
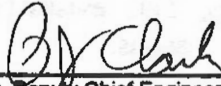


MODIFIED BY EI 96-016 EFFECTIVE 9/5/96 & EI 98-038 EFFECTIVE 7/22/99 <b>SUPERSEDED</b> BY EB 99-066 EFFECTIVE 11/4/99		New York State Department of Transportation <b>ENGINEERING          INSTRUCTION</b>	<b>EI</b> <b>95-051</b>
<b>Title: CORRUGATED METAL PIPE (CMP) SPECIFICATIONS</b>			
<b>Distribution:</b> <input checked="" type="checkbox"/> Main Office(30) <input checked="" type="checkbox"/> Consultants (34) <input type="checkbox"/> Local Gov.(31) <input checked="" type="checkbox"/> Contractors/AGC(39) <input checked="" type="checkbox"/> Regions(32) <input type="checkbox"/> _____ ( )	<b>Approved:</b>  P. J. Clark, Deputy Chief Engineer, Design Div.    12/15/95 _____ Date		

This Engineering Instruction (EI), along with EI 95-050, supersedes EI 93-011 and EI 87-22.

**EFFECTIVE DATE:**

The specifications transmitted by this Engineering Instruction (EI) are effective with the March 21, 1996 lettings. This EI may be deleted when:

- The specifications are incorporated into the 1990 and 1995 Standard Specifications,
- The Construction Considerations are incorporated into Materials Method 12, and
- The Design Considerations are incorporated into the Highway Design Manual.

**PURPOSE:**

This EI serves the following purposes:

1. Reorganizes the 1990 corrugated metal pipe (CMP) Standard Specifications to eliminate redundant specifications and more closely conform with AASHTO Part 1 Specifications.
2. Incorporates Type IR CMP into the 1990 Standard Specifications and Type IIR CMP into both 1990 and 1995 Standard Specifications. Complete updated listings of Types IR and IIR CMP pay items are provided within the body of the EI. Several previously approved Type IR corrugated metal pipe pay items are now disapproved due to manufacturing limitations or minimum service life requirements.
3. Metrication. Transmitted specifications are grouped by number and system of units. Metric specification revisions reference the January 2, 1995 Standard Specifications while U.S. customary unit specification revisions reference the January 2, 1990 Standard Specifications.

**TRANSMITTED SPECIFICATIONS:**

1. Select Granular Fill and Select Structural Fill. This revises 1990 and 1995 Standard Specification §203-2.02C, Select Granular Fill and Select Structural Fill, so that appropriate granular fill will be used with Types IR and IIR corrugated aluminum pipe. When used with Types IR and IIR corrugated aluminum pipe, this material must pass a 50 mm (two inch) sieve and be free of portland cement and portland cement products.

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2. Polymer Coated Steel Pipe. This revises 1990 and 1995 Standard Specification §602, Polymer Coated Steel Pipe, to reflect changes to §707-02, Corrugated Steel Pipe. It also requires the Contractor to provide gauge and coating thickness measuring equipment to the Engineer and establishes joint tolerance requirements when laying pipe.
3. Culverts and Storm Drains. This revises 1990 and 1995 Standard Specification §603, Culverts and Storm Drains, for the following reasons:
  - To reflect changes to §203-2.02C, §707-02, and §707-13, Corrugated Aluminum Pipe,
  - To include allowable gauge reductions for aluminum-coated steel pipe,
  - To require the Contractor to provide gauge and coating thickness measuring equipment to the Engineer,
  - To establish joint tolerance requirements when laying pipe, and
  - To add pay items for Type IR and Type IIR pipe.
4. Underdrains. This revises 1990 and 1995 Standard Specification §605, Underdrains, to reflect changes to §707-02 and §707-13.
5. Corrugated Steel Pipe. This revises 1990 and 1995 Standard Specification §707-02 for the reasons discussed above in "PURPOSE" and requires project inspectors to measure gauge and coating thickness with equipment supplied by the Contractor.
6. Galvanized Steel End Sections. This revises 1990 and 1995 Standard Specification §707-10, Galvanized Steel End Sections, and requires project inspectors to measure gauge with equipment supplied by the Contractor.
7. Aluminum End Sections. This creates a new section in the 1990 Standard Specifications, §707-11, Aluminum End Sections and revises 1995 Standard Specification §707-11, Aluminum End Sections. The new section provides consistency between steel and aluminum products and requires project inspectors to measure gauge with equipment supplied by the Contractor.
8. Corrugated Aluminum Pipe. This revises 1990 and 1995 Standard Specification §707-13 for the reasons discussed above in "PURPOSE" and requires project inspectors to measure gauge with equipment supplied by the Contractor.

The attached shelf notes will be incorporated into the next update of the Standard Specifications. Until that time, they will be inserts into contract proposals beginning March 21, 1996 for projects containing any corrugated metal pipe or metal end section items with 602.xx, 603.xx, and/or 605.xx pay item series.

### AFFECTED DOCUMENTS:

1. Delete 1990 Standard Specification §707-07, Steel Pipe Underdrain.
2. Delete 1990 Standard Specification §707-12, Perforated Corrugated Aluminum Pipe Underdrain.
3. Delete 1990 Standard Specification §707-16, Smooth-Lined Corrugated Steel Pipe.

4. Delete 1990 Standard Specification §707-17, Smooth-Lined Corrugated Aluminum Pipe.

Numbers 1 and 3 are now incorporated within §707-02 while numbers 2 and 4 are incorporated within §707-13.

**AFFECTED PAY ITEMS:**

The following Standard Contract Pay Items have been disapproved:

- 603.5601, Corrugated Steel Pipe - Type IR, 18 Inch Diameter, 16 Gauge
- 603.5602, Corrugated Steel Pipe - Type IR, 18 Inch Diameter, 14 Gauge
- 603.5603, Corrugated Steel Pipe - Type IR, 21 Inch Diameter, 16 Gauge
- 603.5604, Corrugated Steel Pipe - Type IR, 21 Inch Diameter, 14 Gauge
- 603.5606, Corrugated Steel Pipe - Type IR, 24 Inch Diameter, 16 Gauge
- 603.5607, Corrugated Steel Pipe - Type IR, 24 Inch Diameter, 14 Gauge
- 603.5609, Corrugated Steel Pipe - Type IR, 30 Inch Diameter, 16 Gauge
- 603.5610, Corrugated Steel Pipe - Type IR, 30 Inch Diameter, 14 Gauge
- 603.5612, Corrugated Steel Pipe - Type IR, 36 Inch Diameter, 16 Gauge
- 603.5613, Corrugated Steel Pipe - Type IR, 36 Inch Diameter, 14 Gauge
- 603.5615, Corrugated Steel Pipe - Type IR, 42 Inch Diameter, 16 Gauge
- 603.5616, Corrugated Steel Pipe - Type IR, 42 Inch Diameter, 14 Gauge
- 603.5618, Corrugated Steel Pipe - Type IR, 48 Inch Diameter, 16 Gauge
- 603.5619, Corrugated Steel Pipe - Type IR, 48 Inch Diameter, 14 Gauge
- 603.5621, Corrugated Steel Pipe - Type IR, 54 Inch Diameter, 16 Gauge
- 603.5622, Corrugated Steel Pipe - Type IR, 54 Inch Diameter, 14 Gauge
- 603.5624, Corrugated Steel Pipe - Type IR, 60 Inch Diameter, 16 Gauge
- 603.5625, Corrugated Steel Pipe - Type IR, 60 Inch Diameter, 14 Gauge
- 603.5627, Corrugated Steel Pipe - Type IR, 60 Inch Diameter, 10 Gauge
- 603.5628, Corrugated Steel Pipe - Type IR, 66 Inch Diameter, 14 Gauge
- 603.5630, Corrugated Steel Pipe - Type IR, 66 Inch Diameter, 10 Gauge
- 603.5631, Corrugated Steel Pipe - Type IR, 72 Inch Diameter, 14 Gauge
- 603.5633, Corrugated Steel Pipe - Type IR, 72 Inch Diameter, 10 Gauge
- 603.5634, Corrugated Steel Pipe - Type IR, 78 Inch Diameter, 14 Gauge
- 603.5636, Corrugated Steel Pipe - Type IR, 78 Inch Diameter, 10 Gauge
- 603.5638, Corrugated Steel Pipe - Type IR, 84 Inch Diameter, 10 Gauge
- 603.5640, Corrugated Steel Pipe - Type IR, 90 Inch Diameter, 10 Gauge
- 603.5642, Corrugated Steel Pipe - Type IR, 96 Inch Diameter, 10 Gauge
- 603.5644, Corrugated Steel Pipe - Type IR, 102 Inch Diameter, 10 Gauge
- 603.5701 through 603.5744, inclusive, Corrugated Steel Pipe - Type IR, Paved Invert, all diameters and gauges.

The following Standard Contract Metric Pay Items have been disapproved:

- 603.5601 M, Corrugated Steel Pipe - Type IR, 450 mm Diameter, 16 Gauge
- 603.5602 M, Corrugated Steel Pipe - Type IR, 450 mm Diameter, 14 Gauge
- 603.5603 M, Corrugated Steel Pipe - Type IR, 500 mm Diameter, 16 Gauge

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- 603.5604 M, Corrugated Steel Pipe - Type IR, 500 mm Diameter, 14 Gauge
- 603.5606 M, Corrugated Steel Pipe - Type IR, 600 mm Diameter, 16 Gauge
- 603.5607 M, Corrugated Steel Pipe - Type IR, 600 mm Diameter, 14 Gauge
- 603.5609 M, Corrugated Steel Pipe - Type IR, 700 mm Diameter, 16 Gauge
- 603.5610 M, Corrugated Steel Pipe - Type IR, 700 mm Diameter, 14 Gauge
- 603.5612 M, Corrugated Steel Pipe - Type IR, 800 mm Diameter, 16 Gauge
- 603.5613 M, Corrugated Steel Pipe - Type IR, 800 mm Diameter, 14 Gauge
- 603.5615 M, Corrugated Steel Pipe - Type IR, 900 mm Diameter, 16 Gauge
- 603.5616 M, Corrugated Steel Pipe - Type IR, 900 mm Diameter, 14 Gauge
- 603.5618 M, Corrugated Steel Pipe - Type IR, 1 000 mm Diameter, 16 Gauge
- 603.5619 M, Corrugated Steel Pipe - Type IR, 1 000 mm Diameter, 14 Gauge
- 603.5621 M, Corrugated Steel Pipe - Type IR, 1 200 mm Diameter, 16 Gauge
- 603.5622 M, Corrugated Steel Pipe - Type IR, 1 200 mm Diameter, 14 Gauge
- 603.5624 M, Corrugated Steel Pipe - Type IR, 1 400 mm Diameter, 16 Gauge
- 603.5625 M, Corrugated Steel Pipe - Type IR, 1 400 mm Diameter, 14 Gauge
- 603.5627 M, Corrugated Steel Pipe - Type IR, 1 600 mm Diameter, 16 Gauge
- 603.5628 M, Corrugated Steel Pipe - Type IR, 1 600 mm Diameter, 14 Gauge
- 603.5630 M, Corrugated Steel Pipe - Type IR, 1 800 mm Diameter, 14 Gauge
- 603.5632 M, Corrugated Steel Pipe - Type IR, 2 000 mm Diameter, 14 Gauge
- 603.5701 M through 603.5735 M, inclusive, Corrugated Steel Pipe - Type IR, Paved Invert, all diameters and gauges.
- 603.5825 M, Corrugated Aluminum Pipe - Type IR, 1 400 mm Diameter, 10 Gauge
- 603.5831 M, Corrugated Aluminum Pipe - Type IR, 1 800 mm Diameter, 12 Gauge
- 603.5833 M, Corrugated Aluminum Pipe - Type IR, 2 000 mm Diameter, 10 Gauge
- 603.5834 M, Corrugated Aluminum Pipe - Type IR, 2 200 mm Diameter, 10 Gauge

### **DESIGN CONSIDERATIONS:**

Type IR (spiral rib) is a round, helically corrugated metal pipe with 19 mm (¾ inch) square rib corrugations projecting outward at 190 mm (7½ inch) spacings. Type IIR pipe is a Type IR pipe that has been formed into an arch. Both have a Mannings "n" value of 0.013. The structural criteria (fill height) tables are found in a separate EI which will be simultaneously issued with this EI.

Metric pay items are not necessarily equivalent to the U.S. customary unit counterpart. For example, Item 603.5828 is a 66 inch diameter Type IR corrugated aluminum pipe, while Item 603.5828 M is a 1 400 mm diameter pipe. The difference between their diameters is 276 mm (11 inches).

### **CONSTRUCTION CONSIDERATIONS:**

The Contractor is now required to supply the Engineer with gauge and coating thickness measuring equipment. A project inspector will be required to measure gauge and coating thickness and verify that the manufacturer's certification is met. That equipment shall remain the property of the Contractor. Refer to Materials Method 12 for details on corrugated metal pipe acceptance and inspection procedures.

New wording has also been added to §603 regarding joint tolerances of round pipe and pipe arches. Now included are a 13 mm (1/2 inch) tolerance on joint diameters, spans, and rises as well as a 40 mm (1 1/2 inch) tolerance on the perimeters of in-place CMP.

**CONTACT:**

Questions concerning corrugated metal pipe material requirements and construction should be directed to the Field Engineering I section of the Materials Bureau at (518) 457-5956. Questions regarding fill requirements, bedding, and fill height should be directed to the Geotechnical Engineering Bureau at (518) 457-4791.

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The following pay items are approved for use with Standard Specifications of January 2, 1990.

### Corrugated Steel Pipe - Type IR Items (U.S. Customary Units)

Item No.	Item	Pay Unit
603.5605	Corrugated Steel Pipe - Type IR, 21 Inch Diameter, 12 Gauge	Linear Foot
603.5608	Corrugated Steel Pipe - Type IR, 24 Inch Diameter, 12 Gauge	Linear Foot
603.5611	Corrugated Steel Pipe - Type IR, 30 Inch Diameter, 12 Gauge	Linear Foot
603.5614	Corrugated Steel Pipe - Type IR, 36 Inch Diameter, 12 Gauge	Linear Foot
603.5617	Corrugated Steel Pipe - Type IR, 42 Inch Diameter, 12 Gauge	Linear Foot
603.5620	Corrugated Steel Pipe - Type IR, 48 Inch Diameter, 12 Gauge	Linear Foot
603.5623	Corrugated Steel Pipe - Type IR, 54 Inch Diameter, 12 Gauge	Linear Foot
603.5626	Corrugated Steel Pipe - Type IR, 60 Inch Diameter, 12 Gauge	Linear Foot
603.5629	Corrugated Steel Pipe - Type IR, 66 Inch Diameter, 12 Gauge	Linear Foot
603.5632	Corrugated Steel Pipe - Type IR, 72 Inch Diameter, 12 Gauge	Linear Foot
603.5635	Corrugated Steel Pipe - Type IR, 78 Inch Diameter, 12 Gauge	Linear Foot
603.5637	Corrugated Steel Pipe - Type IR, 84 Inch Diameter, 12 Gauge	Linear Foot
603.5639	Corrugated Steel Pipe - Type IR, 90 Inch Diameter, 12 Gauge	Linear Foot
603.5641	Corrugated Steel Pipe - Type IR, 96 Inch Diameter, 12 Gauge	Linear Foot
603.5643	Corrugated Steel Pipe - Type IR, 102 Inch Diameter, 12 Gauge	Linear Foot

The following pay items are approved for use with Standard Specifications of January 2, 1995.

**Corrugated Steel Pipe - Type IR Items (Metric)**

Item No.	Item	Pay Unit
603.5605 M	Corrugated Steel Pipe - Type IR, 500 mm Diameter, 12 Gauge	Meter
603.5608 M	Corrugated Steel Pipe - Type IR, 600 mm Diameter, 12 Gauge	Meter
603.5611 M	Corrugated Steel Pipe - Type IR, 700 mm Diameter, 12 Gauge	Meter
603.5614 M	Corrugated Steel Pipe - Type IR, 800 mm Diameter, 12 Gauge	Meter
603.5617 M	Corrugated Steel Pipe - Type IR, 900 mm Diameter, 12 Gauge	Meter
603.5620 M	Corrugated Steel Pipe - Type IR, 1 000 mm Diameter, 12 Gauge	Meter
603.5623 M	Corrugated Steel Pipe - Type IR, 1 200 mm Diameter, 12 Gauge	Meter
603.5626 M	Corrugated Steel Pipe - Type IR, 1 400 mm Diameter, 12 Gauge	Meter
603.5629 M	Corrugated Steel Pipe - Type IR, 1 600 mm Diameter, 12 Gauge	Meter
603.5631 M	Corrugated Steel Pipe - Type IR, 1 800 mm Diameter, 12 Gauge	Meter
603.5633 M	Corrugated Steel Pipe - Type IR, 2 000 mm Diameter, 12 Gauge	Meter
603.5634 M	Corrugated Steel Pipe - Type IR, 2 200 mm Diameter, 12 Gauge	Meter
603.5635 M	Corrugated Steel Pipe - Type IR, 2 400 mm Diameter, 12 Gauge	Meter

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The following pay items are approved for use with Standard Specifications of January 2, 1990.

## Corrugated Aluminum Pipe - Type IR Items (U.S. Customary Units)

Item No.	Item	Pay Unit
603.5801	Corrugated Aluminum Pipe - Type IR, 18 Inch Diameter, 16 Gauge	Linear Foot
603.5802	Corrugated Aluminum Pipe - Type IR, 18 Inch Diameter, 14 Gauge	Linear Foot
603.5803	Corrugated Aluminum Pipe - Type IR, 21 Inch Diameter, 16 Gauge	Linear Foot
603.5804	Corrugated Aluminum Pipe - Type IR, 21 Inch Diameter, 14 Gauge	Linear Foot
603.5805	Corrugated Aluminum Pipe - Type IR, 21 Inch Diameter, 12 Gauge	Linear Foot
603.5806	Corrugated Aluminum Pipe - Type IR, 24 Inch Diameter, 16 Gauge	Linear Foot
603.5807	Corrugated Aluminum Pipe - Type IR, 24 Inch Diameter, 14 Gauge	Linear Foot
603.5808	Corrugated Aluminum Pipe - Type IR, 24 Inch Diameter, 12 Gauge	Linear Foot
603.5809	Corrugated Aluminum Pipe - Type IR, 30 Inch Diameter, 16 Gauge	Linear Foot
603.5810	Corrugated Aluminum Pipe - Type IR, 30 Inch Diameter, 14 Gauge	Linear Foot
603.5811	Corrugated Aluminum Pipe - Type IR, 30 Inch Diameter, 12 Gauge	Linear Foot
603.5812	Corrugated Aluminum Pipe - Type IR, 36 Inch Diameter, 16 Gauge	Linear Foot
603.5813	Corrugated Aluminum Pipe - Type IR, 36 Inch Diameter, 14 Gauge	Linear Foot
603.5814	Corrugated Aluminum Pipe - Type IR, 36 Inch Diameter, 12 Gauge	Linear Foot
603.5815	Corrugated Aluminum Pipe - Type IR, 36 Inch Diameter, 10 Gauge	Linear Foot
603.5816	Corrugated Aluminum Pipe - Type IR, 42 Inch Diameter, 16 Gauge	Linear Foot
603.5817	Corrugated Aluminum Pipe - Type IR, 42 Inch Diameter, 14 Gauge	Linear Foot
603.5818	Corrugated Aluminum Pipe - Type IR, 42 Inch Diameter, 12 Gauge	Linear Foot
603.5819	Corrugated Aluminum Pipe - Type IR, 42 Inch Diameter, 10 Gauge	Linear Foot
603.5820	Corrugated Aluminum Pipe - Type IR, 48 Inch Diameter, 14 Gauge	Linear Foot
603.5821	Corrugated Aluminum Pipe - Type IR, 48 Inch Diameter, 12 Gauge	Linear Foot
603.5822	Corrugated Aluminum Pipe - Type IR, 48 Inch Diameter, 10 Gauge	Linear Foot
603.5823	Corrugated Aluminum Pipe - Type IR, 54 Inch Diameter, 14 Gauge	Linear Foot
603.5824	Corrugated Aluminum Pipe - Type IR, 54 Inch Diameter, 12 Gauge	Linear Foot
603.5825	Corrugated Aluminum Pipe - Type IR, 54 Inch Diameter, 10 Gauge	Linear Foot
603.5826	Corrugated Aluminum Pipe - Type IR, 60 Inch Diameter, 12 Gauge	Linear Foot
603.5827	Corrugated Aluminum Pipe - Type IR, 60 Inch Diameter, 10 Gauge	Linear Foot
603.5828	Corrugated Aluminum Pipe - Type IR, 66 Inch Diameter, 10 Gauge	Linear Foot
603.5829	Corrugated Aluminum Pipe - Type IR, 72 Inch Diameter, 10 Gauge	Linear Foot

The following pay items are approved for use with Standard Specifications of January 2, 1995.

**Corrugated Aluminum Pipe - Type IR Items (Metric)**

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
603.5801 M	Corrugated Aluminum Pipe - Type IR, 450 mm Diameter, 16 Gauge	Meter
603.5802 M	Corrugated Aluminum Pipe - Type IR, 450 mm Diameter, 14 Gauge	Meter
603.5803 M	Corrugated Aluminum Pipe - Type IR, 500 mm Diameter, 16 Gauge	Meter
603.5804 M	Corrugated Aluminum Pipe - Type IR, 500 mm Diameter, 14 Gauge	Meter
603.5805 M	Corrugated Aluminum Pipe - Type IR, 500 mm Diameter, 12 Gauge	Meter
603.5806 M	Corrugated Aluminum Pipe - Type IR, 600 mm Diameter, 16 Gauge	Meter
603.5807 M	Corrugated Aluminum Pipe - Type IR, 600 mm Diameter, 14 Gauge	Meter
603.5808 M	Corrugated Aluminum Pipe - Type IR, 600 mm Diameter, 12 Gauge	Meter
603.5809 M	Corrugated Aluminum Pipe - Type IR, 700 mm Diameter, 16 Gauge	Meter
603.5810 M	Corrugated Aluminum Pipe - Type IR, 700 mm Diameter, 14 Gauge	Meter
603.5811 M	Corrugated Aluminum Pipe - Type IR, 700 mm Diameter, 12 Gauge	Meter
603.5812 M	Corrugated Aluminum Pipe - Type IR, 800 mm Diameter, 16 Gauge	Meter
603.5813 M	Corrugated Aluminum Pipe - Type IR, 800 mm Diameter, 14 Gauge	Meter
603.5814 M	Corrugated Aluminum Pipe - Type IR, 800 mm Diameter, 12 Gauge	Meter
603.5815 M	Corrugated Aluminum Pipe - Type IR, 900 mm Diameter, 16 Gauge	Meter
603.5816 M	Corrugated Aluminum Pipe - Type IR, 900 mm Diameter, 14 Gauge	Meter
603.5817 M	Corrugated Aluminum Pipe - Type IR, 900 mm Diameter, 12 Gauge	Meter
603.5818 M	Corrugated Aluminum Pipe - Type IR, 900 mm Diameter, 10 Gauge	Meter
603.5819 M	Corrugated Aluminum Pipe - Type IR, 1 000 mm Diameter, 16 Gauge	Meter
603.5820 M	Corrugated Aluminum Pipe - Type IR, 1 000 mm Diameter, 14 Gauge	Meter
603.5821 M	Corrugated Aluminum Pipe - Type IR, 1 000 mm Diameter, 12 Gauge	Meter
603.5822 M	Corrugated Aluminum Pipe - Type IR, 1 000 mm Diameter, 10 Gauge	Meter
603.5823 M	Corrugated Aluminum Pipe - Type IR, 1 200 mm Diameter, 14 Gauge	Meter
603.5824 M	Corrugated Aluminum Pipe - Type IR, 1 200 mm Diameter, 12 Gauge	Meter
603.5825 M	Corrugated Aluminum Pipe - Type IR, 1 200 mm Diameter, 10 Gauge	Meter
603.5826 M	Corrugated Aluminum Pipe - Type IR, 1 400 mm Diameter, 14 Gauge	Meter
603.5827 M	Corrugated Aluminum Pipe - Type IR, 1 400 mm Diameter, 12 Gauge	Meter
603.5828 M	Corrugated Aluminum Pipe - Type IR, 1 400 mm Diameter, 10 Gauge	Meter
603.5829 M	Corrugated Aluminum Pipe - Type IR, 1 600 mm Diameter, 12 Gauge	Meter
603.5830 M	Corrugated Aluminum Pipe - Type IR, 1 600 mm Diameter, 10 Gauge	Meter
603.5832 M	Corrugated Aluminum Pipe - Type IR, 1 800 mm Diameter, 10 Gauge	Meter

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The following pay items are approved for use with Standard Specifications of January 2, 1990.

### Corrugated Steel Pipe - Type IIR Items (U.S. Customary Units)

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
603.5901	Corrugated Steel Pipe - Type IIR, 23" Span x 19" Rise, 12 Gauge	Linear Foot
603.5902	Corrugated Steel Pipe - Type IIR, 27" Span x 21" Rise, 12 Gauge	Linear Foot
603.5903	Corrugated Steel Pipe - Type IIR, 33" Span x 26" Rise, 12 Gauge	Linear Foot
603.5904	Corrugated Steel Pipe - Type IIR, 40" Span x 31" Rise, 12 Gauge	Linear Foot
603.5905	Corrugated Steel Pipe - Type IIR, 46" Span x 36" Rise, 12 Gauge	Linear Foot
603.5906	Corrugated Steel Pipe - Type IIR, 53" Span x 41" Rise, 12 Gauge	Linear Foot
603.5907	Corrugated Steel Pipe - Type IIR, 60" Span x 46" Rise, 12 Gauge	Linear Foot
603.5908	Corrugated Steel Pipe - Type IIR, 66" Span x 51" Rise, 12 Gauge	Linear Foot

The following pay items are approved for use with Standard Specifications of January 2, 1995.

**Corrugated Steel Pipe - Type IIR Items (Metric)**

Item No.	Item	Pay Unit
603.5901 M	Corrugated Steel Pipe - Type IIR, 550 mm Span x 450 mm Rise, 12 Gauge	Meter
603.5902 M	Corrugated Steel Pipe - Type IIR, 680 mm Span x 530 mm Rise, 12 Gauge	Meter
603.5903 M	Corrugated Steel Pipe - Type IIR, 770 mm Span x 630 mm Rise, 12 Gauge	Meter
603.5904 M	Corrugated Steel Pipe - Type IIR, 880 mm Span x 690 mm Rise, 12 Gauge	Meter
603.5905 M	Corrugated Steel Pipe - Type IIR, 1 000 mm Span x 770 mm Rise, 12 Gauge	Meter
603.5906 M	Corrugated Steel Pipe - Type IIR, 1 100 mm Span x 850 mm Rise, 12 Gauge	Meter
603.5907 M	Corrugated Steel Pipe - Type IIR, 1 330 mm Span x 1 030 mm Rise, 12 Gauge	Meter
603.5908 M	Corrugated Steel Pipe - Type IIR, 1 550 mm Span x 1 200 mm Rise, 12 Gauge	Meter
603.5909 M	Corrugated Steel Pipe - Type IIR, 1 780 mm Span x 1 360 mm Rise, 12 Gauge	Meter

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The following pay items are approved for use with Standard Specifications of January 2, 1990.

### Corrugated Aluminum Pipe - Type IIR Items (U.S. Customary Units)

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
603.5301	Corrugated Aluminum Pipe - Type IIR, 20" Span x 16" Rise, 16 Gauge	Linear Foot
603.5302	Corrugated Aluminum Pipe - Type IIR, 20" Span x 16" Rise, 14 Gauge	Linear Foot
603.5303	Corrugated Aluminum Pipe - Type IIR, 23" Span x 19" Rise, 16 Gauge	Linear Foot
603.5304	Corrugated Aluminum Pipe - Type IIR, 23" Span x 19" Rise, 14 Gauge	Linear Foot
603.5305	Corrugated Aluminum Pipe - Type IIR, 23" Span x 19" Rise, 12 Gauge	Linear Foot
603.5306	Corrugated Aluminum Pipe - Type IIR, 27" Span x 21" Rise, 16 Gauge	Linear Foot
603.5307	Corrugated Aluminum Pipe - Type IIR, 27" Span x 21" Rise, 14 Gauge	Linear Foot
603.5308	Corrugated Aluminum Pipe - Type IIR, 27" Span x 21" Rise, 12 Gauge	Linear Foot
603.5309	Corrugated Aluminum Pipe - Type IIR, 33" Span x 26" Rise, 16 Gauge	Linear Foot
603.5310	Corrugated Aluminum Pipe - Type IIR, 33" Span x 26" Rise, 14 Gauge	Linear Foot
603.5311	Corrugated Aluminum Pipe - Type IIR, 33" Span x 26" Rise, 12 Gauge	Linear Foot
603.5312	Corrugated Aluminum Pipe - Type IIR, 40" Span x 31" Rise, 16 Gauge	Linear Foot
603.5313	Corrugated Aluminum Pipe - Type IIR, 40" Span x 31" Rise, 14 Gauge	Linear Foot
603.5314	Corrugated Aluminum Pipe - Type IIR, 40" Span x 31" Rise, 12 Gauge	Linear Foot
603.5315	Corrugated Aluminum Pipe - Type IIR, 40" Span x 31" Rise, 10 Gauge	Linear Foot
603.5316	Corrugated Aluminum Pipe - Type IIR, 46" Span x 36" Rise, 12 Gauge	Linear Foot
603.5317	Corrugated Aluminum Pipe - Type IIR, 46" Span x 36" Rise, 10 Gauge	Linear Foot
603.5318	Corrugated Aluminum Pipe - Type IIR, 53" Span x 41" Rise, 12 Gauge	Linear Foot
603.5319	Corrugated Aluminum Pipe - Type IIR, 53" Span x 41" Rise, 10 Gauge	Linear Foot
603.5320	Corrugated Aluminum Pipe - Type IIR, 60" Span x 46" Rise, 12 Gauge	Linear Foot
603.5321	Corrugated Aluminum Pipe - Type IIR, 60" Span x 46" Rise, 10 Gauge	Linear Foot
603.5322	Corrugated Aluminum Pipe - Type IIR, 66" Span x 51" Rise, 12 Gauge	Linear Foot
603.5323	Corrugated Aluminum Pipe - Type IIR, 66" Span x 51" Rise, 10 Gauge	Linear Foot

The following pay items are approved for use with Standard Specifications of January 2, 1995.

**Corrugated Aluminum Pipe - Type IIR Items (Metric)**

<b>Item No.</b>	<b>Item</b>	<b>Pay Unit</b>
603.5301 M	Corrugated Aluminum Pipe - Type IIR, 16 Gauge 500 mm Span x 400 mm Rise	Meter
603.5302 M	Corrugated Aluminum Pipe - Type IIR, 14 Gauge 500 mm Span x 400 mm Rise	Meter
603.5303 M	Corrugated Aluminum Pipe - Type IIR, 16 Gauge 550 mm Span x 450 mm Rise	Meter
603.5304 M	Corrugated Aluminum Pipe - Type IIR, 14 Gauge 550 mm Span x 450 mm Rise	Meter
603.5305 M	Corrugated Aluminum Pipe - Type IIR, 12 Gauge 550 mm Span x 450 mm Rise	Meter
603.5306 M	Corrugated Aluminum Pipe - Type IIR, 16 Gauge 680 mm Span x 530 mm Rise	Meter
603.5307 M	Corrugated Aluminum Pipe - Type IIR, 14 Gauge 680 mm Span x 530 mm Rise	Meter
603.5308 M	Corrugated Aluminum Pipe - Type IIR, 12 Gauge 680 mm Span x 530 mm Rise	Meter
603.5309 M	Corrugated Aluminum Pipe - Type IIR, 16 Gauge 770 mm Span x 630 mm Rise	Meter
603.5310 M	Corrugated Aluminum Pipe - Type IIR, 14 Gauge 770 mm Span x 630 mm Rise	Meter
603.5311 M	Corrugated Aluminum Pipe - Type IIR, 12 Gauge 770 mm Span x 630 mm Rise	Meter
603.5312 M	Corrugated Aluminum Pipe - Type IIR, 16 Gauge 880 mm Span x 690 mm Rise	Meter
603.5313 M	Corrugated Aluminum Pipe - Type IIR, 14 Gauge 880 mm Span x 690 mm Rise	Meter
603.5314 M	Corrugated Aluminum Pipe - Type IIR, 12 Gauge 880 mm Span x 690 mm Rise	Meter
603.5315 M	Corrugated Aluminum Pipe - Type IIR, 16 Gauge 1 000 mm Span x 770 mm Rise	Meter
603.5316 M	Corrugated Aluminum Pipe - Type IIR, 14 Gauge 1 000 mm Span x 770 mm Rise	Meter
603.5317 M	Corrugated Aluminum Pipe - Type IIR, 12 Gauge 1 000 mm Span x 770 mm Rise	Meter
603.5318 M	Corrugated Aluminum Pipe - Type IIR, 10 Gauge 1 000 mm Span x 770 mm Rise	Meter
603.5319 M	Corrugated Aluminum Pipe - Type IIR, 12 Gauge 1 100 mm Span x 850 mm Rise	Meter
603.5320 M	Corrugated Aluminum Pipe - Type IIR, 10 Gauge 1 100 mm Span x 850 mm Rise	Meter
603.5321 M	Corrugated Aluminum Pipe - Type IIR, 12 Gauge 1 330 mm Span x 1 030 mm Rise	Meter

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603.5322 M	Corrugated Aluminum Pipe - Type IIR, 10 Gauge 1 330 mm Span x 1 030 mm Rise	Meter
603.5323 M	Corrugated Aluminum Pipe - Type IIR, 12 Gauge 1 550 mm Span x 1 200 mm Rise	Meter
603.5324 M	Corrugated Aluminum Pipe - Type IIR, 10 Gauge 1 550 mm Span x 1 200 mm Rise	Meter
603.5325 M	Corrugated Aluminum Pipe - Type IIR, 12 Gauge 1 780 mm Span x 1 360 mm Rise	Meter
603.5326 M	Corrugated Aluminum Pipe - Type IIR, 10 Gauge 1 780 mm Span x 1 360 mm Rise	Meter

## SELECT GRANULAR FILL FOR ALUMINUM PIPE

Make the following changes to the Standard Specifications of January 2, 1995:

Page 2-18

Under §203-2.02 C. *Select Granular Fill and Select Structural Fill*, delete the subsection and *replace* it with the following:

"§203-2.02 C. *Select Granular Fill and Select Structural Fill*. Materials furnished under these items shall be suitable and conform to the following requirements:

1. **Gradation.** Except when used as backfill material for Types IR and IIR corrugated aluminum pipe, the material shall have the following gradation:

Sieve Size	Percent Passing by Weight
100 mm	100
425 $\mu$ m	0 to 70
75 $\mu$ m	0 to 15

When used as backfill for Types IR and IIR corrugated aluminum pipe, 100% of the material shall also pass the 50 mm sieve.

2. **Soundness.** The materials shall be substantially free of shale and soft, poor durability particles. Where the State elects to test for this requirement, a material with Magnesium Sulfate Soundness Loss exceeding 30% will be rejected.

3. **Composition.** When used as backfill for any type of corrugated aluminum pipe, the material shall be free of portland cement or portland cement concrete.

4. **pH.** Where the State elects to test for this requirement, a material with pH of less than 5 or more than 10 shall be rejected."

## SELECT GRANULAR FILL FOR ALUMINUM PIPE

Make the following changes to the Standard Specifications of January 2, 1990 and where appropriate in Addendum No. 1 adopted November 18, 1993:

### Page 2-10

Under §203-2.02 C. *Select Granular Fill and Select Structure Fill*, delete the subsection and *replace* it with the following:

"§203-2.02 C. *Select Granular Fill and Select Structural Fill*. Materials furnished under these items shall be suitable and conform to the following requirements:

1. **Gradation.** Except when used as backfill material for Types IR and IIR corrugated aluminum pipe, the material shall have the following gradation:

Sieve Size	Percent Passing by Weight
4 inch	100
No. 40	0 to 70
No. 200	0 to 15

When used as backfill for Types IR and IIR corrugated aluminum pipe, 100% of the material shall also pass the 2 inch sieve.

2. **Soundness.** The materials shall be substantially free of shale and soft, poor durability particles. Where the State elects to test for this requirement, a material with Magnesium Sulfate Soundness Loss exceeding 30% will be rejected.

3. **Composition.** When used as backfill for any type of corrugated aluminum pipe, the material shall be free of portland cement or portland cement concrete.

4. **pH.** Where the State elects to test for this requirement, a material with pH of less than 5 or more than 10 shall be rejected."

## POLYMER COATED STEEL PIPES

Make the following changes to the Standard Specifications of January 2, 1995:

### Page 6-1

Under §602-3.02D. **Thickness Measuring Equipment**, *delete* the subsection and *replace* it with the following:

"D. **Thickness Measuring Equipment.** Before any polymer coated steel pipe is laid, the Contractor shall provide the Engineer equipment to measure gauge and polymer coating thickness. Gauge shall be measured with a micrometer caliper. Polymer coating thickness shall be measured by a type 2 fixed probe magnetic gauge meeting the requirements of Steel Structures Painting Council Specification SSPC-PA2. All equipment shall be in good working order. When the Engineer verifies the required gauge and coating thickness have been received, the pipe may be laid. Micrometer calipers and type 2 probes shall remain the property of the Contractor."

### Page 6-2

Under §602-3.06C. **Tolerance**, *delete* the subsection and *replace* it with the following:

"C. **Tolerance.** The differences between the diameters of round pipes, or the spans or rises of pipe-arches being joined shall not vary by more than 13 mm, nor shall the perimeters vary by more than 40 mm. These tolerances may be attained by proper production control or by match-marking pipe ends."