Connect all joints on concrete roadway pipe culverts.

Use Type 3 Connections on all culvert pipes, unless specified otherwise. Refer to Materials I M 445.01 for Connector requirements.

Minimum 2 threads showing at all threaded ends.

Connections not required on pipe sections installed by trenchless methods.

For belled concrete pipe joints, connectors may be installed on the inside of the pipe.

**TYPE 1**

One connector at the top of the pipe section.

**TYPE 2** (Sealed Joint)

Two connectors near the top of the pipe section. For details of reinforcement, refer to AASHTO M 170 for the class of pipe required. Refer to Materials I M 491.09 for seal requirements.

**TYPE 3** (Non-Sealed Joint)

Two connectors near the top of the pipe section. For details of reinforcement, refer to AASHTO M 170 for the class of pipe required.

1. If holes are field drilled, place a ribbon of butyl sealant around bolts before placing 3 in. x 3 in. x 3/4 in. plate on bolts through corrugated metal pipe and tightening nuts.

2. 1/2 inch round x 5/8 inch thick washer or 3 in. x 3 in. x 1 in. square plate (shaped to pipe radius).

3. Connectors with One Bend End and Bell End spacers allowed per Materials I M 451. Refer to Optional Bolts detail.


**Possible Tabulations:**

<table>
<thead>
<tr>
<th>PIPE SIZE (IN.)</th>
<th>CONNECTOR SIZE (IN.)</th>
<th>HOLE FOR CONNECTOR (IN.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 to 27</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>30 to 60</td>
<td>1/2</td>
<td>1/2</td>
</tr>
<tr>
<td>56 to 132</td>
<td>1.0</td>
<td>1 1/2</td>
</tr>
</tbody>
</table>

**TYPICAL SECTION**

(Non-Sealed Joint)

**TYPICAL INSTALLATION**

**Type 1 Connection**

Pipe joint wrapping:

- Lock washer to leave 2 draw when installed.

Connectors with One Bend End and Bell End spacers allowed per Materials I M 451. Refer to Optional Bolts detail.

Possible Tabulations:

104-3
104-5B
NEW CONSTRUCTION - TYPE 2 or 3 CONNECTION

TYPICAL INSTALLATION

STORM SEWER OUTLET - TYPE 2 OR TYPE 3 CONNECTION

1. Double line reinforcing, as specified
2. Single line reinforcing, as specified
3. Hole for connector
4. Intake or Manhole
5. Type 2 or 3 Connections

SEAL JOINT
TYPE 2 CONNECTION

1. Place approved sealer as directed before connector is installed
2. Sealer shall fill the joint.
3. Trim off inside after connector is installed

TYPICAL INSTALLATION
NEW CONSTRUCTION - TYPE 2 or 3 CONNECTION

1. Type 2 or 3 Connections in each joint (typ.)
2. Roadway

TYPICAL INSTALLATION
PIPE EXTENSION - TYPE 3 CONNECTION

1. Type 3 Connections
2. Intake or Manhole
3. Existing Pipe
4. New Pipe

TYPE 2 AND TYPE 3 CONNECTIONS

On culvert extensions, connect all new joints including the joint between the old and new culvert pipe. Holes may need to be drilled into existing pipes.