SOURCES OF RESTRAINT
LENGTH CALCULATIONS

* EBAA IRON PROGRAM
  http://www.ebaa.com

* Ductile Iron Pipe Research Association (DIPRA)
  http://www.dipra.org
# Mechanical Joint Restraint Length Calculations

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe Materials</td>
<td>Refer to civil improvement plans.</td>
</tr>
<tr>
<td>Soil Type</td>
<td>If soil type is unknown (no geo-tech report), use SC (clayey sands, sand-clay mixtures) for EBAA Iron or sand silt for DIPRA. If soil type is known (with geo-tech report), use soil type called out in the report and submit report along with restraint calculations.</td>
</tr>
<tr>
<td>Safety Factor</td>
<td>1.5 to 1</td>
</tr>
<tr>
<td>Trench Type</td>
<td>5</td>
</tr>
<tr>
<td>Depth of Bury</td>
<td>Refer to depth of cover</td>
</tr>
<tr>
<td>Test Pressure</td>
<td>200 psi</td>
</tr>
</tbody>
</table>
NOTES:

* Restraint Calculations are required for pipes 12” in diameter and larger. Compute for all fittings (valves, tees, bends, dip sections, etc), unless otherwise required by the Utilities Department.

* Length of pipe to be restrained (from station to station) must be depicted on the plans.

* Calculations to be stamped by P.E.
Thrust Restraint Design for Ductile Iron Pipe

Type of Fitting: **Horizontal Bend**
- Angle of Bend: 45 deg.
- Diameter of Bend: 16 in.

**Laying Condition:** Type 5

**Soil Designation:** Sand Silt

**Depth of Cover:** 4.0 ft.

**Design Pressure:** 200 psi

**Safety Factor:** 1.5

**Fitting:** Horizontal Bend

**Unit Frictional Force:** 495 lbs/ft

**Unit Bearing Resistance:** 1,850 lbs/ft

**Required Restrained Length** for each side of bend:
- 21 ft (Bare)
- 23 ft (Polywrapped)

Press F1 for Context Sensitive Help