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## **SECTION 230553 – IDENTIFICATION FOR HVAC SYSTEMS AND EQUIPMENT**

Latest Edition 05-02-2021 See Underlined Text for Edits

(Engineer shall edit specifications and blue text in header to meet project requirements. This includes but is not limited to updating Equipment and/or Material Model Numbers indicated in the specifications and adding any additional specifications that may be required by the project. Also turn off all “Underlines”.)

### **PART 1 - GENERAL**

#### **1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section and all other sections of Division 23.

#### **1.2 SUMMARY**

- A. This section includes the requirements for identification of HVAC piping and equipment using the following:
  - 1. Equipment labels.
  - 2. Warning signs.
  - 3. HVAC pipe system labels.
  - 4. HVAC duct system stencils.
  - 5. Valve tags.
  - 6. Ceiling markers.
  - 7. Engraved signs.
  - 8. Warning tags
  - 9. Underground pipe markers.

#### **1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Samples: For color, letter style, and graphic representation required for each identification material and device.
  - 2. Data: Installation details, material descriptions, dimensions of individual components for each type tag and sign.
  - 3. Equipment Label Schedule: Submit a sample equipment label schedule for each fire protection system. Include a list of all equipment to be labeled, the proposed content for each label and the location in an “xl” file format.
  - 4. Valve Numbering Schedule: Submit a sample valve tag schedule for each fire protection system. Include equipment tag designation, name and location in an “xl” file format.

#### **1.4 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: Include a copy of the final approved submittal for each product in the operation and maintenance manuals.

- B. Valve Schedules: Include a valve schedule for each piping system in the operation and maintenance manual. The valve schedule shall be an electronic file in “doc” format and printed as a “pdf” file for insertion in the O & M manual. Submit the “doc” file separate from the O & M electronic file.

## 1.5 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.
- D. Names, Abbreviations and Designations: Coordinate names, abbreviations and other designations used in mechanical identification work, with corresponding designations shown, specified or scheduled. Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of mechanical systems and equipment.

## 1.6 WARRANTY/GUARANTEES

- A. See Division 23, Specification Section “Basic Mechanical Requirements – HVAC” for warranty and guarantee requirements.

## PART 2 - PRODUCTS

### 2.1 GENERAL PRODUCT REQUIREMENTS

- A. Labels, Signs and Tags: All labels, signs and tags shall conform to ANSI/OSHA requirements for letter/color combinations.
- B. Basis of Design: The basis of design shall be mechanical identifications materials manufactured by the Seton Name Plate Corporation as follows: **<Edit for Project>**
  - 1. Equipment Labels – Style M4562 – M4565
  - 2. Warning Signs – Style M4562 – M4565
  - 3. HVAC Pipe Labels – Size 8SM - 32
  - 4. Duct System Labels – Custom Stencils
  - 5. Valve Tags – Style 374
- C. Other Acceptable Manufacturers: Subject to compliance with requirements, provide mechanical identifications materials from one (1) of the following:
  - 1. Craft Mark Pipe Markers
  - 2. Pipe Markers – Division of Brimar Industries

## 2.2 EQUIPMENT LABELS

### A. Plastic Labels for Equipment:

1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, one eighth (1/8) inch thick, and having predrilled holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than two and one half (2-1/2) inch by three quarter (3/4) inch.
3. Minimum Letter Size: One quarter (1/4) inch for name of units if viewing distance is less than twenty four (24) inches, one half (1/2) inch for viewing distances up to seventy two (72) inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two thirds (2/3) to three fourths (3/4) the size of principal lettering.
4. Fasteners: Self tapping stainless steel screws, screws, except contact type permanent adhesive where screws cannot or should not penetrate the substrate.
5. Adhesive: Contact type permanent adhesive, compatible with label and with substrate.

### B. Label Content: Include equipment's label as indicated on the construction documents.

### C. Equipment Label Schedule:

## 2.3 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, one eighth (1/8) inch thick, and having predrilled holes for attachment hardware.
- B. Minimum Label Size: Length and width vary for required label content, but not less than two and one half (2-1/2) inch by three quarter (3/4) inch.
- C. Minimum Letter Size: One quarter (1/4) inch for name of units if viewing distance is less than twenty four (24) inches, one half (1/2) inch for viewing distances up to seventy two (72) inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two thirds (2/3) to three quarters (3/4) the size of principal lettering.
- D. Fasteners: Stainless steel self tapping screws.
- E. Adhesive: Contact type permanent adhesive, compatible with label and with substrate.
- F. Label Content: Include caution and warning information plus emergency notification instructions.

## 2.4 HVAC PIPE SYSTEMS LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color coded, with lettering indicating service, and showing flow direction according to ASME A13.1.

1. Do not use pipe labels or plastic tapes for bare pipes conveying fluids at temperatures of 125°F (52°C) or higher
- B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to partially cover or cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
1. Small Pipes: For external diameters less than six (6) inches (including insulation if any, provide full band pipe markers, extending 360 degrees around pipe at each location, fastened by one (1) of the following methods:
    - a. Snap-on application of pre-tensioned semi-rigid plastic pipe marker.
    - b. Adhesive lap joint in pipe marker overlap.
    - c. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than three quarter (3/4) inch wide; full circle at both ends of pipe marker, tape lapped one and one half (1-1/2) inches.
  2. Large Pipes: For external diameters of six (6) inches and larger (including insulation if any), provide either full band or strip type pipe markers, but not narrower than three (3) times letter height (and of required length), strapped to pipe (or insulation) application of semi rigid type, with manufacturer's standard nylon ties.
    - a. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than one and one half (1-1/2) inches wide; full circle at both ends of pipe marker, tape lapped three (3) inches.
    - b. Strapped-to-pipe (or insulation) application of semi-rigid type, with manufacturer's standard stainless steel bands.
- C. Custom Pipe Labels: Provide self-adhesive custom printed pipe labels with contact-type, permanent-adhesive backing.
- D. Custom Pipe Label Contents: Includes identification of piping service and an arrow indicating flow direction and shall comply with the following:
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 one and one half (1-1/2) inches high.
  3. Custom Label Designation and Colors: See chart on the next page.

<b>HVAC SERVICE DESIGNATION</b>	<b>LABEL DISIGNATION</b>	<b>FIELD/LETTER COLOR</b>
Campus Chilled Water Supply	Same as Service Designation	Yellow / Black
Campus Chilled Water Return	Same as Service Designation	Yellow / Black
Primary Chilled Water Supply	Same as Service Designation	Yellow / Black
Primary Chilled Water Return	Same as Service Designation	Yellow / Black
Secondary Chilled Water Supply	Same as Service Designation	Yellow / Black
Secondary Chilled Water Return	Same as Service Designation	Yellow / Black
Secondary Process Cooling Water Supply	Same as Service Designation	Yellow / Black
Secondary Process Cooling Water Return	Same as Service Designation	Yellow / Black
Secondary Chilled Beam Chilled Supply	Same as Service Designation	Yellow / Black
Secondary Chilled Beam Chilled Return	Same as Service Designation	Yellow / Black
AC Condensate Drain	Same as Service Designation	Yellow / Black
Condenser Water Supply	Same as Service Designation	Yellow / Black
Condenser Water Return	Same as Service Designation	Yellow / Black
Condenser Water Drain	Same as Service Designation	Yellow / Black
Primary Hot Water Heating Supply	Same as Service Designation	Yellow / Black
Primary Hot Water Heating Return	Same as Service Designation	Yellow / Black
Secondary Hot Water Reheat Supply	Same as Service Designation	Yellow / Black
Secondary Hot Water Reheat Return	Same as Service Designation	Yellow / Black
Secondary Chilled Beam Hot Water Supply	Same as Service Designation	Yellow / Black
Secondary Chilled Beam Hot Water Return	Same as Service Designation	Yellow / Black
Secondary Perimeter Heat - NZ Supply	Same as Service Designation	Yellow / Black
Secondary Perimeter Heat - NZ Return	Same as Service Designation	Yellow / Black
Secondary Perimeter Heat - SZ Supply	Same as Service Designation	Yellow / Black
Secondary Perimeter Heat - SZ Return	Same as Service Designation	Yellow / Black
Secondary Perimeter Heat - EZ Supply	Same as Service Designation	Yellow / Black
Secondary Perimeter Heat - EZ Return	Same as Service Designation	Yellow / Black
Secondary Perimeter Heat - WZ Supply	Same as Service Designation	Yellow / Black
Secondary Perimeter Heat - WZ Return	Same as Service Designation	Yellow / Black
Glycol Hot Water Heating Supply	Same as Service Designation	Yellow / Black
Glycol Hot Water Heating Return	Same as Service Designation	Yellow / Black
High Pressure Steam Supply (125 psi)	Same as Service Designation	Black / White
High Pressure Steam Condensate (125 psi)	Same as Service Designation	Black / White
Medium Pressure Steam Supply (60 psi)	Same as Service Designation	Black / White
Medium Pressure Steam Condensate (60 psi)	Same as Service Designation	Black / White
Low Pressure Steam Supply (15 psi)	Same as Service Designation	Black / White
Low Pressure Steam Condensate (15 psi)	Same as Service Designation	Black / White
Pumped Condensate	Same as Service Designation	Yellow / Black
BAS Control Compressed Air	Same as Service Designation	Yellow / Black
Natural Gas – Heating	Same as Service Designation	Yellow / Black

2.5 HVAC DUCT SYSTEM STENCILS

A. Custom Stencils for Duct Systems:

1. Stencil Material: Brown Oil Board
2. Lettering Size: Minimum letter height of three (3) inches. Stencil designations can be one (1) or two (2) lines.
3. Number of Characters: The number of characters may be up to fifty (50) depending on the specified designation.
4. Stencil Paint: Exterior, gloss, black acrylic enamel. Paint may be in pressurized spray can form.
5. Directional Arrows: Include directional arrows.

B. Stencils for Access Panels and Door Labels

1. Lettering Size: Minimum letter height of one half (1/2) inch for viewing distances up to seventy two (72) inches and proportionately larger lettering for greater viewing distances.
2. Stencil Paint: Exterior, gloss, acrylic enamel. Paint may be in pressurized spray can form.
3. Identification Paint: Exterior, acrylic enamel. Paint may be in pressurized spray can form.

C. Duct Stencil Markers: Provide duct stencil markers with the following designations and letter color: <Edit for Project>

SERVICE	STENCIL DISIGNATION	LETTER COLOR
Main Supply Air Duct	Main Supply Air Duct – AHU – #	Black
General Exhaust Air Duct	General Exhaust Air Duct – GEF – #	Black
Fume Hood Exhaust Duct <sup>1</sup>	Fume Hood Duct FH – # (GEF – #	Black
Fume Hood Exhaust Duct <sup>2</sup>	Fume Hood Duct FH – # (FHEF – #)	Black
Supply Air Duct	Supply Air Duct – STU – #	Black
Exhaust Air Duct	Exhaust Air Duct – ETU – #	Black
Outside Air	Out Side Air – AHU – #	Black
Relief Air	Relief Air – AHU – #	Black
Smoke Evac Duct	Smoke Evac Duct – SEF – #	Black
Access Door - Supply	ADS – Positive Pressure	Black
Access Door - Exhaust	ADE – Negative Pressure	Black

Foot Notes:

1. Use where fume hoods are connected to general exhaust systems. If not required delete.
2. Use where fume hoods are connected to dedicated exhaust fans. If not required delete.

## 2.6 VALVE TAGS AND SCHEDULE

A. General: Valve tags are required to identify what systems the valves are installed in, where the valves are located and what duty the valves perform.

B. Valve Tags:

1. Description: Stamped or engraved with one quarter (1/4) inch letters for piping system abbreviation and one half (1/2) inch numbers
  - a. Brass Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
  - b. Fasteners: Brass wire-link chain
2. Plastic Laminate Valve Tags: Provide manufacturer's standard three thirty second (3/32) inch thick engraved plastic laminate valve tags, with piping system abbreviation in one quarter (1/4) inch high letters and sequenced valve numbers one half (1/2) inch high, and with five thirty second (5/32) inch hole for fastener.
  - a. Provide One and one half (1-1/2) inch sq. black tags with white lettering, except as otherwise indicated.
  - b. Provide size, shape and color combination as specified or scheduled for each piping system.
3. Plastic Valve Tags: Provide manufacturer's standard solid plastic valve tags with printed enamel lettering, with piping system abbreviation in approximately three sixteenth (3/16) inch high letters and sequenced valve numbers approximately three eights (3/8) inches high, and with five thirty second (5/32) inch hole for fastener.
  - a. Provide one and one eighth (1-1/8) inch sq. white tags with black lettering.
  - b. Provide size, shape and color combination as specified or scheduled for each piping system.
  - c. Valve Tag Fasteners: Provide manufacturer's standard solid brass chain (wire link or beaded type), or solid brass S-hooks of the sizes required for proper attachment of tags to valves, and manufactured specifically for that purpose.
4. Shut Off Valve Tag Data: See chart below:

HVAC VALVE SERVICE	VALVE TAG DISIGNATION
Campus Chilled Water Supply	CCHS – #
Campus Chilled Water Return	CCHR – #
Primary Chilled Water Supply	PCHS – #
Primary Chilled Water Return	PCHR – #
Secondary Chilled Water Supply	SCHS – #
Secondary Chilled Water Return	SCHR – #
Secondary Process Cooling Water Supply	SPCWS – #
Secondary Process Cooling Water Return	SPCWR – #
Secondary Chilled Beam Supply	SCBCHS – #
Secondary Chilled Beam Return	SCBCHR – #
Condenser Water Supply	CWS – #
Condenser Water Return	CWR – #
Condenser Water Supply Drain	CWSD – #
Condenser Water Return Drain	CWRD – #
Primary Heating Water Supply	PHS – #
Primary Heating Water Return	PHR – #
Secondary Hot Water Reheat Water Supply	SRHS – #
Secondary Hot Water Reheat Return	SRHR – #
Secondary Perimeter Heat - NZ Supply	SPHSNZ – #
Secondary Perimeter Heat - NZ Return	SPHRNZ – #
Secondary Perimeter Heat - SZ Supply	SPHSSZ – #
Secondary Perimeter Heat - SZ Return	SPHRSZ – #
Secondary Perimeter Heat - EZ Supply	SPHSEZ – #
Secondary Perimeter Heat - EZ Return	SPHREZ – #
Secondary Perimeter Heat - WZ Supply	SPHSWZ – #
Secondary Perimeter Heat - WZ Return	SPHRWZ – #
Glycol Hot Water Supply	GLYS – #
Glycol Hot Water Return	GLYR – #
HP Steam Supply (125 psig)	HPS – #
HP Condensate Return (125 psig)	HPC – #
MP Steam Supply (60 psig)	MPS – #
MP Condensate Return (60 psig)	MPC – #
LP Steam Supply (15 psig)	LPS – #
LP Condensate Return	LPR – #
Pumped Condensate Return	PCR – #

- C. Valve Schedules: Provide a valve schedule in an “xl” file format for each HVAC piping system. File shall include the valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room, space, equipment, pipe riser), and valve duty. Also mark valves for emergency shutoff and similar special uses as required by the project.



1. Numbering System: Shut Off Valves shall be in numerical order starting with one (1) for each HVAC system.
2. BAS Control Valves: BAS control valves shall be identified by numbers or letters in sequential order for each HVAC system utilizing the “control valve identification from the BAS submittal. <Coordinate BAS valve identification requirements with UMB>

## 2.7 CEILING MARKERS

- A. Ceiling Grid and Access Panel Markers: Provide Kroy type clear adhesive printed labels with three sixteenth (3/16) inch high letters to identify the type of concealed equipment, valves, volume dampers, reheat coils, control dampers, etc.
- B. Ceiling Marker Data: For HVAC the printed data shall be as follows:

ITEM	SERVICE	LABEL
LP Drain	Low Point Drain	HVAC – LPD – **
Air Vent	Manual Air Vent	HVAC – MAV
STU	Supply Terminal Unit	HVAC – STU
GETU	General Exhaust Terminal Unit	HVAC – GETU
FHETU	Fume Hood Exhaust Terminal Unit	HVAC – FHETU
FCU	Fan Coil Unit	HVAC – FCU
CHBU	Chilled Beam Unit	HVAC – CHBU
DFDAD	Duct Fire Damper Access Door	HVAC – DFDAD
DFSDAD	Duct Fire/Smoke Damper Access Door	HVAC – DFSDAD

\* Perimeter Heat Zone Exposure: N, S, E, W.

\*\* System ID: Chilled Water (CHW), Heating Reheat (RH), Glycol (GLY)

## 2.8 ENGRAVED PLASTIC LAMINATE SIGNS

- A. General: Provide engraving stock melamine plastic laminate, complying with FS L-P-387, in the sizes and thicknesses indicated, engraved with engraver's standard letter style of the sizes and wording indicated, black with white core (letter color) except as otherwise indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.
- B. Thickness: One eighth (1/8) inch, except as otherwise indicated.

- C. Fasteners: Self tapping stainless steel screws, except contact type permanent adhesive where screws cannot or should not penetrate the substrate.
- D. Nomenclature: Include the following, matching terminology on schedules as closely as possible.
- E. Size: Provide approximate two and one half (2-1/2) inch x four (4) inch markers for control devices, dampers, and valves; and four and one half (4-1/2) inch x six (6) inches for equipment.

## 2.9 WARNING TAGS

- A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.
  - 1. Size: Three (3) inches by five and one quarter (5-1/4) inches minimum.
  - 2. Fasteners: Self tapping stainless steel screws, except contact-type permanent adhesive where screws cannot or should not penetrate the substrate.
  - 3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
  - 4. Color: Yellow background with black lettering.

## 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.

### 3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

### 3.3 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

### 3.4 PIPE LABEL INSTALLATION

- A. Piping Color Coding: Per schedule.
- B. Pipe Label Locations: 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. Near each valve and control device.
  - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
  - 3. Near penetrations and on both sides of through walls, floors, ceilings, and inaccessible enclosures.
  - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
  - 5. Near major equipment items and other points of origination and termination.
  - 6. Spaced at maximum intervals of fifty (50) feet along each run. Reduce intervals to twenty five (25) feet in areas of congested piping and equipment.
  - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- C. Directional Flow Arrows: Arrows shall be used to indicate direction of flow in pipes, including pipes where flow is allowed in both directions.

### 3.5 DUCT LABEL INSTALLATION

- A. Stenciled Duct Label Option: Stenciled labels showing service and flow direction may be provided instead of plastic-laminated duct labels, at Installer's option.
- B. Locate labels near points where ducts enter into and exit from concealed spaces and at maximum intervals of fifty (50) feet in each space where ducts are exposed or concealed by removable ceiling system.

### 3.6 VALVE TAG INSTALLATION

- A. Provide valve tags for all valves installed in HVAC piping systems. Valve duty usually includes the following:
  - 1. Shut off duty for rooms, equipment, control valves and/or floors.
  - 2. Combination balancing/shut off duty.
  - 3. Riser isolation duty.
  - 4. Drain valves.
  - 5. Control valves.
  - 6. Shut off duty for back flow preventer.

### 3.7 WARNING TAG INSTALLATION

- A. Write required message on, and attach warning tags to, equipment and other items where required.

### 3.8 VALVE TAG SCHEDULE

- A. Include the valve schedule file in the electronic operation and maintenance manual.

### 3.9 CEILING MARKERS

- A. Location: Install each ceiling marker label on the surface of the ceiling grid 'T' bar and/or on the frame of an access door.

### 3.10 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.

END OF SECTION 230553