

SECTION 13

WATER MAIN TAPS

13-1 General

13-1.01 Scope

This section describes the requirements for furnishing and installing water main taps using tapping saddles, couplings, and sleeves; including the materials to be used, methods and requirements for installation, and measurement and payment. Two types of water main taps are included: taps installed concurrent with construction, and taps required on existing water mains under pressure (referred to herein as "Wet Taps"). Taps installed concurrent with construction are limited to maximum nominal size of 2" and are intended for appurtenances such as service assemblies, air release valves, and blowoff valves. Taps made concurrent with construction which are larger than 2" usually require cast iron fittings and inline valves, which are described elsewhere in these specifications.

This section does not include the shutoff valve located at the tap, if required. This section does not include installation of branches in water mains, which are shown on the plans using AWWA C110 or C153 cast iron fittings such as tees, crosses, and wyes. If required, items such as these have been described elsewhere in these specifications.

13-1.02 Description of Work

Work under this section shall include, but not be limited to, excavation, backfill, corrosion protection, reaction blocking, locating wire, and surface restoration, all as described for Water Mains elsewhere in these specifications. Work under this section shall also include, but not be limited to, storage and handling of materials, installation of the saddle or sleeve, tapping the water main, installing the valve (if required), and pressure testing the installation (if required).

13-1.03 Public Convenience, Preservation of Property and Cleanup

While performing work under this section, the Contractor shall comply with the terms and conditions concerning public convenience, preservation of property and cleanup, all as described in the General Conditions of this Contract.

13-1.04 Permits

The Contractor's attention is directed to the Special Conditions of this Contract for permit compliance requirements.

13-1.05 Design

Saddles and sleeves used for water main taps shall be rated for a working pressure equal to the working pressure in the system at the point of connection, or as specified herein, but not less than 150 psi. The saddle or sleeve shall be designed and tested to withstand a sustained pressure of at least two times the system working pressure, but not less than 300 psi. Representative samples of the saddle or sleeve shall be designed and tested to fail at a pressure of not less than 2.5 times the system pressure, but not less than 375 psi. Other tests for specific types of saddles or sleeves shall be as specified herein. An affidavit confirming design criteria and testing results may be required by the District Engineer.

13-1.06 Submittals

Submittals supplied by the Contractor shall include: catalog data for saddles, sleeves, and hole cutting device; operating instructions for wet-tap machines (if machine is required); certificate of factory pressure and leak tests; and affidavits confirming design criteria and testing results for all installations where the system working pressure exceeds 150 psi. The Contractor's attention is directed to the General Conditions of this Contract under "Submittals".

13-1.07 Notice of Intent to Wet-Tap

Performing wet-taps 4" nominal size and larger must be scheduled with the District Engineer. The Contractor shall make a written request for a date and time to perform the work at least five (5) working days in advance of wet-tap operations. The Contractor shall have received submittal approval and have all necessary saddles, sleeves and valves on site and inspected prior to the written request. The District reserves the right to make the final determination for scheduling a wet-tap operation. The Contractor must receive written approval of the date and time prior to performing the wet-tap.

13-1.08 Inspection

The Contractor shall make all saddles, tapping couplings, sleeves, and valves (if required) available for inspection by the District Engineer prior to installation. Each phase of the work shall pass inspection by the District Engineer before commencing with work on the next phase. The phases of work shall consist of, but not be limited to, excavation for the connection, tapping the main, cleaning the outside of the pipe, installing the saddle or sleeve and valve, if necessary, testing the sleeve, making the wet-tap, applying corrosion protection, connecting and wrapping the locating wire, backfilling, and surface restoration.

13-2 Materials and Installation

13-2.01 General

Materials furnished for water main taps shall include tapping saddles, tapped couplings, tapping sleeves, and all the necessary bolts, nuts, and washers; concrete, backfill materials, and materials used for restoration of area around the tap location. Materials and installation shall be as shown on the plans and as designated in these specifications.

13-2.02 Storage and Handling

Saddles and sleeves used for water main taps shall be stored and handled in their original containers, which shall not be unpacked until 24 hours prior to installation, except for inspection. Saddles and sleeves shall be maintained free from dirt and foreign matter and shall be stored on wooden pallets in their original containers.

13-2.03 Excavation and Backfill

Excavation and backfill operations for Water Main Taps shall conform to all the requirements for Pipe Trench Excavation and Pipe Trench Backfill, as described for Water Mains elsewhere in these specifications.

13-2.04 Tapping Saddles

Tapping saddles may be used for water main taps either concurrent with new construction, or for tapping existing water mains under pressure. Tapping saddles shall be limited to a maximum nominal outlet diameter of 2".

13-2.04-A Materials

Tapping saddles used for taps on DIP water mains shall be double strap saddles for pipe sizes up to 16" and triple strap saddles for pipe sizes 18" and larger. Saddle bodies shall be ductile iron conforming to ASTM A536, grade 65-45-12, protected with a corrosion-resistant paint. The gasket shall be virgin NBR, or Buna-N rubber; formulated for treated water. Gaskets shall be cemented in place on the saddle bodies prior to shipment from the manufacturer. The straps, nuts, and washers shall all be AISI C1018 steel electro galvanized with Di-chromate seal, or Mayari-R (Corten) steel. The saddle boss shall be tapped with standard iron pipe threads. Double strap saddles shall be Romac Style 202, Ford Style F202, or approved equal.

Tapping saddles used for taps on PVC water mains shall have ductile iron bodies conforming to ASTM A536, grade 65-45-12, and protected with a corrosion-resistant paint. They shall have one or two 304 stainless steel bands using not less than four 304 stainless steel bolts, nuts and washers, all threaded areas and the washer having been factory coated with fluorocarbon. Single bands with four bolts (two bolts on either side of the saddle) shall be a minimum of 3¼" wide. Double bands with two bolts each (one bolt on either side of the saddle for each of the two bands for a total of four bolts) shall have a total combined width of not less than 3". The gasket shall be virgin NBR, or Buna-N rubber; formulated for treated water. Gaskets shall be cemented in place on the saddle bodies prior to shipment from the manufacturer. The saddle boss shall be tapped with standard iron pipe threads. The saddle bodies shall be preformed at the factory to fit cast iron OD PVC. Each body shall be marked with the OD to which it has been formed. Saddles for taps on PVC water mains shall be Ford Style FS 202 or FC 202 (epoxy coated body); or Romac style 202S or 202N (nylon coated body); or approved equal.

13-2.04-B Installation of Tapping Saddles

Installation of saddles shall be in accordance with the manufacturer's recommendations.

The hole drilled or cut in the main shall be equal to the stated nominal size of the threaded tap on the saddle.

Note: Holes cut in PVC water mains shall be accomplished with a ribbon-type cutter. Drills and hole saws are not recommended by the pipe manufacturer and are, therefore, prohibited. Ribbon cutters shall be advanced slowly and not forced through the pipe wall. Forcing the bit will cause undue heat or fracturing of the PVC material.

Holes cut in DIP water mains may be accomplished by either drilling or the use of a hole saw.

The outside of the pipe shall be cleaned thoroughly of all dirt, grease, oil, and other foreign matter prior to installing the saddle.

Bolts shall be drawn up in an acceptable pattern and torqued to the manufacturer's specifications.

Apply corrosion control materials as specified elsewhere in this section.

13-2.05 Tapped Couplings

Tapped couplings may be used for water main taps concurrent with construction only, and shall be limited to a maximum nominal outlet diameter of 2".

13-2.05-A Materials

Tapped couplings shall be solid cast fittings conforming in all respects to fittings required for Water Mains elsewhere in these specifications. In general, they shall be AWWA C110 or C153 ductile iron, with a cement mortar lining and asphaltic coatings, and end configurations of either push-on or mechanical joints. The coupling shall be cast with a raised boss. The boss shall be tapped with standard iron pipe threads. Tapped couplings shall be U.S. Pipe "Tapped Tees", or approved equal.

13-2.05-B Installation of Tapped Couplings

Tapped couplings shall be installed as a water main fitting, as described in the section entitled "Water Mains", elsewhere in these specifications. Apply corrosion control materials as specified elsewhere in this section.

13-2.06 Tapping Sleeves

Tapping sleeves shall be used for making wet taps 4" nominal size and larger on existing water mains 6" nominal size and larger. Tapping sleeves shall not be used for water main taps concurrent with construction. Tapping sleeves shall be either cast iron split-sleeve type with a flanged outlet and mechanical joints to seal around the pipe (CI), or stainless steel split sleeves with a flanged outlet and a full-face rubber gasket to form the seal (SS), all as specified herein. The type of tapping sleeve used shall be as shown on the plans, or as determined by the District Engineer.

These two types of tapping sleeves shall be limited to use on the water main materials, water main sizes, and tap sizes listed below:

<u>Water Main Size (in.)</u>	<u>Tap Size (in.)</u>	<u>DIP</u>	<u>ACP</u>	<u>PVC</u>	<u>STEEL</u>	<u>GCIP</u>
6	4	CI,SS	CI,SS	CI,SS	SS	SS
8	4	CI,SS	CI,SS	CI,SS	SS	CI,SS
8	6	CI,SS	CI,SS	SS	SS	SS
10	4	CI,SS	CI,SS	CI,SS	SS	CI,SS
10	6	CI,SS	CI,SS	CI,SS	SS	SS
12	4	CI,SS	CI,SS	CI,SS	SS	
12	6	CI,SS	CI,SS	CI,SS	SS	
12	8	CI,SS	CI,SS	SS	SS	
14 to 24	Up to 10	CI,SS	CI,SS	SS		

- Where:
- DIP = Ductile Iron Pipe
 - ACP = Asbestos-Cement Pipe
 - PVC = Polyvinyl Chloride Pipe
 - Steel = 10-gauge minimum wall thickness
 - GCIP = Gray Cast Iron Pipe
 - CI = Cast Iron Split-sleeve with mechanical joints
 - SS = Stainless Steel Band with full-face gasket

Alternative methods for tapping steel water mains, such as weld-on half sleeves, or weld-on split sleeves, shall not be used without prior approval from the District Engineer. The District Engineer may require design calculations, shop drawings, and specific details on coating repairs. Weld-on sleeves shall be allowed only on cement mortar lined water mains.

13-2.06-A Cast Iron Split-sleeve (CI)

Cast iron split sleeves shall have standard mechanical joint ends complying with AWWA C111, except that the mechanical joint glands shall be split to accommodate installation. The outlet shall be flanged with dimensions and drilling that comply with ANSI B16.1, Class 125. The body shall have a 3/8" NPT minimum size test plug. The body shall be coated with corrosion-resistant paint that is compatible with treated water. Cast iron split sleeves shall be Mueller H-615, U.S. Pipe "Tapping Sleeve", Clow F-5205, or approved equal.

13-2.06-B Stainless Steel Tapping Sleeve (SS)

Stainless steel tapping sleeves, including flanges, outlets, armor plates, lugs, nuts, bolts, and washers shall be constructed of 18-8 type 304 stainless steel. Each sleeve shall be rated at a minimum working pressure of 150 psi and shall be factory hydrostatically tested on a pipe to a minimum of 300 psi for a minimum of three minutes with zero leakage allowed. Certified leak test results shall be provided if required by the District Engineer.

The sleeves shall incorporate drop-in type bolt lugs with pass-through bolt design and supplied with a minimum of two longer starter-bolts. Sleeves employing lifter bars and/or bolts welded to one half of the sleeve shall not be accepted.

Sleeves shall incorporate a full circle, full length, overlapping body gasket made of virgin Buna-N, or equal, compounded for water service. The body gasket may be protected by heavy gauge armour plates at the seams in the sleeve body. The body gasket may be factory bonded to the outlet half of the sleeve and the armour plates shall be factory bonded to the body gasket. The body gasket shall be full thickness between the armour plates and the pipe.

The stainless steel flange shall have ANSI 125 lb drilling and be recessed for a tapping valve per MSS-SP60 and furnished with a full-face gasket permanently bonded in place.

Sleeves shall be sized properly to fit the pipe outside diameter. The branch outlet shall be oversized to accept standard tapping saws or bits. The outlet shall be furnished with a 3/8" NPT minimum size stainless steel test plug. All welds shall be passivated. All threads shall be factory coated with fluorocarbon to prevent galling. Nylon washers may be added to reduce installation torque.

Stainless steel tapping sleeves shall be as manufactured by JCM Industries, Inc. Model JCM 432 or PowerSeal Pipeline Products Corporation Model 3490, or approved equal.

Valves used for wet-taps shall be resilient seat gate valves, designed specifically for wet-tapping and shall conform to Main Line Valves described elsewhere in these specifications.

13-2.06-C Installation of Tapping Sleeves

Installation of tapping sleeves shall be in accordance with the manufacturer's recommendations and these specifications. A calibrated torque wrench shall be used to achieve all recommended torques.

After excavating the water main and immediately prior to installing the sleeve, remove all dirt, grease, oil and foreign material from the outside of the water main. The water main shall then be then rinsed thoroughly with water.

Install the tapping sleeve with particular attention to position of gaskets, "O" rings, and seals. Bolts shall be drawn up and torqued to manufacturer's specifications in a uniform and accepted pattern.

The tapping valve shall be installed on the flange, as recommended by the valve manufacturer.

The downstream flange of the valve shall be blocked temporarily so as to accept the weight of the valve and the tapping machine.

The sleeve and valve installation shall be air tested for leaks prior to installing the tapping machine. The sleeve shall be pressurized with water through the test coupling to at least 100% of the system working pressure at the point of the tap. Care shall be taken to insure that working pressure is maintained in the water main for the duration of the test. The testing equipment shall be fitted with an appropriate gauge. After test pressure is achieved, the complete installation shall be inspected visually for leaks. Then, all joints shall be tested with a solution of soap and water. All visible leaks shall be repaired in a manner approved by the District Engineer. The test pressure shall then be maintained on the gauge without any further aid from the pressure source, for a period of 10 minutes without any perceivable decline in pressure. If the pressure declines, the visual test shall be repeated. The water main shall not be tapped if a leak is present. If the tapping valve is the suspected source of leakage, the valve shall be replaced and the test repeated.

Prior to installing the tapping machine and in time for an initial cure of the concrete to occur, a concrete thrust block shall be poured behind the sleeve and under the outlet of valve, all as required for a "tee" fitting described for Water Main Fittings elsewhere in these specifications. The concrete block shall be formed and extended underneath the sleeve and the valve so as to provide support once the temporary blocks are removed. All bolts and connectors shall be protected against contact with the concrete by wrapping with polyethylene film, as required for corrosion protection described elsewhere in this section.

The tap shall be performed in accordance with the tapping machine manufacturer's recommendations. The tapping machine shall be supported and blocked so as to reduce strain on the sleeve, valve, or water main.

Note: PVC pipe shall be tapped using a ribbon cutting bit only. Do not use a drill or hole saw-type bit.

The coupon shall be removed with the tapping machine. If, for whatever reason, the coupon is not recovered with the machine, the Contractor shall be responsible for

coupon retrieval from the system and shall cooperate fully with directions given by the District Engineer while locating and removing the coupon.

Upon removal of the tapping machine, the entire tapping sleeve and valve assembly shall be inspected for water leaks. All visual leaks shall be repaired. All repair methods shall be subject to District Engineer's approval. The valve shall be opened enough to flush any shavings, chips, and debris from the water main.

Apply corrosion control as specified elsewhere in this section.

13-2.07 Corrosion Control

All fittings, couplings, saddles, sleeves, joints, straps, and fasteners having bolts, straps, glands, set screws or other metal fasteners used for water main taps shall be protected from corrosion after assembly and leak test (if applicable), as specified herein. The tapping saddle or sleeve, the valve, and the water main and lateral for three feet on either side of the sleeve and valve, shall be thoroughly wrapped with two layers of 6-mil polyethylene film having a minimum sheet width of 3 feet. The film shall be held firmly in place with tape. Backfilling operations shall be conducted so as not to damage or displace the film.

Taps made on ductile iron having a polyethylene encasement shall, prior to backfilling, provide for repair of the film in compliance with AWWA C105. The saddles, couplings, or sleeves shall be wrapped as described above.

13-2.08 Reaction Blocking

Concrete used for reaction (thrust) blocks and as support under the sleeve and valve, and its installation shall be as described herein and for Water Mains elsewhere in these specifications.

13-2.09 Locating Wire

Connection of the new locating wire from the lateral to the locating wire on the water main shall be as described for Water Mains elsewhere in these specifications.

13-2.10 Surface Restoration and Cleanup

Surface restoration and cleanup for the area around the tap shall comply with Trench Restoration and Final Cleanup, as described for Water Mains elsewhere in these specifications.

13-3 Measurement and Payment

No measurement for separate payment shall be made for any of the work specified in this section, and all costs in connection therewith shall be included in the contract price for the item to which the work is pertinent.