

## **ITEM 602.9002nm02 - LINING WITH CORRUGATED METAL ARCH (METRIC)**

### **DESCRIPTION**

Under this item the contractor shall furnish, assemble, install and grout in place a corrugated metal arch as a lining for an existing culvert in accordance with this specification and the contract documents. All pertinent provisions of Section 602 shall apply except as indicated in this specification.

### **MATERIALS**

Materials shall meet the following specifications:

Portland Cement	701-01, 701-03
Mortar/Grout Sand	703-03, 703-04
Corrugated Structural Steel Plate for Pipe, Pipe Arches and Underpasses	707-09
Corrugated Aluminum Structural Plate for Pipe and Pipe Arches	707-14
Anchor Bolts for Corrugated Culverts	707-20
Zinc Chromatic Primer	708-04
Water	712-01

### **CONSTRUCTION DETAILS**

#### **Liner Installation:**

The contractor shall provide the Engineer with written details of how the work is to be progressed a minimum of ten (10) days prior to starting. Include pipe manufacturer's assembly instructions, grout design and grouting procedure, dewatering details, erection drawings, installation and bracing methods (performed by a NYS Licensed Professional Engineer) and a Level 1 Load Rating Analysis (performed by a NYS Licensed Professional Engineer) certifying the Inventory and Operating Load Rating greater than or equal to that required by a MS-23 Load Rating. All drawings shall be submitted in accordance with Subsections 202.3, 202.5, and 202.10 of the New York State Steel Construction Manual and shall be in SI units. Should the Engineer not approve the Contractor's submission, the Contractor shall be required to resubmit the drawings with appropriate changes or corrections. This resubmission shall not entitle the Contractor to an extension of time, as allowed by Subsection 108-4 of the Standard Specifications. The Engineer will review these submittals in accordance with Subsection 105-16 of the Standard Specifications.

The Contractor shall also be responsible for dewatering, cleaning and inspecting the existing structure, determining the location of and removing obstructions that may prevent proper installation of the liner, removal of deteriorated concrete (as determined by the Engineer), and providing strutting and bracing as required to insure the stability of the existing and proposed culvert.

All elements of the structure shall be handled and assembled in accordance with Subsection 603-3.02B, E (excluding geotextile), G, and the manufacturer's instructions, except as modified herein, on the plans, or by the Engineer in writing.

The Contractor shall maintain the shape of the structure during all stages of assembly and grout fill operation. The Contractor shall be responsible for any bracing necessary to maintain the required line and grade during backfilling the annular space. The requirements of Subsection

## **ITEM 602.9002nn02 - LINING WITH CORRUGATED METAL ARCH (METRIC)**

603-3.05, Field Strutting of Corrugated and Structural Plate Pipe shall apply. In order to prevent distortion and maintain structure shape within specified limits, the following methods or combinations of methods may be used:

1. Field strutting and shoring
2. Sequencing of grouting

The Contractor and Engineer shall meet with the manufacturer's representative prior to assembly of the corrugated arch shell and prior to grout placement.

The entire annular space shall be filled with grout. Provide a minimum annular space of 75 mm for grout material between the new and existing structures, and details on how to hold the liner to line and grade until the fill material has set. To facilitate the grouting of the annular space, external grout tubes and/or grout holes and fittings in the arch shall be used. Plugs shall be inserted into a grout fitting after the grouting operation is complete at that location. Grout fittings shall be compatible with the plugs and grout delivering equipment. If the actual fill material used is less than the anticipated (calculated) fill or an inspection of the relined structure indicates that there are voids in the annular space, the Contractor must provide the EIC with a plan to correct voids found. The voids must be filled to the satisfaction of the Engineer at no additional cost to the State.

If an aluminum arch is used, thoroughly coat the exterior, and any surfaces in contact with cementitious materials, with zinc chromatic primer. Repairs of damaged zinc chromatic coatings shall be made in accordance with written procedures of the Materials Bureau.

The requirements of Subsection 603-3.04A, Damaged Pipe and Repair – General, of the Standard Specifications shall apply.

The contractor may submit an alternate size liner than that called for in the plans for approval by the Regional Structures Engineer. The alternate liner must:

1. Fit into the opening and maintain hydraulic capacity.
2. Be designed to sufficient strength for soil and traffic loading (MS23).

### **METHOD OF MEASUREMENT**

Corrugated structural arch shell shall be measured in meters along the centerline of the structure as designated on the plans and specifications or where directed by the Engineer in writing.

### **BASIS OF PAYMENT**

The unit bid per meter shall include the cost of furnishing all labor, materials, and equipment necessary to remove deteriorated concrete (as determined by the Engineer) and to manufacture and install the corrugated arch including: cleaning, inspecting, strutting, bracing, installing grout holes, plugs, fittings, grouting and damaged liner repairs. The price bid shall also include the cost of supplying the manufacture's representative on site during construction.

**NOTE:** ITEM 602.9002nn 02 – nn denotes serialized pay item.