1. **GENERAL**
   1. **Summary**
      1. Provide identification and labelling on all plumbing piping and equipment.
   2. **References and Related BCIT Standards**
      1. 22 14 00 Facility Storm Drainage.
      2. 22 40 00 Plumbing Fixtures.
   3. **Coordination Requirements**
      1. Coordinate installation of identifying devices with location of access panels and doors. Install identifying devices before installing acoustical ceilings and similar concealment.
   4. **Quality Assurance**
      1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
      2. Installer Qualifications: Company specializing in performing work of this section with minimum five years documented experience.
   5. **Extra Materials**
      1. Furnish minimum of 5% extra stock of each mechanical identification material required, including additional numbered valve tags, additional piping system identification markers, and additional plastic laminate engraving banks of assorted size.
2. **PRODUCT AND DESIGN REQUIREMENTS**
   1. **Identification General**
      1. Provide pipe identification labels including direction-of-flow arrows and with service indicated. Labels shall have background colours matched with specific service designation.
      2. Provide valve tag numbers on plumbing valves.
      3. Include building number for each label as a subtext to each identification, such as SW5 CC-1 for cooling coil CC-1 located in building SW5. Coordinate labelling with the DDC system identification.
   2. **Equipment Labels**
      1. Plastic Labels for Equipment (Indoor Application):
         1. Material and Thickness: Multilayer, multicolour, plastic labels for mechanical engraving, 1/16 inch thick.
         2. Letter Colour: Black.
         3. Background Colour: White.
         4. Minimum Label Size: Length and width vary for required label content, but not less than 1 x 3 inches.
         5. Minimum Letter Size: 1/4 inch.
         6. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
      2. 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 Colour: Black.
         3. Background Colour: White.
         4. Minimum Label Size: Length and width vary for required label content, but not less than 1 x 3 inches.
         5. Minimum Letter Size: 1/4 inch.
         6. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
   3. **Pipe Labels – Interior**
      1. Provide labels for above ground piping located indoors, and not exposed to sunlight or a harsh environment. Provide pre-printed, colour-coded, with lettering indicating service and flow direction.
      2. 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. 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.
   4. **Pipe Label Schedule – Interior**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **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 |

* 1. **Pipe Colour Schedule**

|  |  |  |  |
| --- | --- | --- | --- |
| **Service** | **Identification Lettering** | **Primary Colour** (Background) | **Secondary Colour** (Letter) |
| Acid Waste | Acid | Orange | Black |
| Cold Water Service | C.W. | Green | White |
| Fire Combined Standpipes | SPR/S.P. | Red | White |
| Compressed Air: |  |  |  |
| 0 to 690 kPa | COMP.A. | Blue | White |
| 690 kPa and higher | COMP.A. (HP) | Blue | White |
| Distilled Water | Dist.W. | Green | White |
| Domestic Cold Water | D.C.W. | Green | White |
| Domestic Hot Water Recirc. | D.H.W.R. | Green | White |
| Domestic Hot Water Supply 82°C | D.H.W.S. 82°C | Green | White |
| Domestic Hot Water Supply 60°C | D.H.W.S. 60°C | Green | White |
| Non-Potable Cold Water | N.P.W. | Green | White |
| Fire Lines W.S. | W.S. | Red | White |
| Fuel Oil 2,3,4,5,6 | F.O.# | Yellow | Black |
| Natural Gas | Gas | Yellow | Black |
| Propane | LP GAS | Yellow | Black |
| Safety Valve Blowdown | - | Green | White |
| Fire Sprinkler Lines | SPR | Red | White |
| Fire Sprinkler Lines (Dry) | SPR (DRY) | Red | White |
| Sanitary Drain | SAN | None | None |
| Plumbing Vent | PVent | None | None |
| Storm Drain | Storm | None | None |
| Non Asbestos Containing Material | NACM | Purple | White |

* 1. **Letters with Direction of Flow Arrows**
     1. 12 mm high - 1-1/4 NPS pipe and smaller.
     2. 25 mm high - 1-1/2 NPS up to 2-1/2 NPS pipe.
     3. 50 mm high - 3 NPS and larger pipe.
     4. Bands:
        1. 38 mm wide, except arrow bands 50 mm wide.
     5. Colours:
        1. Horizontally hatched - primary colour.
        2. Vertically hatched - secondary colour.
        3. Black letters and arrows on yellow primary colour.
        4. Background, white letters and arrows or red, blue or green backgrounds.
  2. **Pipe Labels – Exterior**
     1. Provide labels for above ground piping located outside, and exposed to sunlight or a harsh environment, the following product is specified.
     2. Provide pre-printed, colour-coded, with lettering indicating service and flow direction.
     3. 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. 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.
     4. Pipe Labels for pipe O.D. up to 10 inches: Label with a single piece, pre-printed marker that wraps entirely around circumference of pipe, and overlaps and seals to itself rather than adhere to the pipe surface. 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.
  3. **Pipe Label Schedule – Exterior**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **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 |

* 1. **Valve Tags**
     1. Valve Tags: Stamped or engraved with 1/4 inch letters for piping abbreviation and 1/2 inch numbers.
     2. Material: Brass, 0.032 inch minimum thickness. Background Colour: Natural brass.
     3. Letter Colour: Black.
     4. Tag Size: 1-1/2 inches, round.
  2. **Valve Tags for Outdoor Labelling of Process Valves**
     1. Material: MS-215 Max-Tek with printed graphics protected by a chemical and UV resistant MS-3000 top laminate.
     2. Background Colour: To match pipe label colour by system.
     3. Letter Colour: Either white or black for best contrast to background colour.
     4. Tag Size: Minimum 1-1/2 inches.
  3. **Valve Schedules**
     1. Provide schedule for each piping system on standard-size paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
     2. Valve schedule to be included in O&M Manual, and mounted in durable frame in all mechanical and water entry rooms (rooms where valves are present).
  4. **Warning Tags**
     1. Preprinted or partially preprinted, accident-prevention tags; of plasticized card stock with matte finish suitable for writing.
     2. Size: 3 by 5-1/4 inches minimum.
     3. Fasteners: Brass grommet and wire.
     4. Nomenclature: Large-size primary caption such as DANGER, CAUTION, or DO NOT OPERATE.
     5. Colour: Yellow background with black lettering.

1. **EXECUTION**
   1. **Examination**
      1. Examine substrates for proper preparation and ensure substrate is acceptable for installation. If substrate preparation is the responsibility of another installer, notify Consultant of unsatisfactory preparation before proceeding.
   2. **Preparation**
      1. Install identifying devices after completion of coverings and painting.
      2. Clean surfaces thoroughly prior to installation.
      3. 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. **Labelling Installation**
      1. Buried Piping Identifications/Markers:
         1. Metallic Pipe: Provide continuously printed 100 mm wide x 4 mil thick “Blaze Orange” plastic tape with printing indicating type of service of buried pipe. Place tape at ±300 mm above buried pipe in backfill.
         2. Non-Metallic Piping: Provide detectable multi-ply tape consisting of aluminum foil core between two (2) layers of 100 mm x 4 mill thick “Blaze Orange” plastic tape with printing indicating type of service of buried pipe. Place tape at ±300 mm above buried pipe in backfill lifts.
         3. Where multiple small pipes are buried in a common trench and do not exceed an overall width of 450 mm, install a single tape line marker.
      2. Equipment Labels:
         1. Install or permanently fasten labels on each major item of mechanical equipment. Locate equipment labels where accessible and visible.
      3. Pipe Labels:
         1. 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. Near penetrations and on both sides of through walls, floors, ceilings, and inaccessible enclosures.
            3. At access doors, manholes, and similar access points that permit view of concealed piping.
            4. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
      4. Valve Tags:
         1. Install tags on all shut-off valves and control devices in piping systems.
      5. Mark location of equipment or valves located above ceilings with identifying “label” to help in identification for maintenance. These label markings should be coordinated with the Architects.
   4. **Protection**
      1. Protect installed products until completion of Project.
   5. **Cleaning**
      1. Clean faces of mechanical identification devices and glass frames of valve schedules.

\*\*\* END OF **IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT** SECTION \*\*\*