SECTION 02667
CHILLED WATER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY:

A. Section Includes:
   1. Chilled water systems.

B. Related Sections:
   1. Section 02200 - Earthwork
   2. Section 02221 - Trenching, Backfilling, Compacting.
   3. Section 02300 - Utility Tunnels.
   5. Division 15 - Mechanical: Chilled water systems inside building lines or directly buried chilled water systems.

1.2 SYSTEM DESCRIPTION:

A. Order of Preferred Installation:
   1. Utility tunnel
   2. Shallow trench
   3. Direct burial

B. Coordinate installation method with University of Colorado at Boulder Utilities Engineer.

1.3 QUALITY ASSURANCE:

A. General: Comply with requirement of Sections 15010, 15050, and 15531.

B. Permits: Obtain tap permit from the University of Colorado at Boulder Utility Engineer.

C. Materials and workmanship shall conform to the latest issue of all industry standards, publications, or regulations referenced in this section and with the following references as applicable. Materials shall be new and free from defects.

D. Conform to ASME B31-9 – Building Services Piping.

E. Conform to ASME A13.1 – Scheme for identification of Piping Systems.

1.4 SUBMITTALS

A. Shop Drawings: Indicate piping system schematic and connection requirements, including trapeze hangers.
B. Product Data: Provide manufacturers catalog literature with capacity, weight and characteristics and connection requirements.

C. Manufacturer’s Installation Instructions: Indicate hoisting and setting requirements, starting procedures, special procedures, assembly and installation of components.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Comply with requirements of Sections 15150 and 15531.

B. Store products in accordance with manufacturer’s instructions, with seals and labels intact and legible.

C. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged, and are maintained under required conditions.

2.2 IDENTIFICATION:

A. Underground Type Plastic Line Marker:

1. Manufacturer’s standard permanent, continuos-printed plastic tape with metallic core, intended for direct-burial service; not less than 6” wide x 4 mills thick. Provide green tape with black printing reading “CAUTION CHILLED WATER LINE BURIED BELOW”.

2. Provide identification markers of one of the following:
   a. Allen Systems, Inc.
   b. Emed Co., Inc.
   c. Seton Name Plate Corp.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with the requirements of Sections 15050 and 15531.

B. Install in accordance with manufacturer’s instructions.

3.2 INSTALLTION OF IDENTIFICATION:

A. During backfilling and topsoiling of underground chilled water piping, install continuous underground plastic line markers, located at two (2) depths, 1’ above pipe and 1’ below grade.

B. Label piping system and components.
C. The chilled water system layout in tunnel shall be reviewed and approved by Owner’s Representative before the actual installation.

3.3 INSERTS:

A. Provide inserts for suspending hangers from reinforced concrete slabs.

3.4 PIPE HANGERS AND SUPPORTS:

A. Support horizontal piping as required; the following table lists spans and hanger rod sizes based on MSS SP-69 recommendations. If local codes or special design considerations necessitate shorter spans or larger rod sizes, they shall govern. Valves shown are based on standard weight piping filled with water; Contractor shall adjust requirements as necessary for other conditions (such as increase in loading caused by valves, fittings, or other conditions).

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Max. Support Spacing</th>
<th>Hanger Rod Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>½ to 1-¼ inch</td>
<td>7’-0”</td>
<td>3/8”</td>
</tr>
<tr>
<td>1-½ inch</td>
<td>9’-0”</td>
<td>3/8”</td>
</tr>
<tr>
<td>2 inch</td>
<td>10'-0”</td>
<td>3/8”</td>
</tr>
<tr>
<td>2-½ inch</td>
<td>11’ 0”</td>
<td>1/2”</td>
</tr>
<tr>
<td>3 inch</td>
<td>12'-0”</td>
<td>1/2”</td>
</tr>
</tbody>
</table>

B. Install hangers to provide minimum ½ inch space between finished covering and adjacent work.

C. Place a hanger within 12 inches of each horizontal elbow.

D. Use hangers with 1-½ inch minimum vertical adjustment.

E. Where several pipes can be installed in parallel at the same elevation, provide multiple or trapeze hangers.

F. Support riser piping independently of connected horizontal piping.

3.5 IDENTIFICATION PREPARATION:

A. Degrease and clean surfaces to receive adhesive for identification materials.

B. Prepare surfaces in accordance with Division 9 for stencil painting.

3.6 IDENTIFICATION INSTALLATION:

A. Plastic Pipe Markers: Install in accordance with manufacturer’s instructions.
B. Valves Identification:

1. Identify all valves, in main and branch piping located inside the tunnel. Use tags secured with brass “S” hooks or brass chains.

2. Stamp tags with a unique prefix to identify system to which applied, followed by a number (Example: CHS-1, CHS-2, etc.). In general, prefix shall match system abbreviations used on drawings where applicable. Numbering system shall be approved by Owner’s Representative.

3. Provide a typewritten list of valves including: valve identification number, location, function, normal position, service, and area served. Mount list as specified and directed. Include additional copy in operation and maintenance manuals.

C. Piping: Identify piping, concealed or exposed, with plastic pipe markers. Tags may be used on small diameter piping. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and “T”, at each side of penetration of structure or enclosure, and at each obstruction.

3.7 VALVE CHART AND SCHEDULE:

A. Provide valve chart and schedule in aluminum frame with clear plastic shield. Install at location as directed.

END OF SECTION 02667