

# Construction Specification 451—Corrugated Metal Pipe

## 1. Scope

The work consists of furnishing and placing circular, arched, or elliptical corrugated metal pipe and the necessary fittings.

## 2. Material

Pipe and fittings shall be metallic zinc-coated, aluminum-coated, or aluminum-zinc alloy-coated corrugated steel conforming to the requirements of ASTM A 742, A 760, A 761, A 762, A 849, A 875, A 885, and A 929.

## 3. Coupling bands and hardware

Pipe joint coupling bands shall be provided meeting the pipe manufacturer's recommendations. Watertight coupling bands shall be provided when specified in section 11 of this specification.

Coupling bands shall be installed to provide straight alignment of the connecting pipe ends. The bands shall be positioned to overlap adjacent pipe ends equally. The coupling bands shall be corrugated to match the corrugations of the pipe section ends being connected.

## 4. Fabrication

Fabrication of appurtenant sections shall be performed as shown on the drawings and described in section 11 of this specification. The items may consist of inlet sections, outlet sections, end sections, elbows, skew or beveled sections, rod reinforced ends, cut-off collars, or headwalls. Fabrication of these appurtenant sections shall be made from metallic-coated material identical to that from which the attached pipe is fabricated. Fabrication shall be of a quality and finished workmanship equal to that required for the pipe.

## 5. Handling the pipe

The contractor shall furnish equipment as necessary to install the pipe without damaging the pipe or coating. The pipe shall be transported and handled in a manner to prevent damage to the pipe and coating.

## 6. Laying and bedding the pipe

Unless otherwise specified, the pipe shall be installed in accordance with the manufacturer's recommendations. Pipe shall be installed so no reversal of grade between joints results unless otherwise shown on the drawings.

Field welding of corrugated galvanized iron or steel pipe is not permitted. The pipe sections shall be joined with fabricator-supplied coupling bands meeting the specified joint requirements. The coupling shall be installed as recommended by the fabricator.

The pipe shall be firmly and uniformly bedded throughout its full length to the depth and in the manner specified on the drawings.

## 7. Backfill

The pipe shall be loaded sufficiently during backfilling to prevent displacement from line and grade and

to maintain full contact with the bedding during the placement operations.

**Initial backfill**—Unless otherwise specified, initial backfill to 6 inches above the top of the conduit is required. Earth haunching and initial backfill material shall consist of soil material that is free of rocks, stones, or hard clods more than 3 inch in diameter. Coarse backfill material shall be the specified sand, gravel, crushed rock, or drainfill material.

Initial backfill shall be placed in two stages. In the first stage (haunching), backfill is placed to the pipe spring line (center of pipe). In the second stage, it is placed to 6 inches above the top of the pipe.

The first stage material shall be worked carefully under the haunches of the pipe to provide continuous support throughout the entire pipe length. The haunching backfill material shall be placed in layers that have a maximum thickness of about 6 inches and are compacted as shown on the drawings. During compaction operations, care shall be taken to ensure that the tamping or vibratory equipment does not come in contact with the pipe and the pipe is not deformed or displaced.

**Final backfill**—Final backfill shall consist of placing the remaining material required to complete the backfill from the top of the initial backfill to the ground surface, including mounding at the top of the trench. Final backfill material within 2 feet of the top of the pipe shall be free of debris or rocks larger than 3 inches nominal diameter. Coarse backfill material shall be the specified sand, gravel, crushed rock, or drainfill. Final backfill shall be placed in approximately uniform, compacted layers. Final backfill compaction requirements shall be as shown on the drawings.

Vehicles or construction equipment shall not be allowed to cross the pipe until the minimum earth cover has been obtained.

## **8. Embedment in concrete**

Special treatment shall be provided to the pipe surface when embedded or attached to concrete and the pipe material is aluminum or aluminum-coated and aluminum-zinc alloy-coated. Potential contact surfaces in contact with concrete and masonry surfaces shall be coated with two coats of a bituminous paint of the cutback type. Placement of the pipe shall be such that direct metal-to-metal contact with other metallic material, such as embedded steel reinforcement or water control gates, is prevented.

## **9. Repair of damaged coating**

Damaged pipe will not be accepted unless the pipe coating is repaired according to a plan approved by the engineer.

## **10. Measurement and payment**

**Method 1**—For items of work for which specific unit prices are established in the contract, the quantity of each type, class, size, and gauge of pipe is determined to the nearest 0.1 foot by measurement of the laid length of the pipe along the centerline of the pipe. Payment for each type, class, size, and gauge of pipe is made at the contract unit price for that type, class, size and gauge of pipe. Such payment constitutes full compensation for furnishing, transporting, and installing the pipe and fittings and all other items necessary and incidental to the completion of the work except items designated as *special fittings*. Special fittings are those sections of pipe requiring special fabrication to meet layout requirements. Payment for special fittings is made at the contract unit price for special fittings (CMP).

**Method 2**—For items of work for which specific unit prices are established in the contract, the quantity of each type, class, size, and gauge of pipe is determined as the sum of the nominal laying lengths of the

pipe sections installed. Payment for each type, class, size, and gauge of pipe is made at the contract unit price for that type, class, size, and gauge of pipe. Such payment constitutes full compensation for furnishing, transporting, and installing the pipe and fittings and all other items necessary and incidental to the completion of the work except items designated as *special fittings*. Special fittings are those sections of pipe requiring special fabrication to meet layout requirements. Payment for special fittings is made at the contract unit price for special fittings (CMP).

**Method 3**—For items of work for which specific lump sum prices are established in the contract, payment for corrugated metal pipe structures is made at the contract lump sum price. Such payment constitutes full compensation for furnishing, fabricating, transporting, and installing the pipe structure complete with metal pipe, fittings, and appurtenances, and all other items necessary and incidental to completion of the work, which includes, except as otherwise specified, required excavation, dewatering, and earth backfill.

**All Methods**—The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items and items to which they are made subsidiary are identified in section 11 of this specification.

## **11. Items of work and construction details**