PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions Specification Sections, apply to this Section.

B. Related Sections:
   1. Section 15050 “Basic Mechanical Materials and Methods”.
   2. Other Division 15 specifications as applicable.

1.2 SUMMARY

A. This Section includes mechanical identification materials and devices.

1.3 SUBMITTALS

A. Product Data: For identification materials and devices.

B. Samples: Of color, lettering style, and graphic representation required for each identification material and device.

C. Valve Schedules: For each piping system. Reproduce on standard-size bond paper. Tabulate valve number, piping system, system abbreviation as shown on tag, room or space location of valve, and variations for identification. Mark valves intended for emergency shut-off and similar special uses. Besides mounted and laminated copies, furnish copies for maintenance manuals.

D. Equipment Nameplates: List of equipment and nameplate text.

1.4 QUALITY CONTROL

A. Comply with ASME A13.1, "Scheme for the Identification of Piping Systems" for lettering size, length of color field, colors, and viewing angles of identification devices.

1.5 SEQUENCING AND SCHEDULING

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 IDENTIFYING DEVICES AND LABELS
A. General: Products specified are for applications referenced in other Division 15 Sections. If more than single type is specified for listed applications, selection is Installer's option.

B. Equipment Nameplates: Plastic-laminate permanently fastened to equipment with data engraved or stamped.
   1. Data: Manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and essential data.
   2. Location: Accessible and visible.
   3. Nameplates shall be provided for air handling units, fans, compressors, pumps, boilers, chillers, condensing units, motors, motor controls, safety switches, starters, controllers, panelboards, remote control pushbuttons, and alarms. Nameplates shall also be provided special or separate items of temperature control, but not room thermostats.

C. Stencils: Standard stencils, prepared with letter sizes conforming to recommendations of ASME A13.1. Minimum letter height is 1-1/4 inches for ducts, and 3/4 inch for access door signs and similar operational instructions.
   3. Stencil Paint: Exterior, oil-based, alkyd gloss black enamel, unless otherwise indicated. Paint may be in pressurized spray-can form.
   4. Identification Paint: Exterior, oil-based, alkyd enamel in colors according to ASME A13.1, unless otherwise indicated.

D. Snap-On Plastic Pipe Markers: Manufacturer's standard preprinted, semirigid, snap-on type. Include color-coding according to ASME A13.1, unless otherwise indicated.

E. Pressure-Sensitive Pipe Markers: Manufacturer's standard preprinted, color-coded, pressure-sensitive, vinyl type with permanent adhesive.

F. Pipes with OD, Including Insulation, Less Than 6 Inches: Full-band pipe markers, extending 360 degrees around pipe at each location.

G. Pipes with OD, Including Insulation, 6 Inches and Larger: Either full-band or strip-type pipe markers, at least 3 times letter height and of length required for label.

H. Lettering: Use piping system terms indicated and abbreviate only as necessary for each application length.
   1. Arrows: Either integrally with piping system service lettering, to accommodate both directions, or as separate unit, on each pipe marker to indicate direction of flow.

I. Plastic Duct Markers: Manufacturer's standard laminated plastic, in the following color codes:
   1. Green: Cold-air supply.
   2. Yellow: Hot-air supply.
   3. Blue: Exhaust, outside, return, and mixed air.

5. Terminology: Include direction of airflow; duct service such as supply, return, and exhaust; duct origin, duct destination, and design flow.

J. Plastic Tape: Manufacturer’s standard color-coded, pressure-sensitive, self-adhesive, vinyl tape, at least 3 mils thick.
   1. Width: 1-1/2 inches on pipes with OD, including insulation, less than 6 inches; 2-1/2 inches for larger pipes.
   2. Color: Comply with ASME A13.1, unless otherwise indicated.

K. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch sequenced numbers. Include 5/32-inch hole for fastener.
   1. Material: 18 gauge polished brass.
   2. Size: 1-1/2-inches diameter, unless otherwise indicated.
   3. Shape: Round.
   4. Letter Color: Black
   5. Terminology: Each valve shall have an identifying letter designating the system and an identifying number designating the unit. Identifying letter for various systems shall be, for example: HWS, HWR, CWS, CWR, CDWS, CDWR, D (drain), etc.

L. Access Panel Markers: 1/16-inch-thick, engraved plastic-laminate markers, with abbreviated terms and numbers corresponding to concealed valve. Provide 1/8-inch center hole for attachment.

M. Valve Charts and Diagrams: Drawings, listing and showing all valves shall be provided in duplicate. Diagrams shall be floor plans with valve locations shown and valve identification numbers identified. The chart shall designate the location and service of each valve.

N. Valve Diagram Frames: Glazed display frame for removable mounting on masonry walls for each page of valve charts and diagrams. Include screws.
   1. Frame: Finished hardwood.
   2. Frame: Extruded aluminum.
   3. Glazing: ASTM C 1036, Type I, Class 1, Glazing quality B, 2.5-mm, single-thickness glass.

O. Engraved Plastic-Laminate Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white melamine subcore, unless otherwise indicated. Fabricate in sizes required for message. Provide holes for mechanical fastening.
   1. Engraving: Engraver’s standard letter style, of sizes and with terms to match equipment identification.
   2. Thickness: 1/16 inch, for units up to 20 sq. in. or 8 inches in length, and 1/8 inch (3 mm) for larger units.
   3. Fasteners: Self-tapping stainless-steel screws or rivets.
P. Plastic Equipment Markers: Manufacturer's standard laminated plastic, in the following color codes:
   1. Green: Cooling equipment and components.
   2. Yellow: Heating equipment and components.
   4. Blue: Equipment and components that do not meet criteria above.
   6. Terminology: Match schedules as closely as possible. Include the following:
      a. Name and plan number.
      b. Equipment service.
      c. Design capacity.
      d. Other design parameters such as pressure drop, entering and leaving conditions, and speed.
         7. Size: 2-1/2 by 4 inches for control devices, dampers, and valves; 4-1/2 by 6 inches for equipment.

Q. Plasticized Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with mat finish suitable for writing.
   1. Size: 3-1/4 by 5-5/8 inches.
   2. Fasteners: Brass grommets and wire.
   3. Nomenclature: Large-size primary caption such as DANGER, WARNING, CAUTION, or DO NOT OPERATE.

R. Lettering and Graphics: Coordinate names, abbreviations, and other designations used in mechanical identification with corresponding designations indicated. Use numbers, letters, and terms indicated for proper identification, operation, and maintenance of mechanical systems and equipment.
   1. Multiple Systems: Identify individual system number and service if multiple systems of same name are indicated.

PART 3 - EXECUTION

3.1 LABELING AND IDENTIFYING PIPING SYSTEMS

A. Install pipe markers on each system. Include arrows showing normal direction of flow.

B. Marker Type: Stenciled markers with painted, color-coded bands or rectangles.

C. Marker Type: Stenciled markers complying with ASME A13.1.

D. Marker Type: Plastic markers, with application systems. Install on pipe insulation segment where required for hot, non-insulated pipes.

E. Fasten markers on pipes and insulated pipes smaller than 6 inches OD by one of 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, lapped a minimum of 1-1/2 inches at both ends of pipe marker, and covering full circumference of pipe.

F. Fasten markers on pipes and insulated pipes 6 inches in diameter and larger 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 inches wide, lapped a minimum of 3 inches at both ends of pipe marker, and covering full circumference of pipe.
   3. Strapped to pipe or insulation with manufacturer's standard stainless-steel bands.

G. Locate pipe markers and color bands where piping is exposed in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior nonconcealed locations according to the following:
   1. Near each valve and control device.
   2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Mark each pipe at branch, where flow pattern is not obvious.
   3. Near penetrations through walls, floors, ceilings, or nonaccessible enclosures.
   4. At each pipe passage to underground.
   5. At access doors, manholes, and similar access points that permit view of concealed piping.
   6. Near major equipment items and other points of origination and termination.
   7. Spaced at a maximum of 50-foot intervals along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
   8. On piping above removable acoustical ceilings.

3.2 VALVE TAGS

A. Install on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, plumbing fixture supply stops, shutoff valves, faucets, convenience and lawn-watering hose connections, and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in valve schedule.

B. Install mounted valve diagrams and charts in each major equipment room.

C. Provide second diagram and chart laminated between 15 mil plastic sheets. Two (2) holes to be furnished at top, with each hole reinforced.

3.3 EQUIPMENT SIGNS AND MARKERS

A. Install engraved plastic-laminate signs or equipment markers on or near each major item of mechanical equipment. Include signs for the following general categories of equipment:
   1. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
2. Fire department hose valves and hose stations.
3. Meters, gages, thermometers, and similar units.
4. Fuel-burning units, including boilers, furnaces, heaters, stills, and absorption units.
5. Pumps, compressors, chillers, condensers, and similar motor-driven units.
6. Heat exchangers, coils, evaporators, cooling towers, heat recovery units, and similar equipment.
7. Fans, blowers, primary balancing dampers, and mixing boxes.
8. Packaged HVAC central-station and zone-type units.
9. Tanks and pressure vessels.
10. Strainers, filters, humidifiers, water-treatment systems, and similar equipment.

B. Optional Sign Types: Stenciled signs may be provided instead of engraved plastic, at Installer’s option, where lettering larger than 1-inch high is needed for proper identification because of distance from normal location of required identification.
1. Lettering Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
2. Terms on Signs: Distinguish between multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.

C. Plasticized Tags: Install within concealed space, to reduce amount of text in exposed sign outside concealment, if equipment to be identified is concealed above acoustical ceiling or similar concealment.
1. Identify operational valves and similar minor equipment items located in unoccupied spaces, including machine rooms, by installing plasticized tags.

D. Duct Systems: Identify air supply, return, exhaust, intake, and relief ducts with duct markers; or provide stenciled signs and arrows showing service and direction of flow.
1. Location: Locate signs near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.4 ADJUSTING AND CLEANING

A. Relocate mechanical identification materials and devices that have become visually blocked by work of this or other Divisions.

B. Clean faces of identification devices and glass frames of valve charts.

END OF SECTION