

WATER MAIN LINE STOP

**\*\*From Rutland City-Proctor STP 2728(1) Rutland City NH 2716(1)  
Rutland City STP 019-3(57)**

- xx. DESCRIPTION. This work shall consist of furnishing, installing, and setting line stops into existing water mains at the locations indicated in the Plans and as directed by the Engineer.
- XX. MATERIALS. Line stop fitting shall be a full encirclement, pressure retention type split tee. It shall consist of two steel weldments; an upper line stop flange saddle plate and a lower saddle plate. These two saddle plates shall be contiguous.
- (a) Line Stop Flange. The outlet of each fitting shall be machined from a 150 lb forged steel flange (ASTM A181 or A105) or from pressure vessel quality steel plate (ASTM A285, Grade C); flat-faced and drilled per ANSI B16.5. Suitable independently operated locking devices shall be provided in the periphery of the flange to secure the completion plug.
- (b) Line Stop Nozzle. The nozzle, which lies between the saddle and the flange, shall be fabricated from steel pipe (ASTM A234). After welding and stress relief, the nozzle shall be accurately bored as follows to accommodate the line stop plugging head:
- (1) Machine an internal circular shoulder to seal against the circumferential gasket carried on the plugging head.
- (c) Completion Plug. The completion plug shall be machined from a stress relieved carbon steel weldment. It shall contain two (2) circumferential grooves: one to receive the locking devices from the line stop flange, and the second to contain a compressible "O" ring to seal pressure tight against the bore of the flange.
- (d) Blind Flange. Each line stop fitting shall be closed with a blind flange. Facing and drilling of the blind flange shall be compatible with that of the line stop flange. Minimum blind flange thickness shall be that of AWWA Spec. 207, Class D.
- (e) Saddle Alignment Marking. Each saddle half shall be matched and marked with serial numbers, to insure proper alignment in the field.
- (f) Fasteners. All bolts, studs, and nuts used on line stop and drain/equalization fittings shall be of the heavy series.
- (g) General. The manufacturer shall exercise extreme care to insure that weldments are of adequate strength, properly shaped, securely reinforced, and free from distortion that could stress the water main during installation, pressure tapping, or line stopping operations. All steel shall meet the requirements of ASTM A36, as a minimum. All weldments shall be braced and stress relieved.

- (h) Gaskets. Gaskets shall be molded from elastomer compounds that resist compression setting and are compatible with water in the 32 to 140°F temperature range.
- (i) Upper Line Stop Flange Saddle. Upper line stop flange saddle shall consist of a saddle plate, a line stop flange, and a line stop nozzle. The interior of the saddle plate, adjacent to and concentric with the O.D. of the nozzle, shall be grooved to retain a gasket which shall seal the saddle plate to the exterior of the water main. This gasket shall constitute the only seal between the main and the fitting.
  - (1) Saddle plate shall be a minimum of 0.375" in thickness. It shall be shaped to be concentric to the outside of the ductile iron main. The smallest I.D. of the saddle and its interior rings shall exceed the O.D. of the main by a minimum of 0.250" to allow for ovality of the main.
  - (2) A line stop nozzle of 0.375" min. wall thickness shall be securely welded to the saddle plate.
  - (3) The line stop flange shall be securely welded to the nozzle. After welding, the assembly shall be braced, stress relieved, and bored to receive the completion plug and the circumferential gasket of the line stop machine plugging head.
  - (4) Bolt, nut of stud, nut, and washer assemblies shall be furnished to draw the upper and lower saddles together for sealing. Bolting brackets shall be gusseted.
- (j) Lower Saddle Plate. Lower saddle plate shall be a minimum 0.375" thickness and shall be shaped to be concentric to the outside brackets and shall match upper half.
- (k) Split Line Stop Fittings. Split line stop fittings shall be provided with a ¾" NPT test plug, or other provisions must be made for air testing of the sleeve assembly.

XX. SUBMITTALS. Submit Fabrication Drawings in accordance with Section 105.

XX. GENERAL CONSTRUCTION REQUIREMENTS.

(a) Description of Procedure.

- (1) General. The line stopping procedure is a means of temporarily plugging a pressurized pipe without disrupting pressure or service upstream of the line stop. A pressure tap is first made into the main, allowing insertion of a line stop plugging device into the main while under pressure. By using a line stop fitting, the tapping valve can be later recovered after the plugging head has been removed from the main. The following sequence of steps is intended to serve as a recommendation only. All construction means and methods are solely the responsibility of the Contractor.

- (2) Prior to ordering materials, the Contractor shall excavate, dewater, expose, and clean the exterior of the main at locations shown on the Plans for each line stop. If the main is heavily corroded, or if utilities will interfere with fittings, support/reaction blocking, or equipment, move location up or downstream to a section of structurally sound pipe as directed by the Engineer.
  - a. Identify water main pipe sizes and pipe materials.
  - b. Caliper O.D. of all mains to determine ovality.
  - c. Verify wall thickness and interior condition if possible.
  - d. Backfill and restore surface as ordered by the Engineer.
- (3) Re-excavate; Dewater. Assemble split line stop fitting(s) around the main. Install drain nozzle(s) and saddle(s) to the main.
- (4) Pressure test split line stop fitting(s) prior to tapping. Split line stop fittings shall be provided with a ¾" NPT test plug, or other provisions must be made for air testing of the sleeve assembly. The test pressure shall be 1.5 times the working pressure or 200 psi, whichever is greater, for a period of 15 minutes without any pressure drop. Any leaks or other problems must be corrected before the pipe is tapped.
- (5) Install concrete pipe restraints per Fabrication Drawings.
- (6) Mount temporary tapping valve(s) to line stop fitting(s) and drain nozzle(s).
- (7) Mount tapping machine; open valve; pressure tap; retract cutter; close temporary valve; remove tapping machine.
- (8) Mount line stop machine; open temporary valve; insert line stop plugging head into main. If two or more line stops, insert downstream plugging head first.
- (9) Test for shutdown at drain nozzle.
- (10) Cut downstream main. Install required valves and fittings as depicted in the Contract Documents.
- (11) Retract line stop plugging head and close the temporary valve. Remove line stop machine.
- (12) Install completion machine and open valve.
- (13) Insert completion plug into nozzle of line stop fitting.

- (14) Remove completion machine and temporary valve.
- (15) Repeat steps as necessary at other line stop fittings.
- (16) Install blind flange(s) onto nozzle of line stop fitting(s) and onto drain fitting(s).

- xx. INTERRUPTION OF FLOW. The existing mains, upstream of the line stop(s), cannot be shut down or taken out of service. To insure that the entire operation shall be accomplished without interruption of service or flow, the installation shall be accomplished by the Contractor with personnel skilled and experienced in the procedures specific to line stops of this size.
- xx. REDUCTION OF PRESSURE. The entire operation of making the line stop shall be accomplished without reduction of water pressure in the main(s) below 100 psig. It shall be the responsibility of the Contractor to verify pressure prior to commencing the installation.
- xx. DRAIN PRESSURE RELIEF TAPS. Per direction of the Engineer, the Contractor shall furnish and install drain pressure relief taps between line stops as necessary to perform the line stopping procedures and to facilitate removal and replacement of existing water main piping.
- xx. PRELIMINARY FIELD INSPECTION OF MAINS. Sizes, materials, and locations of all existing water mains as depicted in the Contract Documents are based solely on the best available information. This information has not been verified by field inspections. The Contractor shall be required to perform the following prior to installation of line stops:
  - (a) It is necessary to know the exact main O.D., ovality, and bore diameter before line stop fittings and plugging head sealing elements can be manufactured.
  - (b) Prior to ordering material, the Contractor shall excavate at each proposed location, and caliper the header O.D. along at least four (4) diameters to determine ovality.
  - (c) The Contractor shall determine main wall thickness, uniformity, and structural integrity by means of ultrasonic testing if necessary. Data shall be taken to determine extent of internal deposits, tuberculation, etc.
    - (1) If the Engineer determines that the Contractor's data is not adequate, the Engineer may direct the Contractor to make one or more pressure taps on main to obtain test pipe coupons for the Engineer's evaluation.
    - (2) Minimum size of test coupon shall be 5" diameter, drilled through a nominal 6" valve.
  - (d) Heavy interior corrosion and/or tuberculation can be anticipated in the existing mains.
  - (e) Proposed locations for line stops may be moved if deemed unsatisfactory as ordered by the Engineer.

xx. INSTALLATION OF LINE STOP FITTINGS, GENERAL. The Contractor shall power wire brush and grind the exterior of the water main to remove any debris, corrosion deposits, or other surface irregularities that might interfere with proper seating and sealing of each line stop fitting against each main. Any structural defects in main, service connections, appurtenances, adjacent utilities, etc. that could interfere with the line stop installation shall be immediately reported to the Engineer and the proposed location adjusted accordingly.

(a) Inspection. The Contractor shall fit upper and lower saddle plate assemblies to main, thoroughly checking for proper fit to main.

(b) Assembly to Main. Under no circumstances shall the Contractor attempt to force, reshape, or bend saddle plates by excessive tightening of saddle studs while line stop fitting is assembled around the main.

(1) Any retrofitting shall be accomplished with the fitting removed from the main.

(2) Any damage to fitting, accessories, or water main shall be repaired at the Contractor's expense to the satisfaction of the Engineer.

xx. ASSEMBLY OF LINE STOP FITTING.

(a) The upper and lower saddle plates shall be bolted together.

(b) Main Preparation. The entire periphery of the ductile iron main shall be power ground for the entire length of the line stop fitting.

(c) Assembly of Saddle Plates. Upper and lower saddle halves shall be drawn together by bolt assemblies.

(d) Saddle plates shall be bolted together in the horizontal position.

xx. THRUST AND SUPPORT BLOCKING. The Contractor shall submit Fabrication Drawings for all new concrete pipe restraints, including design computations for overall concrete block sizing, steel reinforcement, steel strapping and/or clamping, and placement location of the concrete block with respect to the corresponding water main line stop as depicted in the Contract Documents. All computations shall be stamped by a Licensed Professional Structural Engineer registered in the State of Vermont. Submittals shall be reviewed by the Engineer for conformance in accordance with Subsection 105.03(b)(2)b.

Prior to mounting temporary tapping valve and pressure tapping machinery, the Contractor shall install new concrete pipe restraints and support blocking as shown on the Plans and noted above.

xx. CUTTING OPERATION. Drilling equipment shall be in good condition, and equipped with power drive to insure smooth cutting and to minimize shock and vibration. Cutting equipment shall be carbide tipped and capable of being replaced without removal from the jobsite.

- xx. COMPLETION. Final closure of the branch end of the line stop split tee shall be accomplished by insertion of a completion plug. Testing of the completion plug sealing shall be accomplished through bleed-off in the machine housing. Temporary valve shall be removed and the permanent blind flange with gasket shall be installed.
- XX. METHOD OF MEASUREMENT. The quantity of Special Provision (Water Main Line Stop) of the size specified to be measured for payment will be the number of units installed in the complete and accepted work.
- XX. BASIS OF PAYMENT. The accepted quantity of Special Provision (Water Main Line Stop) of the size specified will be paid for at the Contract unit price per each. Payment will be full compensation for furnishing, transporting, handling, installing, and testing the materials specified, including but not limited to dewatering; all excavation including exploratory excavation; preliminary inspection and identification of existing water main size, material, wall thickness, and condition including interior corrosion and/or tuberculation; bedding; backfill; fittings including split tee for line stop, completion plug, blind flange, caps, and drain pressure relief taps; concrete; blocking and bracing; making all necessary connections; and for furnishing all labor, equipment, tools, and incidentals necessary to complete the work.

Excavation, including backfill and disposal of excavated material not suitable for backfill; and backfill, including material required to replace poor foundation material below the normal grade of pipe(s) will not be paid for separately but will be included for payment under Special Provision (Water Main Line Stop).

Payment for new concrete pipe restraints, as required for installation of all line stops, shall be considered incidental to Contract item 629.42.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
900.620 Special Provision (Water Main Line Stop)( <del>X</del> mm)( <del>X</del> " )	Each