SECTION 23 05 53

MECHANICAL IDENTIFICATION

PART 1: GENERAL

1.1 PURPOSE

A. This guideline is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design. PSP is to apply the principles of this section such that the University of Texas at Arlington (UTA) may achieve a level of quality and consistency in the design and construction of their facilities. Deviations from these guidelines must be approved by UTA and may require justification through Life Cycle Cost (LCC) analysis and submitted to UTA for approval.

1.2 **LESSONS LEARNED AND DESIGN CONSIDERATIONS**

A. UTA representative needs to approve the equipment tags and color scheme prior to releasing the submittal from the engineer.

B. Underground marking tape should be located 12 inches above the pipe with system specific labeling.

C. Pipe markers will have the same abbreviations as shown on the design drawings. These abbreviations will be approved by UTA during the design process.

D. No adhesive will be used for any equipment for pipe labeling.

E. Pipe labels should be installed after any insulation sealant has completely dries and after insulation inspection by UTA.

F. Pipe labels should follow the installation instructions of section three. However; if the labels need to be relocated to be viewed from below or from access panels the labels can be moved but should be placed as close as possible as instructed in section three.

G. Printed labels on the ceiling grid should be used instead of ceiling tacks to identify overhead equipment. Ceiling tacks disappear over time due to removing ceiling tiles for maintenance.

PART 2 - PRODUCTS

2.1 GENERAL

A. This product section is intended to inform the PSP on the minimum standard of quality that should be incorporated in new designs. The PSP should evaluate these standards and incorporate or make additional requirements per project specific requirements. Where the PSP considers any requirement listed not to be applicable or incompatible with the project design intent should be discussed with UTA Office of Facilities Management.

1. Hydronic Piping

a. Pipe markers will have system abbreviations and flow direction indicated.

b. Hydronic Piping Color Scheme:

1) Chilled water supply and return: Green with white lettering.

2) Condenser water supply and return: Green with white lettering.

3) Building heating water supply and return: Yellow with black lettering.

4) Steam Supply: Yellow with black lettering.

5) Condensate return: Yellow with black lettering.

6) Chilled Beam supply and return: Green with white lettering.

7) Domestic Water Piping: Blue with white lettering.

8) Chilled water coil condensate: Green with white lettering.

9) Any other systems not mentioned above will be approved by UTA during design.

c. Minimum lettering size is 1-1/2 inches.

d. Pipe labels will be pretensiled semi-rigid plastic and form around the entire circumference of the pipe/insulation and secured without fasteners or adhesives.

e. Underground piping will be labeled with bright blue colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mils thick, specifically for direct buried piping.

2. Equipment Labeling:

a. Plastic labels black with white mechanical engraved lettering.

b. Minimum 1/8 inch thick.

c. Predrilled holes for mounting with stainless steel rivets or self-tapping screws. (Adhesive is not allowed).

d. Minimum size is 2-1/2 inches by ¾ inches.

e. Minimum letter size is ¼ inch.

f. Label will have same abbreviation and numbering as the construction drawings.

3. Valve Tags:

a. 20 gage brass labels 1-1/2 inch diameter with mechanical graving with chain for attachment to valve.

b. Minimum letter size is ¼ inch.

c. Label will have same abbreviation and numbering as the design drawings.

4. Ceiling Tags:

a. Clear plastic adhesive tags for installation on T-bar ceilings and access hatches with black lettering.

PART 3 - EXECUTION

3.1 Install nameplates with corrosion proof fasteners.

3.2 **Place underground tape 12 inches below grade surface directly above pipe**.

3.3 Identify main and branch line valves.

3.4 Identify all control valves.

3.5 If flow is in both directions a double ended arrow will be shown on pipe marker.

3.6 **Hydronic piping will have pipe markers no greater than every 25 feet and within 5 feet from penetrations through walls and ceilings.**

3.7 The following equipment above ceiling will be marked below the ceiling:

1. Terminal Boxes.
2. Main and branch valves.
3. Fan coil units
4. Duct heaters
5. Utility meters
6. Any other equipment UTA designates during design.

PART 4 - APPENDIX

4.1 REPRESENTITIVE PRODUCT DATA

A. Piping Markers

1. Marking Services Inc. Pipe Marker Example.

B. Equipment Tags

1. Marking Services Inc. Equipment Labels

C. Valve Tags

1. Marking Services Inc. Brass Valve Tags

D. Underground Piping Tape

1. Marking Services Inc. Detectable Underground Warning Tape

END OF SECTION 23 05 53

APPENDIX 4.1.A – PIPE MARKERS

2.03 Pipe Markers -
MS-970 Coiled Pipe Markers

SUBMITTAL SHEET # 5

▶ TECHNICAL DATA

MARKING SERVICES, INC.

800.234.0135 414.973.1331 Fax/800.627.6432 www.marksery.com

MS-970 COILED PLASTIC PIPE MARKERS

DESCRIPTION

MS-970 coiled plastic pipe markers are designed to identify piping in a wide variety of environments. They stay in place on pipes due to the memory of the coiling process and therefore do not rely on a pressure-sensitive adhesive. No preparation of the pipe surface is required for application, so installation time is reduced compared to conventional stick-on marker systems. Legends are sub-surface printed so they are protected by a layer of plastic.

- Ideal for rusty, dirty or sweating pipes where adhesive markers cannot be used.
- No pipe surface preparation needed.
- Coiled construction quickly snaps around pipe.
- Self-locking strip keeps marker in place even on vertical pipes.
- Markers can be removed during line maintenance, then re-installed.
- Standard and custom legends available.
- Flow direction arrows are printed on each marker.
- Complies with ASME A13.1 standard for pipe identification with regard to color, letter height and marker size.

ATTACHING NYLON STRAPS

Two nylon straps are provided with Style F and G, and three for H Markers. The straps are provided in a 36" length for Style F and G and a 48" length for the Style H markers. They will fit around a 20" pipe. For larger pipe diameters, simply connect 2 straps together to form a permanent attachment.

Nylon Strap Part Numbers
36" Nylon Straps #15786
48" Nylon Straps #15787

PHYSICAL PROPERTIES

Materials:	20 mil .020" (0.508 mm) Vinyl Service
Temperature Range:	-40°F to 160°F (71°C)
Chemical Resistance:	
Water Resistance:	Excellent
Alkalis (mild):	Good
Mildew:	Good
Application:	Recommended for indoor use
ASME A13.1 Standard:	Complies
Flow Direction Arrows:	Yes

MARKER SIZES

Pipe Diameter	Style Marker	Marker Width	Character Height	Marker Type
1/4" – 3/8"	TM	3 "	1 / 4 "	coil-on
1/2" – 1"	A	8 "	1 / 2 "	coil-on
1 - 1 / 8 " – 2 - 1 / 4 "	B	8 "	3 / 4 "	coil-on
2 - 3 / 8 " – 3 - 1 / 4 "	C	12"	1 - 1 / 4 "	coil-on
3 - 3 / 8 " – 4 - 1 / 2 "	D	12"	1 - 1 / 4 "	coil-on
4 - 5 / 8 " – 5 - 7 / 8 "	E	12"	1 - 1 / 4 "	coil-on
6" – 7-7/8"	F	12"	1 - 1 / 4 "	strap-on
8" – 10"	G	24"	2 - 1 / 2 "	strap-on
Over 10"	H	32"	3 - 1 / 2 "	strap-on

Pipe Diameter	Style Marker	Marker Width	Character Height	Marker Type
6.35 – 9.5 mm	TM	76.2 mm	6.35mm	coil-on
12.7 – 25.4 mm	A	203.2 mm	13 mm	coil-on
28.58 – 57.15 mm	B	203.2 mm	19 mm	coil-on
60.33 – 88 mm	C	305 mm	32 mm	coil-on
85.73 – 114 mm	D	305 mm	32 mm	coil-on
111 – 150 mm	E	305 mm	32 mm	coil-on
152 – 200 mm	F	305 mm	32 mm	strap-on
203 – 254 mm	G	610 mm	64 mm	strap-on
Over 254 mm	H	813 mm	-	-

Designation of Colors (ASME A13.1-1996)

Classification	Color Description	Swatch
Materials Inherently Hazardous		
Flammable or Explosive	Black on Yellow	X
Chemically Active or Toxic	Black on Yellow	X
Extreme Temperatures or Pressures	Black on Yellow	X
Radioactive	Black on Yellow	X
Materials of Inherently Low Hazard		
Gas or Gaseous Admixture	White on Blue	X
Liquid or Liquid Admixture	White on Green	X
Fire Quenching Materials		
Water, Foam, CO2, Halon, etc.	White on Red	X

Designation of Colors (ASME A13.1-2007)

Classification	Color Description	Swatch
Fire Quenching Materials	White on Red	X
Toxic and Corrosive Fluids	Black on Orange	X
Flammable Fluids	Black on Yellow	X
Combustible Fluids	White on Brown	X
Potable, Cooling, Boiler Feed, and Other Water	White on Green	X
Compressed Air	White on Blue	X
To be defined by the user	White on Purple	X
To be defined by the user	Black on White	X
To be defined by the user	White on Grey	X
To be defined by the user	White on Black	X

APPENDIX 4.1.B – EQUIPMENT TAGS

2.01 Nameplates
For Mechanical Equipment

SUBMITTAL SHEET # 1
▶ TECHNICAL DATA

MARKING SERVICES, INC.

800.234.0135 414.973.1331 Fax/800.627.6432 www.markserv.com

ENGRAVED PLASTIC EQUIPMENT NAMPLATES AND WARNING SIGNS

DESCRIPTION

Equipment nameplates and Warning Signs are engraved on two (2-ply) or three (3-ply) layers of permanently bonded ABS/acrylic plastic. Thickness of material is either 1/16 inch or 1/8 inch, and engraved information clearly shows against background color.

PHYSICAL & CHEMICAL CHARACTERISTICS

Standard Material: 2-ply (two laminated layers of engraving plastic)
Optional Material: 3-ply (three laminated layers of engraving plastic)
Standard Thickness: 1/16"(1,6mm)
Optional Thickness: 1/8" (3,2mm)
Service Temperature: -20°F through 175°F (-28°C through 79°C)
Standard Colors:
- ☒ BLACK (WHITE text)
- ☐ GREEN (WHITE text)
- ☐ RED (WHITE text)
- ☐ BLUE (WHITE text)
- ☐ BROWN (WHITE text)
- ☐ WHITE (BLACK text)
- ☐ YELLOW (BLACK text)

Mounting: Adhesive backing and/or holes: Ø3/16" (Ø4,8 mm) default diameter

Finish: Matte finish with beveled edges

Text Height: Sized to fit within tag boundary or comply with specified height

Typical sizes (H x W):
- ☐ 3/4 x 2-1/2" (19 x 64 mm)
- ☐ 1 x 2-1/2" (25 x 64 mm)
- ☐ 1 x 3" (25 x 76 mm)
- ☐ 1-1/2 x 4" (38 x 102 mm)
- ☐ 2 x 4" (51 x 102 mm)
- ☐ 2 x 6" (51 x 152 mm)
- ☐ 2 x 8" (51 x 203 mm)
- ☐ 4 x 6" (102 x 152 mm)
- ☒ Other (specify: height x width)

Plastic conforms to: ASTM D709

Created on 6/21/2010

APPENDIX 4.1.C – VALVE TAGS

2.02 Tags

1-1/2" Diameter Brass Valve Tags

▶ TECHNICAL DATA

MARKING SERVICES, INC.

800.234.0135 414.973.1331 Fax/800.627.6432 www.markserv.com

BRASS VALVE TAGS

DESCRIPTION

Use brass valve tags to tag valves, instruments, small piping, cables or fugitive emission locations. Solid brass "S" hooks, #16 brass jack chain, #6 solid brass bead chain, nylon ties, lead meter seals or zinc snap hooks are available to attach valve tags. Each is a tough, sturdy, and corrosion resistant fastener.

*Stamped and black-filled
*Packaged in sets of 25 consecutive numbers
*Custom sizes, shapes and gauges available by special order

PHYSICAL PROPERTIES

Standard Material:	Brass
Standard Thickness:	20 gauge (0.032" thick (0.812 mm))
Optional Thickness:	Available on request
Standard Colors:	☒ BRASS (BLACK text)
Non-standard Colors:	Additional text colors available on request
Mounting:	Ø3/16" (Ø4,8mm) default diameter
Finish:	Matte finish
Text Height:	1/4" service indicator on the top line & 1/2" #'s on bottom line
Available Characters:	1/8" Text , # / \ " - . ' ° ( ) A thru Z - all upper case & 0 thru 9
	1/4" Text , # / \ " - . ' & ° A thru Z - all upper case & 0 thru 9
Typical sizes (H x W):	☒ 1.5" (38 mm) diameter ☐ 1.5" x 1.5" (38 mm x 38 mm)
	☐ 2" (51 mm) diameter ☐ 2" x 2" (51 mm x 51 mm)
	☐ 1 x 3" (25 mm x 76 mm) ☐ Other (specify: height x width)

The Maximum # of characters per line

Tag Size	Max # 1/4" char	Max No Lines
1.5" rnd & sq w/ 3 - ½ #'s	5	1
2" rnd & sq w/ 3 - ½ #'s	1st line 5, 2nd 6	2
1.5" rd - characters only	1st line 4, 2nd 5, 3rd 4	3
1.5" sq - characters only	5	3
2" rd & sq- characters only	1st line 6, 2nd 7, 3rd 6	3

Tag Size	Max # 1/8" char	Max No Lines
1.5" rnd & sq w/ 3 - ½ #'s	8	2
2" rnd & sq w/ 3 - ½ #'s	8	3
1.5" rd & sq- characters only	8	3
2" rd & sq - characters only	10	3

Created on 6/23/2010

2.02 Tags -
Fasteners for Valve Tags.

SUBMITTAL SHEET # 3

▶ TECHNICAL DATA

MARKING SERVICES, INC.

800.234.0135 414.973.1331 Fax/800.627.6432 www.markserv.com

BRASS BEAD CHAIN

DESCRIPTION

Our #6 Solid Brass Bead Chain is supplied 100 pieces per box. It is a flexible solid brass chain and provided in 4.5" (114 mm) lengths with a locking link on the end of the chain. The diameter of the chain is 1/8" with a tensile strength of 30 Lbs and approximately 70 balls per foot.

This chain is ideal for use in non-caustic environments and can be linked together to accommodate large valves.

MSI Part Number: 15765

COPPER LEAD METER SEALS

DESCRIPTION

Marking Services, Inc. provides lead meter seals with four-ply wound copper wire for affixing tags in harsher plant environments, or when tags and attachment method may be subjected to excessive wear or potential damage. The braided wire is fed through holes in the lead seal and compressed with a tool for permanent attachment of tags

PHYSICAL PROPERTIES

Lead Seal Diameter:	0.437" (11.1 mm)
Length of wire:	10" (25.4 cm)
Gauge Wire:	# 27
Number of strands:	4

Sold in packs of 100.

MSI Part Number: 15795

APPENDIX 4.1.D – UNDERGROUND PIPE TAPE

2.03 Pipe Markers - Underground Tape.

SUBMITTAL SHEET # 10

▶ TECHNICAL DATA

MARKING SERVICES, INC.

800.234.0135 414.973.1331 Fax/800.527.6432 www.markserv.com

UNDERGROUND WARNING TAPE

NON-DETECTABLE UNDERGROUND WARNING

Marking Services Non-detectable warning tape consists of a nominal 4.0 mil overall thickness inert plastic film, formulated to resist degradation due to acid and alkalies found in soils.

DETECTABLE UNDERGROUND WARNING TAPE

Marking Services Detectable warning tape consists of a nominal 4.5mil overall thickness, with no less than 50 gauge (0.0005") solid aluminum foil core, formulated for extended use underground (resistant to acids, alkalis and other destructive agents normally encountered in the soil). The imprinted warning message is "buried" or "encased" to prevent ink deterioration. The imprint allows for total reflectivity.

PHYSICAL & CHEMICAL CHARACTERISTICS

NON-DETECTABLE UNDERGROUND TAPE TEST DATA:

Material Identification:	4 Mil Polyethylene, 3" or 6" wide
Test Procedure:	ASTM-D-88, Method A
Specimen Conditions:	73° F/ 50% R.H.
Test Temperature:	73° F
Elongation:	552%
Tensile Strength (Transverse):	2,100 psi
Tensile Strength (Longitudinal):	2,870 psi
Roll Weight (3" x 1000'):	6 lbs.

DETECTABLE UNDERGROUND TAPE TEST DATA:

PROPERTY	METHOD	VALUE
Thickness	ASTM D2103	4.5 mils
Elongation	ASTM D882-75B	> 90%
Tensile Strength	ASTM D882	MD: 5530 psi TD: 4544 psi

SIZES	RECOMMENDED BURIAL DEPTH
3" x 1000'	< 24"
6" x 1000'	> 24"

COLOR CODE

RED: Electric Power Lines, Cables, Conduit, and Lighting Cables
YELLOW: Gas, Oil, Steam, Petroleum or Gaseous Materials
ORANGE: Communication, Alarm or Signal Lines, Cables or Conduit
BLUE: Potable Water
GREEN: Sewers and Drain Lines
PURPLE: Reclaimed Water, Irrigation and Slurry Lines
PINK: Temporary Survey Marking
WHITE: Proposed Excavation

Meets APWA recommended color codes.

Example of sample text: "CAUTION BURIED WATER LINE BELOW " (or similar wording)