

The following standard specification is intended to be edited according to the specifics of the project. Brackets [] and areas shaded in gray [e.g. format] indicate requirements that are optional depending upon the type of system being provided or per instructions associated with the [] and project requirements. Consult with University's Representative and campus stakeholders.

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SECTION 23 05 53 HVAC PIPING AND EQUIPMENT IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Equipment identification
2. Valve, automatic control valves, dampers (including smoke and combination fire/smoke dampers) and automatic control dampers identification
3. Piping and ductwork identification
4. Signage

1.2 RELATED SECTIONS

- A. Section 09 XX XX, Painting
- B. Section 23 XX XX
- C. Section 33 05 26, Utility Line Signs, Markers, and Flags

1.3 REFERENCE STANDARDS

- A. ANSI/ASME A13.1 – Scheme for the Identification of Piping Systems.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: Submit samples of each color, lettering style, and other graphic representation required for each identification material or system.
- C. Schedules:
 1. Valve identification chart: Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shut-off and similar special uses, by special "flags", in margin of schedule. In addition to mounted copies, furnish extra copies for Maintenance Manuals as specified in Division 1.
 2. [Note: if applicable.] Automatic control valve identification chart (obtain from the Building Management System contractor for inclusion with this submittal).
 3. Damper identification chart (including smoke and combination fire/smoke dampers).
 4. [Note: if applicable.] Automatic control damper identification chart (obtain from the Building Management System contractor for inclusion with this submittal).
 5. Lists of pipe and equipment to be labeled.
 6. Submit access door numbering scheme and schedule, including access door type, location, size and service.
 7. Include list of wording, symbols, letter size, letter style, and color coding for each system.

1.5 QUALITY ASSURANCE

- A. Coordinate color coding with the University's Representative for preferred color schemes and service abbreviations and valve and equipment numbering schemes prior to submittal review.

- B. Coordinate installation of identifying devices with completion of covering of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices, pipe identification and flow arrows before installing acoustical ceilings and similar concealment.
- E. Coordinate painting schemes of piping, if required, with University's Representative prior to submittal review.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer:
 - 1. Brady/Seton
 - 2. Stranco
 - 3. Rowmark
 - 4. Or equal

2.2 MANUFACTURER'S IDENTIFICATION

- A. Manufacturer's nameplate, name, or trademark shall be permanently affixed to all equipment and material furnished under this Specification. The nameplates of the Subcontractor or Distributor are not acceptable.

2.3 EQUIPMENT IDENTIFICATION

- A. Properly identify each piece of equipment with nameplates mounted on or near each operations device, including:
 - 1. Main control and operating valves, safety devices, and hazardous units
 - 2. Pumps, compressors, and similar motor-driven units
 - 3. Expansion tanks, air separators, water treatment equipment, and similar equipment.
 - 4. Air handling equipment, fans, coils, fancoil units, unit heaters, filters, sound attenuators, and VAV terminal units
 - 5. Chillers and large refrigeration units
 - 6. Provide identification of each VAV terminal unit and each room temperature sensor, using the same address nomenclature as established by the controls contractor.
- B. Identify control panels and major control components outside panels with nameplates.
- C. Identify equipment that is out of view behind access doors in unfinished rooms on face of the access door.
- D. Label content:
 - 1. Include equipment's Drawing designation or unique equipment number. Use same address nomenclature established in the energy management system.
 - 2. Area served
 - 3. Year installed
 - 4. Make and model
 - 5. Equipment size (in CFM, HP, RPM, etc.)
 - 6. If on emergency power, indicate source of power

2.4 NAMEPLATES

- A. Provide plastic labels for mechanical engraving with predrilled holes for attachment hardware.
 - 1. Material: rigid plastic laminated impact acrylic, 2 layer, exterior grade, UV stable
 - 2. Thickness: 3/16 inch minimum

3. Maximum label size: Length and width vary for required label content, but no less than 2 inches wide by 1 inch high.
4. Background color:
 - a. Normal power: Black, matte finish
 - b. Emergency power: Red, matte finish
5. Lettering: White, machine engraved, Futura font, 3/8 inch high, all caps
6. Maximum temperature: Able to withstand up to 160 deg. F.
7. Fasteners: Self-tapping stainless steel screws, except contact type permanent adhesive where screws cannot or should not penetrate substrate.
 - a. Mounting screw type to be #8- 18 x 1 /2 drilling or tapping style, 1/4 inch hex washer head, stainless steel, or similar, appropriate for material in which sign is affixed to. A bead of silicone sealer shall be applied on back of sign and at screw locations prior to affixing sign to equipment.
 - b. For signs larger than 3 inches by 3 inches, use a minimum of 4 mounting screws.

2.5 VALVE TAGS

- A. Attached to stem of each control valve and line shutoff valve installed under Division 22, with No. 16 brass chain, color-coded plastic laminate tag. Engrave laminate tags with 1-inch designated numbers in accordance with typed schedule showing valve size, locations, service, similar to the following form:

RW: 3-inches
Shutoff, Toilets
3rd Floor
Column F-8

1. Engrave identification tags "normally open" (green) or "normally closed" (red).
 2. Do not identify valves where the use is obvious, such as equipment isolation valves.
 3. Tag all valves except fixture stops.
 4. Label HVAC valves "HVAC" plus valve identification number.
 5. Number tags to conform to directory listing number, location, and use.
- B. Access panel markers: Provide manufacturer's standard 1/16 inch thick engraved plastic laminate access panel markers, with abbreviations and numbers corresponding to concealed valve. Include 1/8 inch center hole to allow attachment.

2.6 PAINTED IDENTIFICATION MATERIALS

- A. Stencils: Standard fiberboard stencils, prepared for required applications with the letter sizes generally complying with recommendations of ANSI A13.1 for piping and similar applications, but not less than 3/4 inch high letters for access door signs and similar operational instructions.
- B. Stencil Paint: Standard exterior type stenciling enamel; black, except as otherwise indicated; either brushing grade or pressurized spray-can form and grade.
- C. Identification Paint: Standard identification enamel of colors indicated or, if not otherwise indicated for piping systems, comply with ANSI A13.1 for colors.

2.7 PIPE IDENTIFICATION

- A. General requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- C. Small pipes: For external diameters less than 6 inches (including isolation if any), provide full-band pipe markers, extending 360 degrees around pipe at each location, fastened by one of the following methods:

1. Snap-on application of pre-tensioned semi-rigid plastic pipe marker.
 2. Adhesive lap joint in pipe marker overlap.
 3. Laminated or bonded application of pipe marker to pipe (or insulation).
 4. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 3/4 inch wide; full circle at both ends of pipe marker, tape lapped 1-1/2 inches.
- D. Large pipes: For external diameters of 6 inches and larger (including isolation if any), provide either full-band or strip-type pipe markers, but not narrower than 3 times letter height (and of required length), fastened by one of the following methods:
1. Laminated or bonded application of pipe marker to pipe (or insulation).
 2. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 1-1/2 inch wide; full circle at both ends of pipe marker, tape lapped 3 inches.
 3. Strapped to pipe application of semi-rigid type, with manufacturer's standard stainless steel bands.
- E. Pipe Label Contents: Include identification of piping service using piping system nomenclature as specified, scheduled or shown, and abbreviate only as necessary for each application. Include pipe size and an arrow indicating flow direction.
1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions or as separate unit on each pipe label to indicate flow direction.
 2. Lettering Size: At least 1-1/2 inches high.
- F. Locate pipe markers as follows:
1. Within one foot of each valve, fitting, thermometer or gauge.
 2. At each branch or riser take off.
 3. At each passage through walls, floors and ceiling construction.
 4. At each pipe passage to underground.
 5. On all horizontal pipe runs every 20 ft, at least twice in each room and each story traversed by piping system.
 6. Identify piping contents, flow direction, supply and return.
 7. Where capped piping is provided for future connections, provide legible and durable tags indicating symbol identification.
 8. At wall and ceiling access panels.
 9. Practicable variations or changes in locations and spacing may be made with specific approval of the University's Representative to meet specific conditions.

2.8 UNDERGROUND TYPE PLASTIC WARNING TAPE LINE MARKER

- A. Refer to Section 33 05 26

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.
- B. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

3.2 DUCTWORK INSTALLATION

- A. Access doors: Provide duct markers or stenciled signs on each access door in ductwork and housings, indicating purpose of access (to what equipment) and other maintenance and operating instructions, and appropriate safety and procedural information.
- B. Concealed doors: Where access doors are concealed above acoustical ceilings or similar concealment, plasticized tags may be installed for identification in lieu of specified signs.
- C. Access doors for fire/smoke dampers: Permanently identify on the exterior by a label with letters not less than 1/2 inch in height reading "FIRE/SMOKE DAMPER".

3.3 PIPE SYSTEM IDENTIFICATION

- A. General: Provide for all systems unless indicated otherwise.
- B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
 - 1. At access doors, manholes, and similar access points that permit view of concealed piping.
 - 2. Near major equipment items and other points of origination and termination.
 - 3. 50 feet intervals.
- C. Types: Install pipe markers of one of the following types on each system, and include arrows to show normal direction of flow:
 - 1. Stenciled markers, including color-coded background band or rectangle, and contrasting lettering of black or white. Extend color band or rectangle 2 inches beyond ends of lettering.
 - 2. Stenciled markers, with lettering color complying with ANSI A13.1.
 - 3. Plastic pipe markers, with application system as indicated under "Materials" in this Section. Install on pipe insulation segment where required for hot non-insulated pipes.
 - 4. Stenciled markers, black or white for best contrast, wherever continuous color-coded painting of piping is provided.
- D. Locate pipe markers and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and exterior non-concealed locations.
 - 1. Near each valve and control device. Within one foot of each valve, fitting, thermometer or gauge.
 - 2. At each branch or riser take off, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.
 - 3. At each passage through walls, floors and ceiling construction, or enter non-accessible enclosures.
 - 4. At each pipe passage to underground.
 - 5. At access doors, manholes and similar access points which permit view of concealed piping. At wall and ceiling access panels. Practicable variations or changes in locations and spacing may be made with specific approval of the University's Representative to meet specific conditions.
 - 6. Near major equipment items and other points of origination and termination.
 - 7. Spaced intermediately at maximum spacing of 50 feet (15m) along each piping run, except reduce spacing to 25 feet (8 m) in congested areas of piping and equipment.
 - 8. On all horizontal pipe runs every 20 ft, at least twice in each room and each story traversed by piping system.
 - 9. On piping above removable acoustical ceilings, except omit intermediately spaced markers.

10. Where capped piping is provided for future connections, provide legible and durable tags indicating symbol identification.
11. Identify piping contents, flow direction, supply and return.

E. During back-filling/top soiling of exterior underground piping systems, install continuous underground-type plastic line marker, locate directly over buried line at 12-inches above pipe. Use metallic lined plastic line markers for non-metallic type piping.

3.4 VALVE IDENTIFICATION

- A. General: Provide valve tag on every valve cock and control device in each piping system; exclude check valves, and similar rough-in connections of end-use fixtures and units. List each tagged valve in valve schedule for each piping system.
- B. Valves Concealed in Suspended Ceilings: Provide 1/4 inch high plastic tape marker identifying the valve number on the nearest ceiling grid member.

3.5 MECHANICAL EQUIPMENT IDENTIFICATION

- A. General: Install engraved plastic laminate sign or plastic equipment marker on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device.
 1. Signs shall be placed on the equipment in a logical location, easily visible to maintenance personnel, e.g. near control panels, disconnect switches, nameplates, on or near equipment main access doors and panels, etc. Sign and drilling locations shall be approved by the University's Representative.
- B. Optional sign types: Where lettering larger than 1 inch height is needed for proper identification, because of distance from normal location of required identification, stenciled signs may be provided in lieu of engraved plastic, verify with University's Representative.
- C. Lettering size: Minimum 1/4 inch high lettering for name of unit where viewing distances less than 24 inches, 1/2 inch high for distances up to 6 feet, and proportionately larger lettering for greater distances. Provide secondary lettering of 2/3 to 3/4 of size of the principal lettering.
- D. Plasticized tags: Where equipment to be identified is concealed above acoustical ceilings or similar concealment, use plasticized tags installed within concealed space to eliminate text in exposed sign (outside concealment). In rooms other than security area, mechanical rooms, storage, etc. use thumbtacks for exposed signs with color coded for each type of equipment. Verify with University's Representative.

3.6 ADJUSTING AND CLEANING

- A. Adjusting: Relocate any mechanical identification device which has become visually blocked by Work of this Division or other Divisions.
- B. Cleaning: Clean face of identification devices.

3.7 EXTRA STOCK

- A. Furnish minimum of 5% extra stock of each mechanical identification material required, including additional numbered valve tags (not less than 3) for each piping system, additional piping system identification markers, and additional plastic laminate engraving blanks of assorted sizes.
 1. Where stenciled markers are provided, clean and retain stencils after completion of stenciling and include used stencils in extra stock, along with required stock of stenciling paints and applicators.

END OF SECTION 23 05 53