

**SECTION 420**

**SUPPLY AND INSTALLATION OF PIPE FOR STORM SEWERS AND PERFORATED PIPE FOR SUB-DRAINAGE**

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**420.01 SCOPE**

This specification covers the requirements for the supply and installation of factory fabricated pipes for storm sewers and perforated sub-drains.

The requirements for storm sewer or sub-drain trench excavation and backfilling, and the requirements for storm sewer or sub-drain bedding are covered separately under Section 404 "Trenching and Excavation for Catch Basins and Storm Sewers", and Section 410 "Select Bedding for Storm Sewers, Sub-Drains and Catch Basins" respectively.

**420.02 MATERIALS**

Pipe shall consist of aluminized steel pipe type 2. However, contractors are advised that consideration will be given to proposals to substitute with corrugated polyethylene pipe for diameters of up to and including 600 mm. The pipe shall be of the type and size specified in the Unit Price Table.

The Contractor shall supply concrete to form plugs for the upstream ends of sub-drains. The concrete shall have a minimum compressive strength of 28 days of 20 MPa.

The Contractor shall supply the pipe, couplers, wyes, tees, adaptors, bends, nuts and bolts.

**420.02.01 Aluminized Steel Pipe Materials**

Aluminized corrugated steel pipe, couplers, wyes, tees, bends, adapters, nuts and bolts shall conform to the requirements of the most recent revisions of the following specifications: AASHTO M274 and M36, ASTM A819 and A760 and CSA G401.

The pipe shall have a wall thickness of at least that specified in the Unit Price Table. However, should the wall thickness not be specified, then the wall thickness shall be at least the corresponding thickness given in the following table for pipe of the size and type required.

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PIPE DIAMETER	WALL THICKNESS
100 mm to 500 mm	1.6 mm for Any Corrugation
600 mm to 1200 mm	2.0 mm for Any Corrugation
1400 mm to 1800 mm	2.0 mm for 125 mm X 25 mm Corrugation or 3.5 mm 68 X 13 mm Corrugation
2000 mm to 2400 mm	2.8 mm for 125 mm x 25 mm Corrugation or 4.2 mm for 68 x 13 mm Corrugation

### 420.02.02 Plastic Pipe Materials

Couplers, wyes, tees, adaptors, bends, nuts, bolts and plastic pipe, consisting of corrugated polyethylene pipe, shall be of a type, size and strength acceptable to the Engineer.

### 420.03 PIPE INSTALLATION

All pipe shall be handled with care, so as not to damage the pipes or their protective coatings. Each pipe shall be inspected for defects before being lowered into the trench. Any pipe that is defective or unsound, in the opinion of the Engineer, shall not be incorporated in the work.

The pipe shall be installed in accordance with the requirement given in Form 1235 "Typical Storm Sewer Bedding and Backfill Details".

No pipe laying shall commence until a bed has been prepared to the alignment and grades as required by the Engineer, and until the trench has been inspected and approved by the Engineer.

The Contractor shall provide such unwatering as is required.

No pipe shall be laid or joined when the trench bottom is frozen or under water or when, in the Engineer's opinion, the trench conditions or the weather are unsuitable for such work.

All pipe shall be laid to the line and grades staked by the Engineer.

Pipe to be laid at a location shall be that size and type of pipe that the Engineer required to be laid at that location.

Riveted corrugated steel pipe shall be laid with the inside circumferential laps pointing in the direction of the flow. The longitudinal laps shall be located in the upper half of the pipe.

Helical aluminized corrugated steel pipe shall be installed so that the helix angle is constant for the total length of the installation and each pipe section shall be installed next to the previous section such that the lock-seam forms a continuous helix.

Adaptors, bends, wyes or tees shall be installed where required by the Engineer.

Pipes shall be cut whenever necessary to permit the installation of adaptors, bends, wyes, tees, or catch basins at the places staked by the Engineer.

At catch basins, the pipe shall be cut so that pipe ends will not project more than 300 mm in from the walls of the catch basin.

Pipe cuts shall be made neatly at right angles to the axis of the pipe.

Where aluminized corrugated steel pipe is cut, drilled, or welded, the pipe shall be thoroughly cleaned with a wire brush to remove scale, rust, slag residue, weld spatter, etc., and wiped clean. The cleaned surface shall receive at least one application of metal conditioner to de-oxidize, degrease, and phosphatize the metal surface to be treated if the surface is oily. Pre-mixed, ready-to-apply, liquid zinc compound shall be applied to the prepared clean dry metal surface. The cold-galvanizing compound must be of a type that imparts cathodic action against corrosion.

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The cold-galvanizing compound should have a minimum 50 mm overlap of the surrounding undamaged galvanized metal.

Both metal conditioner and cold-galvanizing compound must be approved by Underwriters Laboratories Inc. for component coatings (organic) and meet or exceed Canadian Government Specification 1-GP-181A. All materials must be applied in accordance with the manufacturer's instructions.

Aluminized corrugated steel pipe sections shall be joined together by means of aluminized steel couplers. The couplers shall be installed to lap approximately equal portions of the pipe being connected and such that the corrugations or projections of the coupler properly engage the pipe corrugations. As the coupler is being tightened, it shall be tapped with a mallet to take up the slack. On asphalt coated pipe, the contacting surfaces of the coupler and pipe shall be lubricated with fuel oil, or a similar solvent, prior to tightening the coupler.

The interior of pipes shall be carefully cleaned of all dirt, cement or superfluous material of every description as the work progresses.

At times when pipe laying is not in progress, the open ends of the pipe shall be closed by a watertight plug or other means approved by the Engineer. If water is in the trench when work recommences, then the plug shall remain in place until the trench is pumped completely dry.

The alignment of sewer pipes between catch basins shall be tested as each portion is laid. The Engineer may order a strong light to be supplied by the Contractor, which will be shone through the pipe from catch basin to catch basin. If less than half of the full diameter of the end of the pipe at the light source is visible from the far end, then the Engineer may order the pipes realigned at the Contractor's expense.

Perforated steel pipe shall be laid with the perforations downwards and symmetrical about the vertical axis.

The upstream ends of perforated pipe shall be sealed by means of a concrete plug. When the pipe is in position the wet concrete shall be placed in the open end of the pipe. The concrete shall fill the end of the pipe to a length equal to the diameter of the pipe.

### **420.04 MEASUREMENT FOR PAYMENT**

Measurement for payment for supply and installation of pipe for storm sewers and perforated pipe for sub-drains, consisting of pipe of a particular size and type shall be the actual in place end to end length, measured in metres to one decimal place, along the centre line of the completed new pipe line made up of material of that size and type.

Pipe length, couplers, adaptors, wyes, tees or bends not actually incorporated into a storm sewer or sub-drain will not be included in measurement for payment.

### **420.05 BASIS OF PAYMENT**

#### **420.05.01 Basis of Payment for Supply and Installation of Pipe for Storm Sewers and Perforated Pipe for Sub-Drainage**

Payment at the contract price for the type and size of storm sewer or perforated pipe sub-drain specified shall be compensation in full for all labour, materials and equipment use to: supply the pipe, couplers, wyes, tees, bends, adaptors, nuts and bolts, transport the materials to the project, store the materials at the project, transport the materials to the site, cut the pipe, clean cut ends, supply and apply metal conditioner and cold-galvanizing compound to cut ends of galvanized pipe, install storm sewer or sub-drain as required, provide concrete plugs for sub-drains, and provide any unwatering that is required.

#### **420.05.02 Basis of Payment for Pipe Restocking**

Contractors are advised that should less than the contract estimated quantity of pipe of a particular size and type be required, then the Contractor will be compensated for restocking this excess pipe at the rate of 15% of the contract unit price for the Supply and Installation of Pipe Culvert of this size and type.

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However, should there be no contract price for the Supply and Installation of Pipe Culvert of this size and type, then the compensation for restocking this excess pipe shall be at the rate of 15% of the contract unit price for; the Supply and Installation of Pipe for Storm Sewers of this size, or the supply and installation pipe for sub-drainage of this size, as appropriate.

Restocking shall include such things as handling, all transportation and any other expenses associated with removing the excess pipe from the project site, and returning it to the supplier or to the Contractor's permanent storage areas.

### **420.05.03 Basis of Payment for Pipe Purchase**

Contractors are advised that should less than the contract estimated quantity of pipe of a particular size and type be required, the Department reserves the right to purchase the excess. Compensation for purchase will be at the invoiced price for that pipe from the pipe supplier plus 10%.