.3 FLANGED COUPLING ADAPTERS (FCA)

Flanged coupling adapters (FCA) shall be provided where indicated. FCA and piping shall be secured against movement with fixed supports or tie rods. FCA shall be Dresser Style 127, Rockwell/Smith-Blair Type 912 with anchor studs for 12 inches and under; Type 913 for 14 inches and over. Coupling Adapters shall be of cast iron construction with shop coating.

2.4 HYDRAULIC CEMENT

A. One-component, quick-setting, Portland-cement based hydraulic repair mortar to be applied where indicated on the construction drawings.

B. Manufacturer or equal: Thoro Waterplug

2.5 VALVE VAULT

A. Precast Concrete Structure

1. The pressure reducing station structure shall be constructed precast reinforced concrete per ASTM C-478/890/913/990 and have dimensions as shown on the plans. The structure shall be constructed as shown on the detail drawings and in accordance with the approved shop drawings and with Iowa DOT Single Reinforced Concrete Box Culvert Standards. The exterior and interior space at each joint shall be filled with mortar after the joint has been made. Mortar shall consist of two parts of Portland cement and five parts of sand, with just enough water added to make a workable mortar of proper consistency. Cut outs to accommodate all piping entering the structure shall be preformed or pre-cut and provided with a link seal manufactured by Link Seal, Inc. to ensure a watertight connection between pipe and structure.
2. The top slab of the structures be consistent with Iowa DOT Single Reinforced Concrete Box Culvert Standards have the dimensions shown on the detail drawings. All joints shall be sealed and the completed reinforced concrete construction shall be watertight. Frames and channel drains for access hatches shall be cast in the slab when fabricated.
3. Top and bottom slab of the structure shall be, at minimum, 10 inches thick, and as recommended by the supplier.

2.6 BITUTHENE WATERPROOFING MEMBRANE

A. PRODUCTS

- | 1. Property | Value |
|---------------------------------------|------------------|
| (a) Color | Grey-black |
| (b) Thickness (ASTM D3767) | 60 mils |
| (c) Tensile Strength (ASTM D412) | 325 psi minimum |
| (d) Tensile Strength Film (ASTM D822) | 5000 psi minimum |
| (e) Lap Adhesion (ASTM D1876) | 5.0 lb/in. width |
| (f) Peel Strength (ASTM D903) | 9.0 lb/in. width |
| (g) Puncture Resistance (ASTM E154) | 50 lb minimum |
| (h) Water Absorption (ASTM D570) | 0.1% maximum |
2. Manufacturer
 - (a) BITUTHENE Low Temperature Membrane or BITUTHENE 3000
 - (b) TAMKO TW-60
 - (c) Carlisle CCW Mira DRI 860/861
 - (d) WR Meadows Mel-Rol.
 3. Accessories
 - (a) Extruded Polystyrene Protection Board
 - (1) Two inch thick extruded polystyrene protection board with minimum compressive strength of 15 psi (ASTM D1621).

B. SURFACE PREPARATION

1. Concrete shall be smooth, monolith and free of voids, spalled areas, loose aggregate and sharp protrusions.
2. Concrete shall be cured for at least 14 days before application of the membrane.

C. INSTALLATION

1. Install membrane as per manufacturers written instructions.
2. Apply Bituthene 3000 only in dry weather when air and surface temperature are above 40°F. Use Bituthene low temperature membrane between 25°F and 40°F.

D. MEMBRANE PROTECTION

Protect bituthene membrane from damaged backfill by covering with extruded polystyrene protection board. Install membrane protection board the same day as the membrane.

2.7 ACCESS HATCHES.

- A. Cast iron hatch and casting to withstand H-20 wheel loading.
- B. Standard Type Y frame with anchor flange around the perimeter.
- C. Each door leaf equipped with t-hinges, safety bar, and concealed pick hole.
- D. Mechanical Fasteners and Hardware: Series 300 stainless steel.
- E. Hatches to be insulated.
- F. Approved Manufacturers: Neenah R-6662-TS or approved equal.

2.8 PRESSURE REDUCING VALVE

A. Equipment Requirements:

1. Pressure reducing valves shall be designed to maintain a constant downstream pressure regardless of fluctuations in demand. When the upstream pressure becomes equal to the spring setting of the pressure sustaining control, the valve throttles to maintain a constant inlet pressure. If the downstream pressure is greater than the upstream pressure the valve closes automatically to prevent return flow. Valve shall include a check feature to prevent reverse flow.
 2. This valve shall be a hydraulically operated, diaphragm-actuated, globe valve. It shall contain a resilient, synthetic rubber disc, having a rectangular cross-section, contained on three and one-half sides by a disc retainer and forming a tight seal against a single removable seat insert. The diaphragm assembly containing a valve stem shall be fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat. This diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating operating pressure from line pressure. The diaphragm shall consist of nylon fabric bonded with synthetic rubber and shall not be used as a seating surface. Packing glands and/or stuffing boxes are not permitted and there shall be no pistons operating the valve or pilot controls. All necessary repairs shall be possible without removing valve from the line.
 3. The pressure reducing pilot control shall be a direct-acting, adjustable, spring-loaded, normally open diaphragm valve, which closes when the downstream pressure exceeds the spring setting.
- B. The valve shall be a globe-pattern cast iron body with flanged ends with ANSI rating of 125 psi. All interior passages of valve with water shall be epoxy. The valve trim shall be stainless steel.
- C. Manufacturer shall provide minimum 6 hours initial valve calibration, start-up services, and operator training. Pressure reducing pilot valve shall be set to maintain a downstream pressure as directed by the Owner. Valves shall be calibrated with associated system.

D. Manufacturers:

1. 6 inch OCV Model 127G004-0601113 Pressure Reducing Valve with check feature, ductile iron, stainless steel internal trim, 150# ANSI flanges, with inline strainer, isolation valves, opening and closing speed controls, Model 190 valve position indicator, 4 inch pressure gauges on inlet and outlet of valve, fused epoxy coating inside and out, copper tubing for pilot controls, and 20 to 80psi pilot spring range.
2. Or equal.

2.9 CHECK VALVES

A. Swing Check Type (Liquid Service)

1. Check valves shall be of either the standard or increasing swing check type as noted on the plans. Check valves shall be provided with an extended hinge pin and outside weight and lever allowing field adjustment.
2. Valve bodies shall be cast iron or ductile iron of minimum 175 psi pressure rating and shall be provided with ANSI standard 125# flanges. Valve gates shall be ductile or cast iron. Renewable gate ring shall be Buna-N Rubber. Body seat shall be 304 or 316 stainless steel.
3. Each check valve shall be provided with a stainless-steel hinge pin extending through bronze bushings. Valves shall have outside packed glands to allow for external adjustment of shaft packing.
4. Each valve shall be provided with a cushion chamber. Air Cushion Cylinder shall be totally enclosed. It shall have an aluminum alloy or bronze cap, head and barrel. The bottom of the cylinder shall be hinged to follow the angular change as the lever rises and lowers. The primary closing speed shall be field adjustable by means of a speed control valve.
5. Manufacturers or Equal:
 - (a) Valmatic 512 AMI with SS hardware
 - (b) Dezurik - APCO 250A
 - (c) Golden Anderson
 - (d) Milliken CCNE

2.10 PRESSURE GAGES

- A. Pressure gages shall be furnished and installed on the upstream and downstream piping of each valve. A stainless steel tapping saddle and brass corporation cock shall be provided for each pressure gage.
- B. Gages shall be industrial quality type with 0 to 160 psi type 316 stainless steel movement and stainless steel or alloy case. Unless otherwise shown or specified, gages shall have a 3 1/2 inch dial, 1/4 inch threaded connection, a type 316 stainless steel snubber adapter, and a shut-off valve. Gages shall be calibrated to read in PSI or feet of water, with an accuracy of one percent. Ranges required for each pressure indicator or application are to be determined at the shop drawing submittal time and are intended to be standard ranges. All gages shall be vibration and shock resistant. Gages without diaphragm seal shall be liquid filled to dampen pulsation and vibration.
- C. Gages shall be equipped with diaphragm type isolator units with 1/4 inch flushing connections unless noted otherwise. Isolator shall have: stainless steel diaphragms for pressure over 15 psi; elastomer diaphragm for pressures of 15 psi and below; and glycerine and water filling

medium. Diaphragm seal shall be manufactured to Ashcraft, Model 101; Marshalltown, Series 225-01 or equal.

- D. Gage manufacturers or equal:
 - 1. Ashcraft Industrial Instruments (dresser)
 - 2. Marsh Belloframe

2.11 PIPE SUPPORTS

- A. Provide 304 stainless steel floor-mount saddle-style pipe supports and extension pipe. Extension pipe and anchors are incidental to this item.
- B. Manufacturer or equal: McMaster 8427T822 (6 inch pipe) and 8427T825 (12 inch pipe)

2.12 ENGINEERED FILL

- A. Water from areas to receive backfill with Class A material shall be removed before commencing work, and areas shall be kept free of water during filling and compaction. All topsoil and organic materials in any area to receive Engineered Fill shall be removed to a minimum depth of 12 inches.
- B. Where concrete floor slabs are to be supported on Engineered Fill, the entire surface of the fill area shall be smoothed, leveled, and compacted using heavy vibratory equipment until there is no loss of elevation. The Class A fill material shall be placed in 6 inch deep lifts and compacted to at least 100% of the maximum density given by ASTM D698 (Standard Proctor Density). The fill shall extend beyond the edges of the footings one foot for each one foot of fill placed below the footings. The compacted lift shall be relatively smooth and level.
- C. Frozen material or material containing ice or snow shall not be used for fill. Fill shall not be placed on soil that is frozen or covered with ice or snow. Necessary precautions shall be taken during freezing weather to prevent freezing of the fill during placing and compaction
- D. All debris shall be removed from the excavated areas before backfilling.
- E. Excavations shall be promptly backfilled as work permits.

2.13 PAINTING

Contractor shall paint interior piping, valves, and fittings in accordance with Section BB.

PART 3 -- EXECUTION

3.1 EXCAVATION

- A. Interference of Underground Structures

If an existing utility is shown on the plans and there is no bid item for removing and restoring, or working around the utility, the Contractor is required to remove and restore, or protect the utility.
- B. Excavation Limits and Requirements
 - 1. The Contractor shall dewater the excavations as necessary to construct the station. Excavation may require shoring and sheeting to maintain stable slopes or facilitate dewatering.

2. The Contractor shall excavate to the limits required by safety and to adequately install the station structure.
- C. Preparation and Maintenance of Foundation.
The Contractor shall undercut the foundation one foot, smooth and compact the existing subgrade. Any areas below the base of the structure shall be backfilled with crushed rock as shown on the plans.

3.2 BACKFILL

Placement of backfill adjacent to the structure shall be delayed until any field constructed concrete has attained its design compressive strength. Any backfill placement prior to attaining this strength shall be considered the responsibility of the Contractor, who shall be liable for any resultant damage to the structure.

3.3 TESTING

A. PRV STATION PRESSURE TESTING

The Contractor shall test the pressure reducing valve (PRV) station piping in accordance with the Special Provisions for Water Main. Contractor is responsible for adherence to manufacturer's recommendations for pressuring testing of the pressure reducing valve to prevent damage to the valve.

B. BACTERIOLOGICAL TEST

After final flushing, two consecutive sets of acceptable samples, taken 24 hours apart, shall be collected from the new main. All testing must be in compliance with AWWA C651.

C. CONTINUITY TEST

The Contractor shall furnish a locator and using a low voltage circuit, test the entire system in the presence of the Engineer. The test shall consist of a continuous above ground trace of the piping and appurtenances installed to within 2 feet of installed locations. All areas failing the location test shall be corrected at the Contractor's expense.

BB - PRESSURE REDUCING VALVE STATION PAINTING

PART 1 -- GENERAL

1.1 SUMMARY

- A. This section includes painting of interior process pipes, valves, and fittings located inside pressure reducing station as well as the ceiling, walls and floor of the PRV structure. Finish coating colors shall be selected by the Engineer based on color charts provided by the paint supplier.
- B. Painting includes surface preparation, priming, finish coats, inspection, cleaning, and touch-up of surfaces in addition to shop priming and surface treatment.
- C. The painting subcontractor shall examine the specifications for the various other trades and shall thoroughly become familiar with all of their provisions regarding their painting; painting subcontractor shall understand that all surfaces that are left unfinished by requirements of other specifications shall be painted or finished as a part of this contract.
- D. Unless otherwise approved by the Engineer in writing, all coatings applied under a single paint system shall be the product of a single manufacturer.

1.2 SUBMITTALS

- A. Information shall be submitted as per Iowa DOT requirements.
- B. Information submitted shall include, but not be limited to the following:
 - 1. Paint manufacturer's name with paint specification details.
 - 2. Color charts of materials for selection of color.
 - 3. Technical and material safety data sheets on each paint material used.
 - 4. Manufacturer's recommended application procedures.
 - 5. Information regarding pipe identification system and valve tags.

1.3 QUALITY ASSURANCE

- A. The label of Containers shall include the manufacturer's name, type of paint (stock number), color and instructions for reducing where applicable, mixing and application instructions, drying or curing time, storage and temperature limits.
- B. Field Quality Control shall be established by inspecting the first finished surface of each color scheme for color, texture, and workmanship. The first acceptable surface for each color scheme.
- C. The painting work shall be in conformance with the following applicable standards:
 - 1. American National Standards Institute (ANSI)
 - (a) A 13.1 - Scheme for the Identification of Piping Systems.
 - (b) Z 53.1 - Safety Color Code for Marking Physical Hazards.
 - 2. Steel Structures Painting Council (SSPC) Surface Preparation Specifications.
 - (a) SP 1 - Solvent cleaning. Removes oil grease, soil, etc., with other methods to remove rust, paint, and mill scale.

- (b) SP 3 - Power Tool Cleaning. Removes loose material. Not intended to remove all scale or rust.
- (c) SP 5 - White Metal Blast Cleaning. Removes all scale, rust, foreign matter. Leaves surface gray-white uniform metallic color.
- (d) SP 6 - Commercial Blast Cleaning. Two-thirds of each square inch free of all visible residues; remainder only light discoloration.
- (e) SP 7 - Brush-Off Blast Cleaning. Removes only loose material, remaining surface tight and abraded to give anchor pattern.
- (f) SP 10 - Near-White Blast Cleaning. At least 95 percent of each square inch shall be free of all visible residues.

D. The Contractor shall control the dry film thickness of the coatings on metal surfaces with a correctly calibrated thickness gage, type to be approved by Engineer. Contractor shall supply gage thickness samples for gage reference and calibration.

E. A Tnemec technical representative is required to be on-site and observing for the initial application of Series 971 Aerolon materials.

PART 2 -- PRODUCTS

2.1 MANUFACTURERS: TNEMEC

2.2 SEALANTS

Caulking sealant shall be Sikaflex 1A or Sikaflex 221(NSF approved for contact with potable water) or equal single component polyurethane sealant. The caulking used shall be submitted and approved the Engineer in writing.

2.3 LABELS

All exposed piping shall be provided with identifying labels. Labels shall include the piping system designation, and a flow arrow. Identifying labels shall be provided adjacent to valves or fittings, near connections to equipment, and on both sides of walls penetrated. Pipe labels shall be Seton "Setmark" pipe markers. Markers for piping smaller than 6 inches shall be snap on similar to Seton Setmark type SNA. Markers for piping larger than 6 inches shall be strap-on similar to Seton Setmark Type STR. Markers shall be factory printed. Pipe label size shall be as follows:

Pipe Size	Letter Height
1/2" to 1-1/4"	1/2"
1-1/4 to 2"	3/4"
2" to 6"	1-1/4"
6" to 10"	2-1/2"
10" and Over	3-1/2"

PART 3 -- EXECUTION

3.1 SUBSTRATE EXAMINATION

A. Examine substrates and surfaces and conditions under which work is to be performed. Notify, in writing of any conditions detrimental to performance of the work. Do not proceed with this work until unsatisfactory conditions have been corrected; starting of painting work shall be construed as acceptance of surface and conditions within any particular area.

- B. Do not paint over dirt, rust, scale, grease, moisture, or conditions otherwise detrimental to formation of a durable paint film.

3.2 SURFACE PREPARATION

- A. Remove all hardware, hardware accessories, machined surfaces, plates, and similar items in place and not to be painted or provide surface-applied protection prior to surface preparation and painting operations. Remove mounted accessories if necessary, for complete painting of items or adjacent surfaces. Following completion of painting of surface, pipe or appurtenance, reinstall removed items using workmen skilled in trades involved.

- B. Perform preparation procedures for each substrate in strict accordance with paint manufacturers written instructions and as outlined in the following schedule:

- 1. P6: SSPC-SP10 or NACE 2 Near-White Metal Blast Cleaning

The removal of all visible oil, grease, dirt, dust, mill scale rust, paint, oxides, corrosion products and other foreign matter by compressed air nozzle blasting, centrifugal wheels or other specified method. Discoloration caused by certain stains shall be limited to no more than 5% of each nine square inches of surface area. A blast profile of 1.5 to 2.0 mils shall be achieved.

- 2. P9: Acid Etching

Remove residual dust and dirt with water using a high-pressure hose. Remove excess water and allow concrete to dry until the surface is damp. Uniformly apply a solution of 1 part Muriatic Acid and 2 to 4 parts fresh water utilizing low pressure spray equipment or sprinkling cans. When bubbling begins to subside immediate rinse with clean water while scrubbing with a stiff bristle broom. Test with pH paper and continue the rinsing operation until a pH of 7 or higher is obtained. Allow floor to dry thoroughly before coating.

- 3. P12: Concrete (Abrasive Blasted)

Abrasive blast all surfaces to remove all laitance and solid contaminants. Blasting shall be performed sufficiently close to the surface so as to open up surface voids, bug holes, air pockets and other subsurface irregularities. All surface voids, bug holes, air pockets and other subsurface irregularities shall be filled with Tnemec Series 215 Epoxy Filler. (Note: all concrete shall cure for a minimum of 28 days).

3.3 MATERIAL PREPARATION

- A. Prepare painting materials in accordance with manufacturer's directions. Mix materials before application to produce uniform density. Stir as required during application of materials. Do not stir surface film into material; remove film and if necessary, strain materials before using.
- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing and application of paint in a clean condition, free of foreign materials and residue.

3.4 APPLICATION

- A. Manufacturer's instructions shall be strictly followed in the application of proprietary coatings.
- B. All coatings shall be applied by experienced and qualified painting subcontractors.
- C. Each coat shall produce a minimum dry film thickness as specified herein. In areas where this thickness is not developed, sufficient additional coats shall be applied to produce it.

- D. Paint shall not be applied in extreme heat, nor in dust or smoke laden air, nor in damp or humid weather. Temperature must be 50°F or higher and relative humidity must be less than 85 percent.
- E. Drying times shall be not less than called for in manufacturer's instructions.
- F. Spray painting shall be conducted under controlled conditions, and the Contractor shall be fully responsible for any damage to adjacent work or adjoining property occurring from spray painting.
- G. Cover or otherwise protect surfaces not being painted, areas not to be painted, and the work of other trades. Remove protective materials when appropriate.
- H. Install adequate ventilation equipment in all areas of application to ensure that at no time does the content of air exceed the Threshold Limit Value given on the manufacturer's Material Safety Data Sheets for the specific coatings being applied.
- I. After Engineer's approval of surface preparations, apply first coat of the system the same day. Use properly designed brushes, rollers and spray equipment for all applications. Film thickness of each system shall meet the minimum specified but not exceed it more than 20%.
- J. Painting shall remain 3 inches away from unprepared surface of any substrate. When steel is blasted, do not coat the last 3 inches of the blasted area until unprepared adjacent surface is prepared.
- K. Each coat will be inspected by the Engineer prior to application of the next coat. Areas found to contain runs, overspray, roughness, or other signs of improper application shall be required to be recoated in accordance with the Engineer's instructions.
- L. Provide daily cleanup of both storage and working areas and removal of all paint refuse and trash.

3.5 PROTECTION

- A. Protect work of other trades, weather to be painted or not, against damage by painting and finishing work. Correct any damages by cleaning, repairing or replacing and repainting.
- B. Provide "wet paint" signs as required to protect newly painted surfaces. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

3.6 CLEAN-UP

During progress of work, dispose of discarded paint materials, rubbish, cans and rags. Upon completion of painting work, clean all paint-spattered surfaces by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

3.7 CAULKING PIPE FLANGE ANNULAR SPACE

The annular space between flange and the pipe in all vertical pipes shall be caulked with clear silicone sealant after finish painting to prevent condensate from collecting in the space.

3.8 SCHEDULES

- A. Areas to be painted include the following:
 1. Paint interior process pipes, valves, fittings, and appurtenances located inside pressure reducing valve station.

2. Interior walls and ceiling of the PRV vault.
 3. Floor of PRV vault.
- B. No painting is necessary on the following:
1. Aluminum hardware, fixtures, finish hardware, etc.
 2. Stainless steel surfaces.
- C. Contractor shall paint structure, piping, valves, and fittings with colors selected by the Owner.
- D. Paint and paint products shall be supplied according to the following application schedule. Tnemec products are used as Reference Series.
1. Interior and Exterior Ferrous & Non-Ferrous Metals (Non-Submerged) and Interior Cast in Place Concrete & Precast Concrete Ceilings and Walls:

Product	Tnemec
Surface Preparation:	P6 (Ferrous & Non-Ferrous Materials (non-submerged)) P12 (Ceilings and Walls)
Prime: Color: DFT:	Series 1224 - Epoxoline WB 32GR Light Gray 6 to 9 mils
Field Intermediate: Color: DFT:	Series 971 Aerolon 1278 Insulation Yellow 80 to 100 mils
Field Finish: Color: DFT:	Series 1028 Endurotone Color to be selected by the OWNER 2 to 3 mils
Total DFT	88 to 112 mils

2. Concrete Floors

Product	Tnemec
Surface Preparation:	P9 or P12
Coating: Color: Coverage:	Series N69F Hi-Build Epoxoline II Color to be selected by the Engineer Two coats at a coverage of 225 sq. ft/gallon