
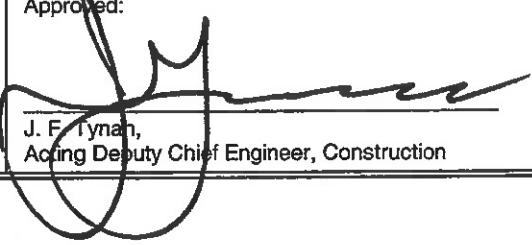


To:		New York State Department of Transportation ENGINEERING BULLETIN	EB 01-025
<i>Expires one year after issue unless replaced sooner</i>			
Title: MURK PART 1B, CONSTRUCTION INSPECTION MANUAL (CIM) - SECTION 663 WATER SUPPLY UTILITIES			
Distribution: <input type="checkbox"/> Manufacturers (18) <input type="checkbox"/> Surveyors (33) <input checked="" type="checkbox"/> Main Office (30) <input checked="" type="checkbox"/> Consultants (34) <input type="checkbox"/> Local Govt. (31) <input checked="" type="checkbox"/> Contractors (39) <input checked="" type="checkbox"/> Regions/Agencies (32) <input type="checkbox"/> _____ ()	Approved:  J. F. Tynan, Acting Deputy Chief Engineer, Construction	5-4-01 Date	

ADMINISTRATIVE INFORMATION

This Engineering Bulletin (EB) is effective immediately for all contracts affected by EI 00-038 "Standard Specifications - Water Supply Utilities". This EB does not supersede any previous issuances.

PURPOSE

This EB issues a new Section 663 of the Construction Inspection Manual. This section provides guidance and instructions for field staff on the installation of water supply utilities.

TECHNICAL INFORMATION

The revised Standard Specification section was issued by EI 00-038 "Standard Specifications - Water Supply Utilities". That EI eliminated numerous special specifications and standardized installation and payment statewide. The associated Standard Sheets were issued by EB 00-072 "Standard Sheets - Water Supply Utilities".

TRANSMITTED MATERIALS

This EB transmits Construction Inspection Manual Section 663, Pages 1 to 7, dated March 2001.

CONTACT

Address questions regarding this issuance to Dave Kent of the Construction Division at (518) 457-6475 or via e-mail at dkent@gw.dot.state.ny.us

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BACKGROUND

Standard Specification Section 663-Water Supply Utilities, contains the contract requirements for water supply utility installation. Water supply utilities typically belong to municipalities or water districts. The organization, staffing and capabilities of these organizations varies widely, as well as their material and construction requirements. The Engineer will frequently represent the interests of the owner, though some owners will require that their staff or consultant be present to observe work on the water supply system. These arrangements are spelled out in the Utility Agreement between the Owner and the State. Installation of new water main as a betterment or relocation/replacement due to other work requires a State Department of Health (DoH) permit. The DoH permit will outline disinfection, testing and certification requirements.

GENERAL REQUIREMENTS

The requirements of the System Owner are contained in Special Notes entitled "Owner Requirements for Water Mains and Appurtenances". Read these notes to determine any Owner requirements for materials, installation, valve operation, testing, etc. A utility agreement may also contain requirements for inspection by Owner personnel, tapping requirements (some Owners will not allow wet tapping of a live main by Contractor personnel), valve operation requirements, etc. Contractor personnel should not operate valves outside the project limits without Owner approval.

Documentation required for ductile iron water pipe, steel water pipe, valves, hydrants, tapping sleeves, line stop fittings, bolted couplings, wedge type mechanical restraint glands, high deflection restrained joint fittings, iron water main fittings, etc:

- (1) The Contractor shall provide manufacturer certification that the material is in conformance with Standard Specification §110-10 Buy America and Buy America Waivers for Non-Federally Aided Contracts, and §110-11 Buy America and Buy America Waivers for Federally Aided Contracts.

The Inspector will notify the Engineer of any ductile iron water pipe, steel water pipe, valves, hydrants, tapping sleeves, line stop fittings, bolted couplings, wedge type mechanical restraint glands, high deflection restrained joint fittings and iron water main fittings from foreign country producers. The Engineer will confirm that the Contractor's bid was based on using foreign steel and/or iron. If the bid was not based on using foreign steel and/or iron, the Engineer will determine whether the quantity of foreign steel and/or iron surpasses the maximum allowed in §110-10.03 Control of Materials. The entire quantity of material above the maximum allowed will be rejected, unless a waiver is obtained by the Contractor from the approving authority. (NOTE: Iron products are exempt from this requirement for non-federally aided contracts.)

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- (2) The Contractor shall provide Manufacturer Certification identifying the material as one of the following and the bare fitting weight as listed in the appropriate AWWA Standard (currently listed only in lbs.):

<u>Cast Material</u>	<u>AWWA Standard</u>
Gray Iron and Ductile Iron Full Body Fittings	C110
Ductile Iron Compact Fittings	C153

Note: Some fittings are not listed under the above standards and therefor cannot be certified under these standards.

Removals

Unused/abandoned water supply pipe should be removed, but it may be abandoned in place. If abandoned in place, the ends shall be capped in accordance with the contract documents. Removal and storage can become problematic if the Owner does not arrive to take the materials. The Contractor is not required to deliver, but if the Owner does not accept the responsibility to remove the material, the Contractor may dispose of it (properly). Requiring a Contractor to deliver removed materials outside of the contract limits is a violation of federal policy. The Owner should be notified by Certified Mail that the material will be disposed of if not removed in a specified time period. Iron or steel pipe has residual value, and may be scrapped. Iron, steel or plastic pipe may also be disposed of as Construction and Demolition (C&D) Debris.

Asbestos-Cement Pipe

Large quantities of water supply pipe fabricated from asbestos-cement (AC) were installed across the State prior to the banning of asbestos containing products. AC pipe was originally white, but may be discolored, the surface is smooth, with a texture similar to concrete pipe. AC pipe is non-metallic and will crack readily if struck with a hammer. In place, the material poses no health threat, but the material should never be cut, ground, tapped or any other operation performed under this section that may create dust, which poses a severe health hazard. Any operation, including cutting, tapping, removal, etc requires a special specification and an associated asbestos removal permit from the Department of Labor (DOL). If AC pipe is encountered in the field, and not identified in the contract documents, stop all associated work adjacent to the pipe, backfill the area and contact the Regional Environmental Contact for assistance.

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Shutdowns

The Contractor shall only shut down a portion of the water supply system with the consent of the Owner. The Contractor shall provide 48 hours notice to each customer, which may be provided by posting a written notice on the building entrance. The Contractor should attempt to schedule work, particularly for commercial customers, during days or hours that minimize impact on customers. The Contractor should provide the Engineer a plan for work, and confirmation that notifications were made. The temporary water service item is typically used to supply critical facilities (hospitals, commercial/industrial users, etc.) and should not be paid for to meet the Contractor's selected construction schedule or to correct Contractor created deficiencies.

Existing Valves

The Owner should be asked to operate and exercise any existing valves that will need to be operated during construction, prior to the Contractor beginning work. The Owner may refuse to operate an existing valve if there is a chance that the valve will malfunction during operation, leaving the risk of failure and subsequent replacement cost to the State.

Excavation and Backfill

Trench widths for water supply pipe excavation, installation and backfill are shown on the Standard Sheets. Safety related requirements for trench protection must be addressed. Materials containing fly ash or slag are corrosive to cast and ductile iron, and shall not be allowed to come into contact with water supply pipe or appurtenances. Pipe bedding shall only be installed when called for in the contract documents (typically in the Owner Requirements), or where unsuitable or unstable material is encountered during excavation.

Thrust Restraint

Thrust restraint is required to prevent a pressurized pipe from separating due to movement. Many Owners will require multiple types of thrust restraint, though only one is required. External threaded rods are the least effective, due to corrosion and potential failure. Concrete blocks are common, but can be expensive. The most effective types are restrained joints, where the joints are firmly bolted together. Restrained joints can be provided for existing pipe through the use of wedge type mechanical restraint glands. The thrust block sizes shown on Standard Sheet M663-2 are for standard conditions ONLY (1.5m burial, 1380kPa (200 psi) test pressure, 96kPa (2,000 psf) soil bearing capacity, and 1440 kg/cm (90 pcf) soil unit weight). These values are conservative for most applications, and frequently are over conservative. See the standard sheet for adjustment method, and refer to the Owner Requirements for test pressure. The Regional Geotechnical Engineer can provide assistance in evaluating soil conditions.

Example: Assuming the other standard values are acceptable, for a test pressure of 690kPa (100 psi), reduce the thrust block area by 50% (100psi/200psi). Maintain the minimum dimensions shown on the Standard Sheet.

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Water Supply Pipe Installation

Ductile iron pipe is available in three types of joints, as shown on the Standard Sheets. Push-on joints are assembled by simply pushing the plain end of a length of pipe into the bell end of another piece of pipe with a gasket installed. This provides no thrust restraint. A mechanical joint provides a limited amount of thrust restraint. A restrained joint mechanically locks a retainer ring welded to the plain end of a pipe.

The Contractor shall follow the Standard sheets for pipe installation and installation procedures outlined in the pertinent AWWA Standards (C600, C603, C605). Care must be used in the handling of pipe, as the lengths are typically too heavy to be handled manually. Pipe shall be kept clean and free of dirt, typically by using temporary pipe plugs. Ductile iron pipe lengths may be measured as 5.5m (18 ft) or 6.1m (20 ft) standard full laying lengths. Plastic pipe may also be measured in this manner, based on a standard full length. Pipe segments that are field cut must be field measured, deducting the amount of plain end that is inserted into the bell of the next section. The length of fittings must be deducted from field measurements of installed lengths, as fittings are paid for by weight.

Installation of steel water pipe is different from iron or plastic. Steel pipe is typically used for very large diameters (48 NPS and larger). Rather than gasketed joints and fittings, steel water pipe is installed with fully welded joints and the fittings are shop fabricated from lengths of steel pipe. Steel pipe is typically coated, on the inside and outside, and some of the coating will have typically to be done in the field. The use of steel water pipe normally requires a cathodic protection system to prevent corrosion. Follow the contract documents for installation and inspection of cathodic protection systems.

Polyethylene Encasement and Insulation

Ductile iron pipe is frequently encased in polyethylene when installed in corrosive soil conditions. The encasement may be done using sheets or tubes, in accordance with AWWA Standard C105. Ends should be overlapped and taped. Fittings shall be encased using plastic sheets cut, fit and taped to encase the fitting.

Thermal Insulation for buried water pipe is used when the bury depth over the pipe is less than the desired, typically 1.5 m (5 ft). This typically occurs when a water pipe is installed under a culvert or over some underground obstacle which reduces the bury depth. The insulation should extend along the water supply pipe to a point on either end that has a minimum 1.5 m ground clearance. The item for bridge mounted water mains includes insulation, and is not paid for separately.

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Valves

Valves shall be installed with firm, even bearing. The Owner may require concrete blocks, pavers, crushed stone, gravel, etc. to support the valve. The valve box is placed over the operating nut on the top of the valve, but not bearing on the valve. Some Owners will require that concrete, concrete block or similar walls be installed to support the edges of the valve box, to prevent it from bearing on the valve. Screw type valve boxes are easier to install, but may transmit wheel loads to the body of the valve if not properly installed. The separate pieces of slide type valve boxes will telescope together under pressure, preventing damage to the valve. The slide type is the preferred type of valve box and shall be provided unless the Owner requires otherwise.

Hydrants

Hydrants shall be supplied with a length(s) of anchor pipe up to 2.0 m long at no additional cost to the State. Anchor pipe, which is typically available in 300 mm increments up to 1 800 mm, may be provided from the supplier with retainer rings and glands installed, to reduce field cutting and welding. Use of the correct length anchor pipe will allow proper placement of the hydrant. Larger offsets from the main to the hydrant will require installation of additional lengths of pipe, typically 6 NPS. New hydrants shall not be connected to a main with a lateral pipe smaller than 6 NPS.

Hydrants shall be installed so that the lower barrel does not extend more than 100mm above grade over a 1.5m span, to prevent snagging on the bottom of an errant vehicle. The groundline is identified by the Manufacturer using an offset from the flange because hydrant barrels are typically manufactured from ductile iron, and the groundline cannot be cast on the exterior as previously done with cast iron barrels. The hydrant shall be installed with groundline within 25mm of finished grade, to provide adequate restraint of the lower barrel, which allows the upper barrel to break off if struck by an errant vehicle. Barrel extensions to adjust the height of the upper barrel are available in 150mm increments; no more than one extension will be allowed. Small adjustments of a hydrant barrel are difficult, and localized minor adjustments of finished grade may be necessary.

Hydrant Fenders

Hydrant fenders should only be installed behind a raised curb, in a low speed (urban) setting.

Dry Hydrants

A dry hydrant consists of a length of pipe with strainer on one end that is in a pond or other year round source of water, and a fitting on the other end that allows quick connection to a fire department pumper truck. Dry hydrants shall be installed as detailed on the plans.

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Iron Water Main Fittings

Iron water main fittings are available in two basic types, "full body" fittings (AWWA Std C110) and compact fittings (AWWA Std C153). Unless specifically noted otherwise in the Owner Requirements, "full body" fittings may be supplied in either gray iron or ductile iron. Compact fittings are only available in ductile iron. In accordance with AWWA Standards C110 and C153, all fittings shall have the following distinctly cast on them: pressure rating, nominal opening diameters, manufacturer's ID, country where cast and the number of degrees or fraction of circle on all bends. Ductile iron fittings shall have the letters "DI" or "Ductile" cast on them.

Iron water main fittings are paid for by weight. Fitting weights for payment are those listed in the appropriate AWWA Standard, when available (not all fittings or sizes are covered by the AWWA Standards). Total the weights in pounds, convert the project total to kilograms, rounding to the nearest whole kilogram.

The material certification required under §722-01 shall list a fitting description, quantity, bare fitting weight and source of fitting weight (AWWA C110, C153 or Manufacturer, if fitting is not listed in either standard). Payment will be made based on material weight listed on the material certification.

Wedge Type Mechanical Restraint Glands

These glands are often known by their trade names, "Megalug", "Ford 1100", etc. The radial wedge bolts are tightened, and when the proper torque is reached, the outer portion of the bolt head snaps off, making the installation simple and reliable. The reliability may be compromised if the nuts are turned in the wrong direction with an air wrench, as the outer bolt heads will snap off. If this happens, or the device must be removed and re-installed, the bolts must be installed to the proper torque using a torque wrench.

Water Service Connections

A water service connection consists of a corporation stop, a length of small diameter service pipe, a curb stop and curb box and another length of small diameter service pipe to the customer. A corporation stop is a brass fitting that is either direct tapped (threaded) into a water main, or installed through a tapping sleeve. A corporation stop is a small valve that allows the water to be shut off after installing the device on a pressurized main. The service line is then attached to it and the curb stop is installed. This then allows the curb stop to be shut off, while the corporation stop is turned on, and the main backfilled.

A variety of tapping machines are available to install corporation stops. Care shall be taken to ensure that the machines are safely operated when tapping active mains under pressure.

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Water Meter Pits

Water meter pits may be used in larger, commercial applications or when multiple structures on a single property are served from one service line. Meter pits are typically installed on the customers property, and will require a release. If a property owner does not grant a release, the (System) Owner may opt to discontinue service to that location. Unless otherwise noted in the Owner Requirements, meters shall be supplied by the Owner at no additional cost to the State or the Contractor.

Adjust Valve Box Elevation

Valve boxes may be adjusted using adjustment rings or frames, or by adjusting the existing box to the required grade. Valve box construction, either slide type or screw type, facilitates adjustment.

Hydrostatic Testing

Unless otherwise noted in the Owner Requirements, newly installed water supply pipe must be pressure tested to 1035kPa (150 psi) for a minimum of 2 hours. Allowable leakage amounts must be determined per AWWA Standard C600. Care must be taken to ensure that the main is restrained prior to pressurization, yet joints should be observed for visible leaks. No personnel should be allowed in a trench, excavation, meter pit or any confined space during the initial pressurization of a newly installed water supply pipe. Failure of a large diameter, high pressure water supply pipe may be hazardous to personnel in these locations. Valve operation to pressurize a newly installed water supply pipe shall be done gradually to prevent pressure fluctuations, which may damage the system.

Disinfection

Disinfection and testing shall be conducted in accordance with AWWA Standard C651 and the project DoH permit, if applicable. The testing results typically must be completed prior to activation and use. This may require that the existing main be left in service until the new main is approved. Testing results must be received from the Contractor prior to final progress payment.

Highly chlorinated or neutralized water used for disinfection should not be directly discharged to an environmentally sensitive water body or into a storm drainage system (open or closed) that outlets directly into a sensitive stream or water body. Highly chlorinated or neutralized water should be discharged to a sanitary sewer or municipal wastewater treatment facility if available. Highly chlorinated or neutralized water may be discharged into vegetated upland areas at least 100 feet from any surface water body. If this is not possible, contain highly chlorinated or neutralized water and aerate on site to allow chlorine to volatilize. If containing highly chlorinated or neutralized water on site is not feasible, discharge the water into a tank truck to be disposed of. Contact the Regional Environmental Contact for assistance.

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REFERENCES

American Water Works Association (AWWA) Standards
Special Notes - "Owner Requirements for Water Mains and Appurtenances"
HDM Chapter 13; Utilities
Section 722, Water Supply
Standard Sheets M663-1 to M663-7