SECTION 23 22 13

STEAM AND CONDENSATE HEATING PIPING

**BASED ON DFD MASTER SPECIFICATION DATED 12/20/2023**

This section has been written to cover most (but not all) situations that you will encounter. Depending on the requirements of your specific project, you may have to add material, delete items, or modify what is currently written. The Division of Facilities Development expects changes and comments from you.

# P A R T 1 - G E N E R A L

SCOPE

This section contains specifications for steam and condensate heating piping for this project. Included are the following topics:

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High Pressure Steam Condensate (Steam pressure over 15 psig)

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RELATED WORK

Section 01 91 01 or 01 91 02 - Commissioning Process

Section 23 05 23 - General-Duty Valves for HVAC Piping

Section 23 05 15 - Piping Specialties

Section 23 05 29 - Hangers and Supports for HVAC Piping and Equipment

Section 23 07 00 - HVAC Insulation

Section 23 08 00 - Commissioning of HVAC

Section 23 25 00 - HVAC Water Treatment.

REFERENCE

Applicable provisions of Division 1 govern work under this section.

REFERENCE STANDARDS

Edit the following list so only the standards that are needed in your spec are included in it.

ANSI B16.4 Cast Iron Threaded Fittings

ANSI B16.5 Pipe Flanges and Flanged Fittings

ASTM A53 Pipe, Steel, Black and Hot-Dipped, Zinc Coated Welded and Seamless

ASTM A105 Forgings, Carbon Steel, for Piping Components

ASTM A126 Gray Cast Iron Castings for Valves, Flanges, and Pipe Fittings

ASTM A234 Pipe Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures

ASTM A380 Practice for Cleaning and Descaling Stainless Steel Parts, Equipment, and Systems

SHOP DRAWINGS

Refer to division 1, General Conditions, Submittals.

Contractor shall submit schedule indicating the ASTM specification number of the pipe being proposed along with its type and grade and sufficient information to indicate the type and rating of fittings for each service.

Use the following paragraphs when the project involves central power plant work. Check with DFD engineering personnel to verify whether these paragraphs are needed on other projects.

TYPE F STEEL PIPE:

Statement from manufacturer on his letterhead that the pipe furnished meets the ASTM specification contained in this section.

TYPE E OR S STEEL PIPE:

Mill certification papers, also known as material test reports, for the pipe furnished for this project, in English. Heat numbers on these papers to match the heat numbers stenciled on the pipe. Chemical analysis indicated on the mill certification papers to meet or exceed the requirements of the referenced ASTM specification.

QUALITY ASSURANCE

Order all Type E and Type S steel pipe with heat numbers rolled, stamped, or stenciled to each length or each bundle, depending on the size of the pipe, and in accordance with the appropriate ASTM specification.

Any installed material not meeting the specification requirements must be replaced with material that meets these specifications without additional cost to the Owner.

DELIVERY, STORAGE, AND HANDLING

Promptly inspect shipments to insure that the material is undamaged and complies with specifications.

Cover pipe to eliminate rust and corrosion while allowing sufficient ventilation to avoid condensation. Do not store materials directly on grade. Protect pipe, tube, and fitting ends so they are not damaged. Where end caps are provided or specified, take precautions so the caps remain in place. Protect fittings, flanges, and unions by storage inside or by durable, waterproof, above ground packaging.

Offsite storage agreements will not relieve the contractor from using proper storage techniques.

Storage and protection methods must allow inspection to verify products.

DESIGN CRITERIA

Use only new material, free of defects, rust and scale, and meeting the latest revision of ASTM specifications as listed in this specification.

Construct all piping for the highest pressures and temperatures in the respective system in accordance with ANSI B31, but not less than 125 psig unless specifically indicated otherwise.

Where weld fittings fittings are used, use only long radius elbows having a centerline radius of 1.5 pipe diameters.

Where ASTM A53 type F pipe is specified, ASTM A53 grade A type E or S, or ASTM A53 grade B type E or S may be substituted at Contractor's option. Where ASTM A53 grade A pipe is specified, ASTM A53 grade B pipe may be substituted at Contractor's option. Where the grade or type is not specified, Contractor may choose from those commercially available.

WELDER QUALIFICATIONS

Use the following paragraph for all building service piping and steam piping less than or equal to 15 psig.

Welding procedures, welders, and welding operators for all building service piping and steam piping less than or equal to 15 psig to be in accordance with certified welding procedures of the National Certified Pipe Welding Bureau.

Use the following paragraph when the project has any high pressure steam piping (greater than 15 psig).

Welding procedures, welders, and welding operators for all steam system piping at service pressures above 15 psig to be qualified complying with the provisions of the latest revision of ANSI/ASME B 31.1-Power Piping or Section IX of the ASME Boiler and Pressure Vessel Code for boiler external piping.

Before any metallic welding is performed, Contractor to submit his Standard Welding Procedure Specification together with the Procedure Qualification Record as required by Section IX of the ASME Boiler and Pressure Vessel Code and/or the National Certified Pipe Welding Bureau.

Welder certifications are required to be renewed every three years. If qualification papers are needed on a project, verify that they are current.

The A/E or DFD reserves the right to test the work of any welder employed on the project, at the Contractor's expense. If the work of the welder is found to be unsatisfactory, the welder shall be prevented from doing further welding on the project.

# P A R T 2 - P R O D U C T S

The following specifications are based on "normal" systems where the design system pressures do not exceed 125 psig at 353°F or chilled water systems not exceeding 175 psig. If a specific application requires design pressures/temperatures beyond these limits (central plants or extensions from central plants, for example), contact DFD engineering personnel for assistance.

LOW PRESSURE STEAM (15 psig and lower)

Instrument impulse tubing on heating plant boilers and transmitters: ½” O.D. 316 stainless steel tube, 0.062” thick wall, Swageloc or equal with stainless steel “Gageable” tube fittings.

2" and Smaller above grade in buildings: ASTM A53, type S, standard weight (schedule 40) black steel pipe with ASTM A126/ANSI B16.4, Class 125 cast iron threaded fittings.

2” and Smaller in heating plants and below grade distribution systems: ASTM A53, type E or S, standard weight (schedule 40) black steel pipe with ASTM A105 grade II/ANSI B16.11, threaded or welded (for inaccessible piping) forged steel fittings.

2-1/2" and Larger: ASTM A53, standard weight (schedule 40) blac k steel pipe with ASTM A234 grade WPB/ANSI B16.9 standard weight, seamless, carbon steel weld fittings.

LOW PRESSURE STEAM CONDENSATE (Steam pressure 15 psig and lower)

Instrument impulse tubing on heating plant boilers and transmitters: ½” O.D. 316 stainless steel tube, 0.062” thick wall, Swageloc or equal with stainless steel “Gageable” tube fittings.

2" and Smaller above grade in buildings: ASTM A53, type S, extra strong (schedule 80) black steel pipe with ASTM A126/ANSI B16.4, Class 125 cast iron threaded fittings.

2” and Smaller in heating plants and below grade distribution systems: ASTM A53, type E or S, extra strong (schedule 80) black steel pipe with ASTM A105 grade II/ANSI B16.11, threaded or welded (for inaccessible piping) forged steel fittings.

2-1/2"and Larger: ASTM A53, extra strong (schedule 80) black steel pipe with ASTM A234 grade WPB/ANSI B16.9, extra strong, seamless, carbon steel weld fittings.

If any high pressure steam piping is required, then shop drawings [pipe certification] are required.

HIGH PRESSURE STEAM (Over 15 psig)

Instrument impulse tubing on heating plant boilers and transmitters: ½” O.D. 316 stainless steel tube, 0.062” thick wall, Swageloc or equal with stainless steel “Gageable” tube fittings.

2” and Smaller in heating plants and below grade distribution systems: ASTM A106, Grade B, standard weight (schedule 40) black steel pipe ASTM A105 grade II/ANSI B16.11, threaded or welded (for inaccessible piping) forged steel fittings.

2 1/2” and Larger in heating plants and below grade distribution systems : ASTM A106, Grade B, standard weight (schedule 40) black steel pipe with ASTM A234 grade WPB/ANSI B16.9 standard weight, seamless, carbon steel weld fittings.

For HPS distribution projects use only A106 pipe for all sizes. Discuss with the PM any use of A53 for the project. Use the following if A53 is approved.

2" and Smaller above grade in buildings: ASTM A53, type S, standard weight (schedule 40) black steel pipe with ASTM A126/ANSI B16.4, Class 250 cast iron threaded fittings.

If a request is made to use welded piping rather than threaded joints, the pipe material spec must be changed to type E or type S pipe.

2-1/2" and Larger above grade in buildings: ASTM A53, type E or S, standard weight (schedule 40) black steel pipe with ASTM A234 grade WPB/ANSI B16.9 standard weight, seamless, carbon steel weld fittings.

If there is any high pressure steam service on the project, then shop drawings are required for the piping services.

On steam piping serving turbines, the piping and fittings shall be pickled, cleaned and capped before shipment to the site.

HIGH PRESSURE STEAM CONDENSATE (Steam pressure over 15 psig)

Instrument impulse tubing on heating plant boilers and transmitters: ½” O.D. 316 stainless steel tube, 0.062” thick wall, Swageloc or equal with stainless steel “Gageable” tube fittings.

2" and Smaller above grade in buildings: ASTM A53, type S, extra strong (schedule 80) black steel pipe with ASTM A126/ANSI B16.4, Class 250 cast iron threaded fittings.

2-1/2" and Larger: ASTM A53, type E or S extra strong (schedule 80) black steel pipe with ASTM A234 grade WPB/ANSI B16.9 extra strong, seamless, carbon steel weld fittings.

For HPS distribution projects use only A106 pipe for all sizes. Discuss with the PM any use of A53 for the project.

2” and Smaller in heating plants and below grade distribution systems: ASTM A106, Grade B, standard weight (schedule 80) black steel pipe ASTM A105 grade II/ANSI B16.11, threaded or welded (for inaccessible piping) forged steel fittings.

2 1/2” and Larger in heating plants and below grade distribution systems: ASTM A106, Grade B, standard weight (schedule 80) black steel pipe with ASTM A234 grade WPB/ANSI B16.9 standard weight, seamless, carbon steel weld fittings.

STEAM CONDENSATE PUMP DISCHARGE

2" and Smaller in buildings: ASTM A53, type S, extra strong (schedule 80) black steel pipe with ASTM A126/ANSI B16.4, class 125, standard weight cast iron threaded fittings.

2” and Smaller in heating plants and below grade distribution systems: ASTM A106, Grade B, standard weight (schedule 80) black steel pipe ASTM A105 grade II/ANSI B16.11, threaded or welded (for inaccessible piping) forged steel fittings.

2 1/2” and Larger in heating plants and below grade distribution systems: ASTM A106, Grade B, standard weight (schedule 80) black steel pipe with ASTM A234 grade WPB/ANSI B16.9 standard weight, seamless, carbon steel weld fittings.

BOILER FEEDWATER, BLOWDOWN, DRAIN AND TRIM

Use pipe and pipe fittings as indicated for the associated steam condensate.

For central utility plants blowdown piping use schedule 160 pipe and fittings. Edit this section for that pipe type.

CHEMICAL TREATMENT

Use pipe and pipe fittings as specified for the system to which the chemical treatment piping is connected. Plastic pipe furnished with the chemical treatment materials may also be used if its pressure/temperature rating is acceptable for the service.

VENTS AND RELIEF VALVES

Use pipe and pipe fittings as specified for the system to which the relief valve or vent is connected.

STAINLESS STEEL PIPING

2" and Smaller: ASTM A312 or A376, Schedule 40, seamless stainless steel, type 304 pipe with ASTM A182, Gr. F304, 3000 lb socket-weld fittings.

2-1/2" and Larger: ASTM A312 or A376, Schedule 40, seamless stainless steel, type 304 pipe with ASTM A403, Gr. WP304, butt-weld fittings.

Use 3000 lb socket-weld, stainless steel ground joint unions.

Use ASTM A182, Gr. F304, 150 pound flanges with 1/16" raised face, serrated face finish and weld neck pattern.

UNIONS

2" and Smaller: ASTM SA105A threaded forged carbon steel, meets ANSI B16.11.

**FLANGES**

ASTM A181 grade I or A105, grade III hot forged steel weld neck flanges, welding and of a pressure class compatible with that specified for valves, piping specialties and fittings of the respective piping service. Flanges smaller than 2-1/2" may be used as needed for connecting to equipment and piping specialties. Use raised face flanges ANSI B16.5 for mating with other raised face flanges on equipment with flat ring or full face gaskets. Use ANSI B16.1 flat face flanges with full face gaskets for mating with other flat face flanges on equipment. Slip on flanges are not allowed without written DFD approval.

Provide ASTM A 193 B7 grade bolts and A 194 2H grade nuts & hardened washers for connections (Use star washers when required for grounding.)

GASKETS

Steam Systems and steam condensate systems: Spiral wound gasket with external ring to prevent gasket blowout, ASME B16.20. Suitable for use with flat face and raised face flanges. 304 stainless steel/non-asbestos filler/carbon steel outer guide ring. Filler to be graphite or PTFE on low pressure systems, 800 degree F graphite or ceramic on high pressure steam. Flexitallic Style CG, Leader Style SR, Garlock Flexseal or approved equal.

# P A R T 3 - E X E C U T I O N

PREPARATION

Remove all foreign material from interior and exterior of pipe and fittings.

ERECTION

Install all piping parallel to building walls and ceilings and at heights which do not obstruct any portion of a window, doorway, stairway, or passageway. Where interferences develop in the field, offset or reroute piping as required to clear such interferences. In all cases, consult drawings for exact location of pipe spaces, ceiling heights, door and window openings, or other architectural details before installing piping.

Provide anchors, expansion joints, swing joints and/or expansion loops so that piping may expand and contract without damage to itself, equipment, or building.

All pipe shall be installed with adequate space to fully insulate the pipe, minor alignment offsets to provide adequate spacing for the pipes shall have no additional cost to the project.

See comment on expansion provisions in Section 23 05 15. Show all needed loops anchors and guides on the plans.

Mitered elbows, notched tees, and orange peel reducers are not acceptable. On threaded piping, bushings are not acceptable.

Pipe tees shall be used for all branch takeoffs and tees except "Weldolets" and "Threadolets" may be used for branch takeoffs up to one-half (1/2) the diameter of the main. All other branch takeoff and tee fittings are unacceptable.

Do not route piping through transformer vaults or above transformers, panelboards, or switchboards, including the required service space for this equipment, unless the piping is serving this equipment.

This requirement is based on NFPA 70-1987, 384-4 and 450-47.

Install all valves, control valves, and piping specialties, including items furnished by others, as specified and/or detailed. Make connections to all equipment installed by others where that equipment requires the piping services indicated in this section.

WELDED PIPE JOINTS

Make all welded joints by fusion welding in accordance with ASME Codes, ANSI B31, and State Codes where applicable.

All pipe welding shall be completed by Qualified Welders in accordance with the Contractor’s Procedure Specifications.

Contractor will ensure that these steps are followed where pipe sections will be joined by welding:

1. Cleaning – Welding surfaces will be clean and free of defects.
2. Alignment – Inside diameter of piping components will be aligned as accurately as possible. Internal misalignment shall not exceed 1/16”.
3. Spacing – Pipe sections will be spaced to allow deposition of weld filler material through the entire weld joint thickness.
4. Girth Butt Welds:
	1. Girth butt welds shall be complete penetration welds.
	2. Concavity will not exceed 1/32”
	3. Under cuts will not exceed 1/32”
	4. As welded surfaces are permitted however surfaces will be free from coarse ripples, grooves, abrupt ridges and valleys.

Electrodes shall be Lincoln, or approved equal, with coating and diameter as recommended by the manufacturer for the type and thickness of work being done.

The piping and fittings shall be pickled, cleaned, thoroughly dried, and capped before shipment to the site.

On steam piping systems inside utility plants or other structures (pits), Tungsten Inert Gas (TIG) weld first pass. Clean all piping by pulling or blowing cleaning pigs through piping after erection.

For turbine projects coordinate with PM for the need of silencers and or other requirements for the cleaning blow, i.e., traffic control, coordination with the facility, public notice of excessive noise etc. start with the statement below and edit as needed.

For piping connecting to turbines. Blow compressed air (or steam if approved in writing by DFD) through piping onto target cloth at turbine inlet. Clean piping until target cloth is clean at turbine inlet.

All welds shall be painted/primed with high temperature paint rated for 450°F minimum continuous working temperature.

Backer rings are not allowed without written DFD approval.

THREADED PIPE JOINTS

Use a Teflon based thread lubricant or Teflon tape when making joints; no hard setting pipe thread cement or caulking will be allowed.

STEAM AND STEAM CONDENSATE

Pitch mains down 1 inch in 40 feet in the direction of flow. Pitch terminal equipment runouts down 1 inch in 2 feet for proper condensate drainage.

Install drip traps at each rise, at the horizontal termination of each steam main and as needed to prevent water hammer but at a maximum spacing of 250 ft..

A/E to include DFD master detail on DFD website. A/E must design system to prevent water hammer and identify location of drip traps on plans.

Use eccentric fittings for changes in horizontal pipe sizes with the fittings installed for proper condensate drainage. Concentric fittings may be used for changes in vertical pipe sizes.

Make branch connections and runouts at the top of the main or 45 degrees from the top. Condensate connections may be made in the horizontal plane in limited space situations.

Use a minimum of two elbows in each pipe line to a piece of terminal equipment to provide flexibility for expansion and contraction of the piping system. Offset pipe connections at equipment to allow for service, such as removal of the terminal device.

Install flanges, taps, vents and drains needed to fill, vent and drain the piping for hydrostatic testing.

Relief valve discharge pipe to be as short and straight as possible. Install drip pan elbow at base of vertical discharge pipe. Support all pipe to keep weight of pipe and accessories from resting on relief valve or drip pan elbow. Run drain lines from relief valve and drip pan elbow to nearest drain point. If relief valve has a weep hole, provide a galvanized sheet metal drain pan below the valve and run 3/4 inch drain pipe from drain pan to nearest drain point.

STEAM CONDENSATE PUMP DISCHARGE

Pitch mains down 1 inch in 40 feet in the direction of flow. In limited space situations and where specifically indicated on the drawings, horizontal lines may be run dead level. Where two separate pump discharge mains join together, provide a check valve in each line before the tee and a gate valve for line isolation in an accessible location.

BOILER FEEDWATER, BLOWDOWN, DRAIN AND TRIM

Install all lines as indicated on the drawings and as required by each manufacturer for the specific equipment furnished. Provide additional valves and piping specialties as required to make the system operational.

CHEMICAL TREATMENT

Install chemical treatment piping as indicated on the drawings, as detailed, and as recommended by the supplier of the chemical treatment equipment.

VENTS AND RELIEF VALVES

Install vent and relief valve discharge lines as indicated on the drawings, as detailed, and as specified for each specific valve or piping specialty item. In no event is a termination to occur less than six feet above a roof line.

UNIONS AND FLANGES

Install a union or flange, as required, at each automatic control valve and at each piping specialty or piece of equipment which may require removal for maintenance, repair, or replacement. Where a valve is located at a piece of equipment, locate the flange or union connection on the equipment side of the valve. Concealed unions or flanges are not acceptable.

GASKETS

Store horizontally in cool, dry location and protect from sunlight, water and chemicals. Inspect flange surfaces for warping, radial scoring or heavy tool marks. Inspect fasteners, nuts and washers for burrs or cracks. Replace defective materials.

Align flanges parallel and perpendicular with bolt holes centered without using excessive force. Center gasket in opening. Lubricate fastener threads, nuts and washers with lubricant formulated for application.

Draw flanges together evenly to avoid pinching gasket. Tighten fasteners in cross pattern sequence (12 – 6 o’clock, 3 – 9 o’clock, etc.), one pass by hand and four passes by torque wrench at 30% full torque, 60% full torque and two passes at full torque per ASME B16.5. Retighten bolts after 24 hours of operation at system pressure and temperature. Bolts to have a minimum of two complete threads showing through the nut.

BOILER EXTERNAL PIPING HYDROSTATIC TEST

For purposes of hydrostatic testing, boiler external piping shall be as defined in ANSI B31.1, Power Piping, paragraph 100.1.2.A. Conduct test with Contractor supplied apparatus in accordance with ANSI B31.1, paragraph 137.1.1 and ASME Boiler and Pressure Vessel Code, Section 1, paragraph PG-99.

PIPING SYSTEM LEAK TESTS (HYDROSTATIC TEST)

Verify that the piping system being tested is fully connected to all components and that all equipment is properly installed, wired, and ready for operation. If required for the additional pressure load under test, provide temporary restraints at expansion joints or isolate them during the test. Verify that hangers can withstand any additional weight load that may be imposed by the test.

On piping that cannot be tested because of connection to an active line, provide temporary blind flanges and hydrostatically test new section of piping. After completion of test, remove temporary flanges and make final connections to piping

Provide all piping, fittings, blind flanges, and equipment to perform the testing.

Conduct pressure test with test medium of water unless specifically indicated. Minimum test time is indicated in the table below; additional time may be necessary to conduct an examination for leakage. Each test must be witnessed by the Division's representative. If leaks are found, repair the area with new materials and repeat the test; caulking will not be acceptable.

Do not insulate pipe until it has been successfully tested.

For hydrostatic tests, use clean water and remove all air from the piping being tested by means of air vents or loosening of flanges/unions. Measure and record test pressure at the high point in the system.

Consultant must verify that all system components have been designed for these test pressures; contact DFD engineering personnel if there are questions.

|  |  |  |  |
| --- | --- | --- | --- |
| **System** | **Pressure** | **Medium** | **Duration** |
| Low pressure steam and condensate | 100 psig | Water | 8 hr |
| High pressure steam and condensate\*\* | 250 psig | Water | 8 hr |
| Steam condensate pump discharge | 100 psig | Water | 8 hr |

\*\*Verify operating system pressure with DFD and specify test pressure accordingly. Several state agencies have systems that operate at higher pressures and require test pressures in excess of that scheduled above.

All pressure tests are to be documented on a Division of Facilities Development form included in this specification.

\*\*For Utility Distribution projects use the following DO NOT hydro testing

PIPING SYSTEM NON-DESTRUCTIVE LEAK TESTS (RADIOGRAPHIC or PHASED ARRAY UT TEST)

Use Radiographic or Phased Array Ultrasonic (UT) testing as follows:

1. All welds

Weld test criteria shall be in accordance to ASME B31.1 current version.

Failed welds shall be ground out, re-welded and tested until all tested welds are accepted. The repair and re-testing shall have no additional cost to the project.

All weld tests are to be documented on a Division of Facilities Development form included in this specification.

**SOCKET WELD TESTING**

**S**ocket welds shall be tested by magnetic particle inspection.

CONSTRUCTION VERIFICATION ITEMS

Contractor is responsible for utilizing the construction verification checklists supplied under specification Section 23 08 00 in accordance with the procedures defined for construction verification in Section 01 91 01 or 01 91 02.

\*\*\*END OF SECTION\*\*\*

**PIPING SYSTEM LEAKAGE TEST REPORT**

**State of Wisconsin**

**Department of Administration Date**

**Division of Facilities Development Submitted:**

**Project Name:**

**Location: DFD Project No:**

**Contractor:**

 **□ HVAC □ Refrigeration □ Controls**

□ **Power Plant** □ **Plumbing** □ **Sprinkler**

 **Test Medium:** □ **Air** □ **Water** □ **Other**

**Test performed per specification section No.**

**Specified Test Duration \_\_\_\_\_ Hours Specified Test Pressure PSIG**

**System Identification:**

**Describe Location:**

 **Test Date:**

**Start Test Time: Initial Pressure: PSIG**

**Stop Test Time: Final Pressure: PSIG**

**Tested By: Witnessed By:**

**Title: Title:**

**Signed: Signed:**

**Date: Date:**

**Comments:**

**PIPING SYSTEM UT TEST REPORT**

**State of Wisconsin**

**Department of Administration Date**

**Division of Facilities Development Submitted:**

**Project Name:**

**Location: DFD Project No:**

**Contractor:**

 **□ HPS Operating Pressure ­­­­­­\_\_\_\_\_\_\_\_\_\_\_ Operating Temp\_\_\_\_\_\_\_\_\_\_\_\_**

 **□ Condensate Operating Pressure ­­­­­­\_\_\_\_\_\_\_\_\_\_\_ Operating Temp\_\_\_\_\_\_\_\_\_\_\_\_**

 **Test Medium:** □ **Phase Array** □ **XRAY**

**Test performed per specification section No.**

**System Identification:**

**Describe Location:**

 **Test Date:**

**Start Test Time: Test Result:** □ **Pass** □ **Fail**

**Stop Test Time: Re-Test Result:** □ **Pass** □ **Fail**

 **Re-Test Result:** □ **Pass** □ **Fail**

**Tested By: Witnessed By:**

**Title: Title:**

**Signed: Signed:**

**Date: Date:**

**Comments:**