NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
PARTIAL JOINT PENETRATION JACK AND BORE
WELDING PROCEDURE SPECIFICATION (WPS) AWS D1.1

Specifications & Codes: NCDOT Standard Specifications/AWS D1.1, Sections 2 thru 6
Filler Metal Specification: AWS A5.1 Classification: E-7018
Manufacturer: NCDOT Approved Electrodes Single or Multiple Pass Position of Weld Flat, Horizontal, Vertical, Overhead
Welding Current: DC Polarity: Positive Progression: Vertical-up
Root Treatment: N/A
Preheat Temp: 100° minimum Interpass: 450° maximum Post Heat: N/A

<table>
<thead>
<tr>
<th>Pass Num.</th>
<th>Electrode Size</th>
<th>Welding Current Amperes</th>
<th>Welding Current Volts</th>
<th>Travel Speed</th>
<th>Position</th>
<th>Joint Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>1/8” 5/32”</td>
<td>90-150</td>
<td>20-23</td>
<td>6-9 ipm</td>
<td>All</td>
<td>SEE ATTACHMENTS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>120-200</td>
<td>21-24</td>
<td>6-10 ipm</td>
<td>All</td>
<td></td>
</tr>
</tbody>
</table>

**PREHEAT**

<table>
<thead>
<tr>
<th>Thickness</th>
<th>Min. Temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 3/4”</td>
<td>100°</td>
</tr>
<tr>
<td>Over 3/4” to 1 1/2”</td>
<td>100°</td>
</tr>
<tr>
<td>Over 1 1/2” to 2 1/2”</td>
<td>150°</td>
</tr>
<tr>
<td>Over 2 1/2”</td>
<td>225°</td>
</tr>
</tbody>
</table>

**COMMENTS:**
Remove all coating, rust, dirt and mill scale within one inch of the area to be welded. Remove all slag, spatter and weld discontinuities between passes. Clean the completed weld of all debris, slag and spatter.

**WPS Description**
PARTIAL JOINT PENETRATION Jack & Bore

Written By: Randy Dempsey, CWI/CWE, TT IV

Signature: Randy Dempsey

**WPS #:** 020612031

Authorized By: Steve Walton, Metals Engineer

Signature: Steve Walton

**Revision #:** 1

NCDOT MATERIALS & TESTS UNIT (STEEL SECTION)
PARTIAL JOINT PENETRATION

Jack & Bore SINGLE V GROOVE JOINT DETAILS

Weld Symbol definitions per AWS A2.4:2007
PARTIAL JOINT PENETRATION

Jack & Bore SINGLE BEVEL JOINT DETAILS

Weld Symbol definitions per AWS A2.4:2007
Illustrations for a partial joint penetration Jack & Bore.

Typical fit-up using a 45 degree Single Bevel.

Typical fit-up using a 60 degree Single V-groove.

Typical appearance after cleaning first pass.

Completed weld