

6. DRAWINGS: As soon as practicable after contract award and before fabrication or installation of materials, shop drawings shall be submitted for information in accordance with SPECIAL CLAUSES. Shop drawings must be submitted before start of work. Shop drawings shall include assembly instruction drawings showing plate erection sequence for staggered circumferential joints.

7. ASSEMBLY OF STRUCTURAL PLATES shall be in accordance with instructions furnished by the manufacturer. The instructions shall show the position of each plate and the order of assembly. Plate sections shall be connected with 3/4-inch galvanized bolts in two staggered rows of 4 bolts per linear foot of longitudinal seam and spaced not more than 12 inches in one row for each circumferential joint. Gasket tape shall be applied at all laps.

7.1 Joint Gasket Tape:

7.1.1 Preparation of Surfaces: Metal surfaces to receive joint gasket tape shall be clean and dry. All oil, grease, dirt, loose rust, loose mill scale, and other foreign substances shall be removed. The removal of oil or grease shall be accomplished in a manner that will not leave a greasy residue. Clean cloths and clean fluids shall be used as required.

7.1.2 Application: All bolted joints in the structural plate shall be sealed with joint gasket tape as indicated. Tape shall be placed on one plate with removable backing exposed. Tape shall not be stretched, and contours of the corrugations shall be followed in application of tape. Tape shall have butt joints at splices. As many thicknesses of tape as required to fill all voids shall be used at triple laps of the structural plates and at all other laps requiring additional gasket material to make waterproof joints. Tape shall be stored at ambient temperatures of less than 100 degrees Fahrenheit and shall be handled and stored in a manner which will not deform the tape as received from the manufacturer.

7.1.3 Bolt Holes in Gasketing Tape: Make bolt holes in the gasketing tape, after it has been placed in position and the liner paper has been removed but before the lapped adjacent plates are positioned. Bolt holes shall be punched in the tape with either a cold or heated spud wrench. Sharpening the end of the spud wrench or heating the wrench to a maximum temperature of 275 degrees Fahrenheit will facilitate punching the holes and minimize the possibility of distorting the tape in the critical areas around the bolts. Trimming the bolt holes with a knife will not be allowed.

7.2 Erection: Arch shape shall be maintained during erection before backfilling as per manufacturers requirements and in accordance with AASHTO Standard Specification for Highway Bridges. To assure proper alignment, arches shall be initially assembled with a minimum number of bolts, all of which shall be placed near the middle of plate edges. After the arch is closed and initial assembly is complete, the remaining bolts shall be installed, moving from the middle of the edges to the corners of the sheets. Placing of all bolts may follow about three rings or segments

behind assembly operations. Nuts shall be placed on bolts and finger tightened. Bolts shall be placed so that heads are outside the structure and all nuts are inside. Any necessary cambering of the structure shall be finished and sealant shall be placed before final tightening of any bolts begins.

7.3 Sealant shall be placed as recommended by the manufacturer in all exterior lapped joints and under all bolt heads, as indicated.

7.4 Bolting: After sealant has been applied, the tightening of nuts shall be started. Uniform pressure shall be maintained along all bolt lines as the tightening of the nuts progresses. The nuts shall be tightened to a final torque of 150-200 foot-pounds or as otherwise specified by manufacturer. Tightening shall commence at the middle of the edges of sheets and progress outward in opposite directions to the corners of sheets. Bolts on both sides of the structure shall be tightened in the same stages to avoid "walking" toward the loose side and rifling or twisting of the barrel. If impact wrenches are used, frequent checks shall be made with a torque wrench to insure proper tightness. After all nuts are tight, the tightness of one out of every 20 bolts shall be tested with a torque wrench in the presence of the Contracting Officer. If 25 percent of the bolts tested are found to not be tightened to the specified torque, then all bolts shall be retightened.