



Marking Services Incorporated

SECTION 23 05 53

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

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PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Equipment labels.
- B. Pipe labels.
- C. Valve tags.
- D. Duct labels.

1.2 RELATED SECTIONS

- A. Section 23 11 23 - Facility Natural-Gas Piping..
- B. Section 22 14 13 - Facility Storm Drainage Piping.
- C. Section 23 30 00 - HVAC Air Distribution.
- D. Section 23 50 00 - Central Heating Equipment.
- E. Section 23 60 00 - Central Cooling Equipment.
- F. Section 22 05 53 - Identification for Plumbing Piping and Equipment.
- G. Section 26 05 53 - Identification for Electrical Systems.

1.3 REFERENCES

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

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.
 3. Installation methods.
- C. Shop Drawings: Submit list of wording, symbols, letter size, and color coding for HVAC equipment, piping, valve and duct identification.
1. Equipment Label Schedule: Provide a schedule of all equipment to be labeled with the proposed content for each label.
 2. Pipe Label Schedule: Provide a schedule of each piping system indicating a proposed nomenclature and location of all pipe markers.
 3. Valve Tag Schedule: Provide a proposed valve numbering scheme and schedule for each piping system. Tabulate valve number, piping system, system abbreviation as shown on tag, room or space location of valve, normal-operating position (open, closed, or modulating), and variations for identification. Mark valves intended for emergency shut-off and similar special uses.
 4. Duct Label Schedule: Provide a schedule of each duct system indicating a proposed nomenclature and location of all duct markers.
- D. Closeout Submittals: Record actual as built locations of valve tags and update schedules accordingly.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience
- B. Installer Qualifications: Company specializing in performing Work of this section with minimum five years documented experience.
- C. ASME Standards: Comply with ASME A13.1 for color scheme, lettering size, length of color field, and viewing angles of identification devices.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging with labels clearly identifying product name and manufacturer until ready for installation.
- B. Storage: Store materials in clean, dry area indoors until ready for installation.
- C. Handling: Protect materials and finish from damage during handling and installation.

D. 1.7PRE-INSTALLATION MEETINGS

- E. Convene minimum two weeks prior to commencing Work of this section.
- F. Review installation procedures and coordination required with related Work.
- G. Inspect and make notes of job conditions prior to installation:
 1. Record minutes of the conference and provide copies to all parties present.
 2. Identify all outstanding issues in writing designating the responsible party for follow-up action and the timetable for completion.
 3. Installation of identification system shall not begin until all outstanding issues are resolved to the satisfaction of the Architect.

1.7 SEQUENCING

- 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

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Marking Services, Inc. , which is located at: 8265 N. Faulkner Rd. P. O. Box 240027; Milwaukee, WI 53224; Toll Free Tel: 800-234-0135; Tel: 414-973-1331; Email: [request info \(sales@markingservices.com\)](mailto:request info (sales@markingservices.com)); Web: www.markserv.com
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 MECHANICAL IDENTIFICATION GENERAL

- A. General: Provide manufacturer's standard products of categories and types required for each application specified. For each identification type, provide all products from same manufacturer with same text, style, color, shape, and other identification features.
 - 1. Provide nameplates with the unit number on all mechanical equipment.
 - 2. Provide pipe identification labels including direction-of-flow arrows and with service indicated. All labels shall have background colors matched with specific service designation.
 - 3. Provide valve tag numbers on HVAC piping valves.
 - 4. Provide duct identification labels including direction-of-flow arrows and with service indicated. All labels shall have background colors matched with specific service designation.

2.3 EQUIPMENT LABELS

- A. Plastic Labels for Equipment (Indoor Application):
 - 1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16 inch thick.
 - 2. Letter Color: Black
 - 3. Background Color: White
 - 4. Minimum Label Size: Length and width vary for required label content, but not less than 1 by 3 inches.
 - 5. Minimum Letter Size: 1/4 inch.
 - 6. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Plastic Labels for Equipment (Outdoor Application):
 - 1. Material: MS-215 Max-Tek with printed graphics protected by a chemical and UV resistant MS-3000 top laminate.
 - 2. Letter Color: Black

3. Background Color: White
4. Minimum Label Size: Length and width vary for required label content, but not less than 1 by 3 inches.
5. Minimum Letter Size: 1/4 inch.
6. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

2.4 PIPE LABELS (INDOOR PIPING)

- A. Provide labels for above ground piping located indoors, and not exposed to sunlight or a harsh environment.
- B. Pre-printed, color-coded, with lettering indicating service, and showing flow direction.
- C. Lettering shall be sub-surface printed and protected from direct contact by a layer of plastic. Markers with surface printed lettering will not be accepted.
- D. Pipe Labels for pipe O.D. less than 8 inches: MS-970 Coiled, semi rigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive in contact with the pipe surface.
- E. Pipe Labels for pipe O.D. 8 inches and over: MS-970 Strap-on, semi rigid plastic to cover partial circumference of pipe and to attach to pipe with nylon ties

F. Pipe Label Schedule:

| Pipe O.D. (including insulation) | Marker Style | Marker Width | Lettering Height | Marker Type |
|----------------------------------|--------------|--------------|------------------|-------------|
| 1/4 inch to 3/8 inch | MS970-TM | 3 inches | 1/4 inch | Coil-on |
| 1/2 inch to 1 inch | MS970-A | 8 inches | 1/2 inch | Coil-on |
| 1-1/8 inch to 2-1/4 inch | MS970-B | 8 inches | 3/4 inch | Coil-on |
| 2-3/8 inch to 3-1/4 inch | MS970-C | 12 inches | 1-1/4 inch | Coil-on |
| 3-3/8 inch to 4-1/2 inch | MS970-D | 12 inches | 1-1/4 inch | Coil-on |
| 4-5/8 inch to 5-7/8 inch | MS970-E | 12 inches | 1-1/4 inch | Coil-on |
| 6 inch to 7-7/8 inch | MS970-FC | 12 inches | 1-1/4 inch | Coil-on |
| 8 inch to 10 inch | MS970-G | 24 inches | 2-1/2 inch | Strap-on |
| Over 10 inch | MS970-H | 32 inches | 3-1/2 inch | Strap-on |

G. Pipe Label Color Schedule:

| Service | Lettering Color | Background Color |
|------------------------|-----------------|------------------|
| Chilled Water Piping | White | Green |
| Condenser Water Piping | White | Green |
| Heating Water Piping | White | Green |
| Steam Piping | White | Green |
| Steam Condensate | White | Green |
| Refrigerant Piping | Black | Orange |

2.5 PIPE LABELS (OUTDOOR PIPING)

- A. Provide labels for above ground piping located outside, and exposed to sunlight or a harsh environment, the following product is specified.
- B. Pre-printed, color-coded, with lettering indicating service, and showing flow direction.
- C. Pipe markers shall be constructed of MS-995 Maxilar material. Pipe markers shall withstand direct contact with all process chemicals, operating temperatures up to 250 degrees F, and prolonged exposure to direct sunlight.

- D. Pipe markers shall be constructed of printed 5 mil (0.005 inch) polyester and top laminated with MS1000 clear ultra violet and chemical resistant plastic film that is engineered to provide maximum durability of the printed legend. Markers shall be pre-coiled to wrap entirely around the circumference of pipe up to 10 inch outside diameter, and self-sealed with a strip of clear ultra violet and chemical resistant plastic film. Coiled markers shall seal to themselves, and not the pipe surface.
- E. Pipe Labels for pipe O.D. up to 10 inches: Shall be labeled with a single piece, pre-printed marker that wraps entirely around the circumference of the pipe, overlaps and seals to itself rather than adhere to the pipe surface.
- F. Pipe Labels for pipe O.D. 10 inches and greater: Shall be constructed of printed 5 mil (0.005 inch) polyester and top laminated with MS1000 clear ultra violet and chemical resistant plastic film that is pre-applied to an acrylic-faced, co-extruded ABS plastic carrier. Carrier shall have pre-formed legs running the entire length of the part to ensure marker remains straight and aligned with pipe. Flow direction shall be identified by application of a separate arrow label of same construction. Carriers shall be affixed to piping by means of two stainless steel straps that wrap entirely around the circumference of the pipe.

G. Pipe Label Schedule:

| Pipe O.D. (including insulation) | Marker Style | Marker Width | Lettering Height | Marker Type |
|----------------------------------|--------------|--------------|------------------|-------------|
| 3/4 inch to 1 inch | MS995-A | 8 inches | 1/2 inch | Wraparound |
| 1-1/8 inch to 2-3/8 inch | MS995-B | 8 inches | 3/4 inch | Wraparound |
| 2-1/2 inch to 4-3/4 inch | MS995-D | 12 inches | 1-1/4 inch | Wraparound |
| 5 inch to 7-7/8 inch | MS995-E | 12 inches | 1-1/4 inch | Wraparound |
| 8 inch to 10 inch | MS995-J | 12 inches | 1-1/4 inch | Wraparound |
| Over 10 inch | MS995-MB | 32 inches | 2-1/2 inch | Carrier |

H. Pipe Label Color Schedule:

| Service | Lettering Color | Background Color |
|------------------------|-----------------|------------------|
| Chilled Water Piping | White | Green |
| Condenser Water Piping | White | Green |
| Heating Water Piping | White | Green |
| Steam Piping | White | Green |
| Steam Condensate | White | Green |
| Refrigerant Piping | Black | Orange |

2.6 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4 inch letters for piping abbreviation and 1/2 inch numbers.
 1. Tag Material: Brass, 0.032 inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
 2. Background Color: Natural brass.
 3. Letter Color: Black.
 4. Tag Size: 1-1/2 inches, round.
 5. Fasteners: Brass S-Hooks and Jack Chain.
- B. Valve Tags: For outdoor labeling of process valves.
 1. Material: MS-215 Max-Tek with printed graphics protected by a chemical and UV resistant MS-3000 top laminate, and having stainless steel grommet protected predrilled holes with for attachment hardware.
 2. Background Color: To match pipe label color by system.

3. Letter Color: Either white or black for best contrast to background color.
4. Tag Size: Minimum 1-1/2 inches.
5. Fasteners: Stainless steel S-Hooks and stainless steel Jack Chain.

2.7 DUCT LABELS (non-plenum space)

A. Pre-printed, color-coded, with lettering indicating associated equipment, service, and showing flow direction.

1. Contents: Include identification of duct service using same system designation as used on Drawings and an arrow indicating flow direction. On each label, prefix the system designation with the associated equipment number (example: AHU-1 SUPPLY AIR).
2. Material: MS900 vinyl with pressure sensitive acrylic adhesive backing.
3. Marker Size: 2-1/4 inch high, with length to suit required label content.
4. Lettering Size: Minimum 1-1/2 inches high
5. Direction-of-Flow Arrows: Separate unit for each duct label to indicate flow direction.
6. Arrow Marker Size: 2-1/4 inch by 6-1/2 inches.

B. Duct Label Color Schedule:

| Service | Lettering Color | Background Color |
|-------------|-----------------|------------------|
| Supply Air | White | Green |
| Exhaust Air | Black | Yellow |
| Return Air | White | Blue |
| Relief Air | White | Blue |
| Outside Air | White | Blue |

2.8 DUCT LABELS (plenum space)

A. Pre-printed, color-coded, with lettering indicating associated equipment, service, and showing flow direction.

1. Contents: Include identification of duct service using same system designation as used on Drawings and an arrow indicating flow direction. On each label, prefix the system designation with the associated equipment number (example: AHU-1 SUPPLY AIR).
2. Material: MS-4000 1.6 mil aluminum with pressure sensitive adhesive backing. Meets NFPA 101 Life Safety Code for class A materials.
3. Marker Size: 2-1/4 inch high, with length to suit required label content.
4. Lettering Size: Minimum 1-1/2 inches high
5. Direction-of-Flow Arrows: Separate unit for each duct label to indicate flow direction.
6. Arrow Marker Size: 2-1/4 inch by 6-1/2 inches.

B. Duct Label Color Schedule:

| Service | Lettering Color | Background Color |
|-------------|-----------------|------------------|
| Supply Air | White | Green |
| Exhaust Air | Black | Yellow |
| Return Air | White | Blue |
| Relief Air | White | Blue |
| Outside Air | White | Blue |

2.9 CEILING TACKS

A. Provide steel ceiling tacks with a color-coded head 3/4 inch diameter and a 1.5 inch serrated shank.

1. Provide ceiling tacks in acoustical tile ceilings to locate equipment, valves or dampers that require regular maintenance or are part of a Life Safety System.

2. Tacks shall be color coded as follows (coordinate with Owner):
 - a. Yellow - HVAC equipment
 - b. Red - Life Safety (fire dampers, sprinkler valves, etc.)
 - c. Green - Plumbing Valves
 - d. Blue - Heating/Cooling Valves

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Install identifying devices after completion of coverings and painting.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. For labels that are installed using pressure-sensitive adhesives, 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.
- C. For pipe markers that are pre-coiled or strap-on type and do not adhere directly to the piping, no surface preparation is necessary.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Equipment Labels:
 1. Install or permanently fasten labels on each major item of mechanical equipment.
 2. Locate equipment labels where accessible and visible.
- C. Pipe Labels: 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 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
- D. Valve Tags: Install tags on all shut-off valves and control devices in piping systems, except valves within factory-fabricated equipment units.
- E. Duct Labels: Locate labels where ducts enter into and exits from concealed spaces or is concealed by removable ceiling system as follows:
 1. Near penetrations and on both sides of walls, floors, ceilings, and

- inaccessible enclosures.
 - 2. At access doors, manholes, and similar access points that permit view of concealed duct.
 - 3. Near major equipment items and other points of origination and termination.
 - 4. Spaced at maximum intervals of 50 feet along each run.
- F. Mark location of equipment or valves located above ceilings with identifying ceiling tacks to help in identification for maintenance.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION