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I. **SCOPE**

This Method describes procedures for the Department’s Quality Assurance program for the following items:

1. Corrugated Steel Pipe (707-02)
2. Corrugated Structural Steel Plate For Pipe, Pipe Arches And Underpasses (707-09)
3. Galvanized Steel End Sections (707-10)
4. Aluminum End Sections (707-11)
5. Corrugated Aluminum Pipe (707-13)
6. Corrugated Aluminum Structural Plate For Pipe & Pipe Arches (707-14)

This Method encompasses a quality assurance program whereby material is accepted by certification and inspection at the project site.

This Method supersedes all previous instructions issued for the above listed materials.

II. **DEFINITIONS**

1. **Supplier** - A fabricating company engaged in the production of corrugated metal pipe products from metal sheeting material. Also a division thereof that sells, delivers, and certifies corrugated metal pipe products to buyers. To qualify as a supplier the division, must also be engaged in performing additional work to complete the manufacture of the pipe and/or pipe accessories.

2. **Sheet Manufacturer** - A company engaged in the production of the metal sheeting material.

3. **Department** - The New York State Department of Transportation.

4. **Region or Regional Office** - One of eleven geographical subdivisions of the State used to designate or identify their location of the proposed work.

5. **Regional Director** - The Director, acting through the Commissioner, who is delegated the authority and responsibility to execute the total Department prescribed work plans for his respective region.
6. **Materials Bureau** - A Bureau within the Department which may be contacted by using the address and/or phone number as follows:

   **New York State Department of Transportation**  
   **Director, Materials Bureau**  
   **50 Wolf Road, Pod 3-4**  
   **Albany, New York 12232**  
   **(518) 457-3240**

7. **Project Inspector** - The Department of Transportation representative detailed to supervise or inspect methods and materials relating to work both on and off the site of the contract.

8. **Regional Materials Inspector** - An individual from the Regional Materials Section assigned to function on inspection assignments at the project.

9. **Domestic Steel** - All steel manufacturing processes must be performed in the United States and its possessions or territories. The ore, scrap, and pig iron may be foreign or domestic; however, transformation into steel and all subsequent processes and fabrication must be performed in the United States and its possessions or territories.

10. **Annual Certification** - An official document, prepared by the sheet or plate manufacturer and forwarded to the Materials Bureau by the Supplier. Include the following minimum information in this document:

    a) The Sheet Manufacturer's name and address.
    b) The date of execution.
    c) The material supplied and the AASHTO and/or ASTM designation to which it complies as specified in the Standard Specifications.
    d) The chemical composition of the metal.
    e) The type of any metallic and/or polymer coatings.
    f) A definite statement included for items containing steel certifying the domesticity in accordance with the previous definition, as required.
    g) The signature of an official or officer of the Sheet Manufacturer having legal authority to bind the company.
    h) A statement by the Supplier assuring that the base metal material to be supplied that year is represented by this certification. Should the base metal supply change during the year, the Supplier will notify the Materials Bureau and an updated certification will be required.
11. **Certification for Corrugated Pipe Items** - An official document, prepared by the Supplier, which accompanies each individual shipment to a Department project location. Include the following information in this document:

   a) The Supplier’s name and location. If applicable the Polymer Coating Brand Name and Polymer Coating Applicator’s name and location.
   b) The content of the shipment, project destination, and date the shipment was made. The content of the shipment will include the diameter, gauge and length of pipe; and gauge, number and type of piece for plate.
   c) A definite statement included for items containing steel certifying the domesticity in accordance with the previous definition, as required.
   d) A definite statement that the material in the shipment conforms to the Department’s specification requirements.
   e) The certification will be signed by a representative of the Supplier having the authority to legally bind the company. It is not necessary that such signature be notarized. A sample form is included for the Supplier’s information, see page 17. This form may be duplicated by the Supplier for use or they may use their own form provided it contains all the same information.

III. **GENERAL METHOD**

The products described in the SCOPE section of this Method will be accepted under Department Specifications when the Supplier of each product has filed with the Department’s Materials Bureau an acceptable annual certification executed by the Sheet or Plate Manufacturer of each brand of metal to be supplied.

Execute Annual Certification in conformance with the applicable procedures referenced herein and the Standard Specifications for each item.

The Annual Certification is accepted by the Materials Bureau before or after the fabrication, but prior to the item’s installation and will be filed between January 1st and February 15th of each year.

A letter from the Director, Materials Bureau indicating addition to the Department’s Approved List will be considered part of the evidence of acceptability until the Approved List can be updated. The Approved List can be found @ [http://www.dot.ny.gov](http://www.dot.ny.gov) under Business Center /Publications & Guidance/ Construction/Approved Lists.

At the time of a Supplier’s delivery to a Department project location, each individual shipment must be accompanied by a Certification for Corrugated Pipe Items.
It is the Supplier’s responsibility to maintain on file, all copies of Certification for Corrugated Pipe Items and test results for a minimum period of seven years and be made available to the Department upon request.

Receipt of a properly executed Certification for Corrugated Pipe Items with each individual shipment will constitute evidence of acceptability of that shipment at the project site. In addition, the shipment will be inspected at the project site.

The Department maintains a program of random monitoring which may include sampling at fabricating shop locations to assure conformance with procedures and specifications.

Inspections of pipe and/or plate will be made at the project site as described in the Inspection of Pipe or Plate section of this Materials Method.

Reject any pipe and/or plate measured along with all other pipes and plates it represents that doesn’t meet specified dimensions. The Region Materials Inspector will notify the Materials Bureau of any rejections. This may be cause for removal of the Supplier from the Department’s Approved List.

IV. ACCEPTANCE PROCEDURE

<table>
<thead>
<tr>
<th>Responsibility</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplier</td>
<td>Annual Certification documents are sent to the Materials Bureau between January 1st and February 15th of each year.</td>
</tr>
<tr>
<td>Materials Bureau</td>
<td>Maintains Approved List of Suppliers, Applicators and Polymer film that have complied with the specific requirements, which can be found @ <a href="http://www.dot.ny.gov">http://www.dot.ny.gov</a> under Business Center/Publications &amp; Guidance/ Construction/Approved Lists.</td>
</tr>
<tr>
<td>Supplier</td>
<td>Delivers fabricated material to Department project sites, each delivery being accompanied by a Certification for Corrugated Pipe Items.</td>
</tr>
</tbody>
</table>
**Project Inspector**
Check the Certification for Corrugated Pipe Items; Insure that the Supplier’s name appears on the Approved List; When polymer coated corrugated steel pipe is used, the brand of polymer film and applicator will be checked to insure they appear on the Approved List; Inspects material for compliance with specifications (see Section VI). Material not conforming to specifications must be rejected; Informs Regional Materials.

**Regional Materials Inspector**
Inspect material for compliance with specifications (see Section VI); Reject material not conforming to specifications.

**Supplier or Contractor**
Make repairs (if allowed) following the repair procedures (see Section VI).

**Project Inspector**
Check replacement or repairs. If repairs are not acceptable the material will be rejected and replaced. Inform Region Materials.

**Regional Materials Inspector**
Inform Materials Bureau Product Operations Section of the rejections.
CRITERIA FOR INSPECTING STEEL AND ALUMINUM CORRUGATED PIPE AND STRUCTURAL PLATE

The Project Inspector should conduct a limited inspection as the corrugated pipe sections or structural plates are unloaded at the project site or anytime up to the installation of the pipe. The Project Inspector will conduct a detailed examination of every section of pipe or structural plate made accessible by the contractor. The criteria given in this method will be used by the Project to judge the acceptability of the pipe or plate.

The criteria for inspecting corrugated pipe and structural plate contains a description of possible damage and defects that are repairable. Correct the repairable defects according to the procedures described in this Materials Method.

**Corrugated Pipe and Plate**

**Riveted Pipe** - Riveted pipe should not exhibit uneven deviation from true shape. Do not allow uneven laps and ragged edges. Loose, unevenly aligned or spaced rivets and poorly formed rivet heads are cause for rejection of the pipe. Drive all rivets cold so that the plates are drawn together throughout the entire lap. The center of no rivet will be closer than twice its shank diameter from the edge of the metal. Rivet longitudinal seams with at least one rivet in the valley of each corrugation.

**Lock Seams** - Lock seams will exhibit no cracks or repair welds, except a one inch maximum length repair weld at re-rolled end only. Allow tight contact for lapped surfaces. Do not allow any loosely formed or open seams. Any of the previous defects are cause for rejection of that section of pipe.

**Welded Seams** - Sections of pipe that show indication of cracks, skips or deficient welds will be cause for rejection by the Inspector.

**Circular Perforations** - Perforations should be approximately circular and cleanly cut and arranged in rows parallel to the axis of the pipe. Locate the perforations on the inside crests or along the neutral axis of the corrugations. Arrange the rows-of-perforation in two equal groups placed symmetrically on either side of a lower unperforated segment corresponding to the flow line of the pipe. The spacing of the rows will be uniform. The minimum distance between the centerlines of rows is one inch.

**Metallic Coating** - The Project Inspector examines zinc, aluminum or aluminum-zinc coated steel for defects. Steel coated in accordance with AASHTO specifications should be free of the defects listed as follows:
1. **Bare Spots** - Defective areas on the pipe or plate resulting from a lack of adherence by the coating and are recognized by the appearance of red rust resulting from corrosion of the uncoated steel.

2. **Pimples** - Defective areas on the pipe or plate caused by inclusions of dross (zinc-iron alloy) particles in the zinc coating and are recognized by a swelled bump in the galvanizing.

3. **Wet Storage Stains** - Defective areas on the pipe or plate due to closely stacked freshly coated articles which become damp during storage. The stains are recognized by the appearance of white rust, a white deposit on the coating.

The Contractor must repair any damaged coating when directed by the Engineer. Field repair is allowed only when the total damaged area on each piece is less than 2 square feet of the coated surface. Any piece with a total damaged area greater than the amount specified above, will be rejected and immediately removed from the worksite. Any rejected piece will be replaced by the Contractor at no cost to the State. The coating will be repaired by the following method:

- The damaged area must be cleaned by wire brushing to remove all defective coating and repaired with one brush coat or two spray coats of zinc repair material. The brand of repair material used must be one which appears on the Department’s Approved List.

**Polymer Coating** - Project Inspector examines polymer coated steel lot defects. Steel coated with polymer in accordance with AASHTO specifications that are free of the defects listed as follows:

1. **Delaminations** - The defective areas on a pipe resulting from a lack of adherence by the polymer coating. These areas are recognized by the separation of the polymer coating from the steel. These areas must not be repaired and the pipe must be rejected.

2. **Nicks and Scrapes** – The defective areas on the pipe resulting from shipping and handling of the pipe. These areas are recognized by the appearance of the underlying steel. When directed by the Engineer, the Contractor must repair any damaged coating. Field repair is allowed only when the total damaged area on each piece is less than 2 square feet of the coated surface. Any piece with a total damaged area greater than the amount specified above must be rejected and immediately removed from the worksite. Any rejected piece must be replaced by the Contractor at no cost to the State. The coating must be repaired by the following method:

- The damaged area must be cleaned by wire brushing to remove all defective coating and repaired with two brush coats of polymer repair material. The brand of repair material used must be one which appears on the Department’s Approved List.
Additional Defects - In addition to coating damage, the following defects will be cause for rejecting the pipe when inspected at the project:

1. The difference in diameter of the abutting pipe ends must not be more than 2 inch (See Sketch 1, page 16).
2. Sharp bends in pipe arch that are less than the specified minimum corner radius for that size (See Sketch 2, page 16).
3. The variation in the straight centerline will not exceed 1 inch in 20 feet (See Sketch 3, page 16).
4. Other defects are listed in the Section on “Workmanship” of AASHTO Standard Specification M36 Corrugated Steel Pipe, Metallic Coated, for Sewers and Drains and M245 Corrugated Steel Pipe Polymer Pre-coated for Sewers and Drains.

BITUMINOUS COATED ROUND CORRUGATED PIPE

The Project Inspector measures the thickness of the bituminous paving over the crest of the pipe corrugations. The Department uses four types of bituminous paved pipe:

1. Fully Bituminous Coated and Paved Invert
2. Fully Bituminous Coated and 100 Percent Paved
3. Polymer Coated, with a Bituminous Paved Invert
4. Polymer Coated, 100 Percent Bituminous Paved

Measure one pipe out of ten or less pipes of similar diameter and type of bituminous paving for thickness. An average thickness is determined by measuring the thickness of the interior asphalt paving over all successive corrugation crests between seams of the pipe and dividing by the number of measurements taken. A nail or other similar sharp probe is used to measure the paving depth. The minimum average thickness for all types is 0.06 inch.

The Project Inspector examines all pipe for consistency of bituminous paving. The paving should be smooth with no corrugations visible. If corrugations appear, the Project Inspector measures the pipe coating in those areas using the aforementioned procedure.

OTHER CORRUGATED METAL PIPE

Other corrugated metal pipe (for example Portland cement concrete lined corrugated steel pipe) will be accepted as directed by the Director, Materials Bureau.
CORRUGATED DEPTH OF METAL PIPE AND STRUCTURAL PLATE

The Region Materials Inspector will measure the depth of corrugations of the pipe and structural plate. One pipe out of sixty or less pipes of similar corrugation pattern will be measured. An average corrugation depth will be determined by measuring all successive corrugations (excluding re-rolled ends) between lockseams of the pipe using the Department’s depth gauge and dividing by the number of measurements taken. Each measurement will be the vertical distance from the base of the depth gauge resting on the corrugation crests to the bottom of the intervening valley. The minimum averages will be as follows:

<table>
<thead>
<tr>
<th>Corrugation Type</th>
<th>Nominal Inside Diameter (inches)</th>
<th>Corrugation Pattern (inches)</th>
<th>Nominal Depth (inches)</th>
<th>Minimal Depth (inches)</th>
<th>Steel Pipe</th>
<th>Aluminum Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helical</td>
<td>4 to 18</td>
<td>1 ½ x ¼</td>
<td>0.25</td>
<td>0.24</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Helical</td>
<td>12 to 21</td>
<td>2 x ⅛</td>
<td>0.44</td>
<td>0.42</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Helical</td>
<td>12 to 21</td>
<td>2 ⅔ x ⅛</td>
<td>0.44</td>
<td>0.42</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Helical</td>
<td>12 to 84</td>
<td>2 ⅞ x ⅛</td>
<td>0.50</td>
<td>0.48</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Helical</td>
<td>36 to 120</td>
<td>3 x 1</td>
<td>1.00</td>
<td>0.95</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Helical</td>
<td>36 to 120</td>
<td>5 x 1</td>
<td>1.00</td>
<td>0.95</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

| Annular          | 4 to 18                           | 1 ½ x ¼                     | 0.25                   | 0.24                   | X          | X             |
| Annular          | 12 to 84                          | 2 ⅞ x ⅛                    | 0.50                   | 0.48                   | X          | X             |
| Annular          | 30 to 120                         | 3 x 1                       | 1.00                   | 0.95                   | X          | X             |
| Annular          | 36 to 120                         | 5 x 1                       | 1.00                   | 0.95                   | X          | X             |

One out of twenty or less structural plates of similar corrugation pattern will be examined. An average corrugation depth will be determined by measuring all corrugations on the plate and dividing by the number of measurements taken. Each measurement will be the vertical distance from a straight edge resting on the corrugation crests of the plate, to the bottom of the intervening valley. The minimum average will be as follows:

<table>
<thead>
<tr>
<th>Structural Plate Type</th>
<th>Corrugation Pattern (inches)</th>
<th>Nominal Depth (inches)</th>
<th>Minimum Depth (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>6 x 2</td>
<td>2 ½</td>
<td>2 ¼</td>
</tr>
<tr>
<td>Aluminum</td>
<td>9 x 2</td>
<td>2</td>
<td>1 ⅞ ⅟₀</td>
</tr>
</tbody>
</table>

NOTE: All measurements will be recorded on the BR355 Form. A copy of this form will be maintained in the project records.
V. INSPECTION OF PIPE OR PLATE

THICKNESS MEASUREMENT

Corrugated Metal Pipe — A pipe is defined as a 20 foot length. The Regional Materials Inspector will choose one pipe out of ten or less pipes of equal diameter and gauge to measure metal thickness. Three measurements will be made around the perimeter of the pipe at 120 degree intervals using a micrometer. These measurements will be made on the tangent (flat spot) of the corrugation in circumferentially (annular) corrugated pipe. In helically corrugated pipe, the measurements will be made on the tangent of the re-rolled corrugations. The average of these measurements will represent the total pipe thickness. Measurements should be made away from lock seams. If the pipe is bituminous coated, the coating will be scraped and cleaned until the underlying metal is exposed. The pipe will then be measured for metal thickness.

If the pipe is polymer coated, the Regional Materials Inspector will then make three measurements on the inside and outside of the pipe using the digital coating thickness gauge (DCTG). These measurements will be done at the same location around the perimeter as the total pipe thickness measurements, and at least one foot from the end of the pipe. Because the re-rolling procedure may compress the polymer coating and result in a non-representative reading, the polymer thickness is determined from the interior measurement. Measurements will include any type metallic coating thickness, a polymer exterior coating (nominal 0.003 in. thick, minimum 0.0025 in. thick) and an interior polymer coating (nominal 0.010 in. thick, minimum 0.009 in. thick).

From the above measurements the Regional Materials Inspector can determine if the pipe meets specifications.
EXAMPLE:
The Thickness measurements of a 14 gauge polymer coated corrugated steel pipe were taken and found to be: 0.010 inch nominal thickness of polymer coating on the inside of pipe, 0.003 inch nominal thickness coating on the outside.

The Perimeter measurements were taken as follows:
Polymer + Steel + zinc coating = 0.095” average micrometer measurement
Interior Polymer + zinc coating = 0.0100” average DCTG measurement
Exterior Polymer + zinc coating = 0.003” average DCTG measurement

The metallic coated steel thickness calculations were as follows:
0.095” - 0.010” - 0.0035” + 0.003” (zinc thickness both sides) = 0.0845”
Since 0.0845” is greater than 0.072” (see TABLE 1), then this example meets specification.
EXAMPLE

Measurements were taken one foot from the edge:
Polymer + zinc coating = 0.0110” average DCTG measurement
Minimum polymer coating thickness 0.0110” - 0.0015”* = 0.0095”
Specified minimum polymer coating thickness = 0.009”
Since 0.0095” is greater than 0.009”, coating meets thickness requirement.

*Zinc coating thickness assumed to be 0.0015 in./side

Coupling Bands - The Region Materials Inspector will examine coupling bands for thickness. One band out of ten or less bands of similar diameter and gauge will be examined. Three measurements will be made around the perimeter of the band with a micrometer. From these measurements the Inspector can determine the average band thickness. In all cases the sample band will not be more than two normal gauge thicknesses thinner than the thickness of the pipe to which it is to be connected. In no case will the band be thinner than the following:

<table>
<thead>
<tr>
<th>Band Type</th>
<th>Nominal Thickness (inches)</th>
<th>Minimum Thickness (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Galvanized</td>
<td>0.052</td>
<td>0.046</td>
</tr>
<tr>
<td>Aluminum-Coated (Type 2)</td>
<td>0.052</td>
<td>0.046</td>
</tr>
<tr>
<td>Aluminum-Zinc</td>
<td>0.052</td>
<td>0.046</td>
</tr>
<tr>
<td>Aluminum</td>
<td>0.052</td>
<td>0.045</td>
</tr>
</tbody>
</table>

Structural Plate - The Regional Materials Inspector will also examine structural plate for thickness. One plate out of ten or less plates of similar gauge will be measured. The Inspector will make three random measurements on the tangent (flat spot) of the corrugations using a micrometer. From these measurements the Inspector can determine if the plate meets specifications.
EXAMPLE
Thickness Measurements of 8 gauge corrugated steel structural plate:
Random Measurements Taken:
Steel and zinc coating = 0.160” (average micrometer measurement)
Specified minimum thickness = 0.156” (see TABLE 2).
Since 0.160 in. is greater than 0.156”, steel meets thickness requirement.

NOTE: Record all measurements on the Form BR-355 and maintain the copies in the project records.

TABLE 1
MINIMUM THICKNESS FOR ROUND CORRUGATED STEEL PIPE AND CORRUGATED STEEL PIPE ARCHES

<table>
<thead>
<tr>
<th>Gauge</th>
<th>Nominal Thickness (inches)</th>
<th>Minimum Thickness (inches)</th>
<th>Zinc Coated Steel Pipe</th>
<th>Aluminum Coated Steel Pipe</th>
<th>Aluminum-Zinc Coated Steel Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>0.052</td>
<td>0.046</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>16</td>
<td>0.064</td>
<td>0.057</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>14</td>
<td>0.079</td>
<td>0.072</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>12</td>
<td>0.109</td>
<td>0.101</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>10</td>
<td>0.138</td>
<td>0.129</td>
<td>X</td>
<td>X</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>0.168</td>
<td>0.159</td>
<td>X</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

1. An “X” indicates thicknesses included in the applicable specification.
2. Includes metallic coating.
3. Weight of aluminum coating, total both sides, 1.0 oz/ft², approx. 0.0017 in. thickness/side
4. Weight of zinc coating, total both sides, 2.0 oz./ft², approx. 0.0015 in. thickness/side
5. Weight of aluminum-zinc coating, total both sides, 0.7 oz./ft², approx. 0.0009 in. thickness/side
### TABLE 2
MINIMUM THICKNESS OF ROUND CORRUGATED ALUMINUM PIPE AND CORRUGATED ALUMINUM PIPE ARCHES

<table>
<thead>
<tr>
<th>Gauge Number</th>
<th>Nominal Thickness (inches)</th>
<th>Minimum Thickness (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>0.048</td>
<td>0.045</td>
</tr>
<tr>
<td>16</td>
<td>0.060</td>
<td>0.052</td>
</tr>
<tr>
<td>14</td>
<td>0.075</td>
<td>0.072</td>
</tr>
<tr>
<td>12</td>
<td>0.105</td>
<td>0.101</td>
</tr>
<tr>
<td>10</td>
<td>0.135</td>
<td>0.130</td>
</tr>
<tr>
<td>8</td>
<td>0.167</td>
<td>0.158</td>
</tr>
</tbody>
</table>

### TABLE 3
MINIMUM THICKNESS FOR CORRUGATED STRUCTURAL STEEL PLATE

<table>
<thead>
<tr>
<th>Gauge Number</th>
<th>Nominal Thickness (inches)</th>
<th>Minimum Thickness (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>0.109</td>
<td>0.097</td>
</tr>
<tr>
<td>10</td>
<td>0.138</td>
<td>0.126</td>
</tr>
<tr>
<td>8</td>
<td>0.168</td>
<td>0.156</td>
</tr>
<tr>
<td>7</td>
<td>0.188</td>
<td>0.176</td>
</tr>
<tr>
<td>5</td>
<td>0.218</td>
<td>0.206</td>
</tr>
<tr>
<td>3</td>
<td>0.249</td>
<td>0.237</td>
</tr>
<tr>
<td>1</td>
<td>0.280</td>
<td>0.268</td>
</tr>
</tbody>
</table>

1. Includes zinc coating
2. 12 through 8 gauge, weight of zinc coating, total both sides 2.0 oz./ft²
3. 7 through 1 gauge, weight of zinc coating, total both sides 3.0 oz./ft²
TABLE 4
MINIMUM THICKNESS OF CORRUGATED ALUMINUM STRUCTURAL PLATE

<table>
<thead>
<tr>
<th>Nominal Thickness (inches)</th>
<th>Minimum Thickness (inches)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.100</td>
<td>0.094</td>
</tr>
<tr>
<td>0.125</td>
<td>0.118</td>
</tr>
<tr>
<td>0.150</td>
<td>0.142</td>
</tr>
<tr>
<td>0.175</td>
<td>0.165</td>
</tr>
<tr>
<td>0.200</td>
<td>0.190</td>
</tr>
<tr>
<td>0.225</td>
<td>0.215</td>
</tr>
<tr>
<td>0.250</td>
<td>0.240</td>
</tr>
</tbody>
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SKETCH ONE
Cross-Sectional View

SKETCH TWO
Pipe Arch

SKETCH THREE
Variation from a Straight Centerline Will Be No More Than 3/8" in Twenty Feet
CERTIFICATION FOR CORRUGATED PIPE ITEMS

Supplier’s Name: _______________________________________________________
Location: ______________________________________________________________
Department Contract Number: _____________________________________________
Contractor: ____________________________________________________________
Location: ______________________________________________________________
Carrier: _______________________________________________________________
Trailer Number: ___________ Order Number: ___________ Shipping Date: _________

<table>
<thead>
<tr>
<th>ITEM</th>
<th>QUANTITY</th>
<th>SIZE (DIAMETER AND LENGTH OR TYPE OF PIECE)</th>
<th>GAUGE</th>
</tr>
</thead>
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Polymer Coating Applicator: ________________ Location: _______________________
Polymer Coating Brand Name: ________________________
Asphalt Coating and /or Paved by: _____________________
Location: _________________________________________

I certify that the above shipment conforms to the New York State Department of Transportation Specifications. Steel items conform to the Domestic requirement defined in Materials Method No.: NY 12.

Signed: ______________________________
Title: ______________________________
Date: ______________________________
BR 355 (2/11)

New York State Department of Transportation
Materials Bureau
Thickness Measurements of Corrugated Metal Pipe

Region: ________________________
Date: _________________________
Inspector: ______________________

<table>
<thead>
<tr>
<th>DIAMETER (Inches)</th>
<th>ITEM NO.</th>
<th>GAUGE</th>
<th>TOTAL THICKNESS (inches)</th>
<th>EXTERIOR COATING THICKNESS (inches)</th>
<th>INTERIOR COATING THICKNESS (inches)</th>
<th>METAL THICKNESS (1' from edge)</th>
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<th>E PASS</th>
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<td>0.0035</td>
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<td>0.0110</td>
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<td><strong>AVG.</strong></td>
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<td>0.0035</td>
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<td><strong>NONE</strong></td>
<td><strong>NONE</strong></td>
<td><strong>-</strong></td>
<td><strong>P</strong></td>
</tr>
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*Z = assumed metallic coating thickness of 0.003 inches, total both sides.