Amendment to OPSS 1802 (Nov 2015) – Material Specification for Smooth Walled Steel Pipe

OPSS 1802 is amended by the addition of the following section:

TS 1802.10 SUPPLY, STORAGE, AND DELIVERY OF WELDED STEEL PIPE

TS 1802.10.01 General

This specification covers electrically butt-welded straight-seam and helical-seam pipe for water distribution. The following standards have been referred to:

- AWWA C200-91 Standard for Steel Water Pipe 6 inch (150mm) and larger;
- ASME Code for Unfired Pressure Vessels; and
- ASTM A139 Standard Specification for Electric Fusion (Arc) Welded Steel Pipe (NPS 4 and Over).

Should any uncertainty arise as to the meaning of the specifications or the proper manner of execution, the Contract Administrator will upon request, give the required information. Otherwise the City will assume the supplier has read and understands this specification.

TS 1802.10.01.01 *Intent*

The intent is to specify the provision of new, finished work. Items omitted which are clearly necessary for the completion of the work or its appurtenances shall be considered a portion of the work though not directly called for in the specification.

TS 1802.10.02 Shop Drawings

Immediately following receipt of a purchase order, five sets of working and assembly drawings giving details, design and method of construction, type of joint and bill of materials of the pipe shall be submitted to the Contract Administrator for review or modification. Drawings in metric dimensions and terminology shall be submitted. Use weld symbols from AWS 2.4, most recent addition, on all weld joint details.

Do not commence fabrication until drawings have been returned, stamped reviewed.

TS 1802.10.03 Material

Fabricate pipe from steel mill-certified to ASTM A139, Grade C.

TS 1802.10.04 Fabrication and Welding

TS 1802.10.04.01 *Fabrication of Pipe*

The longitudinal edges of the sheet or plate shall be shaped by press or by rolling to the true pipe radius. Hammering the edges to shape is not permitted. The plate or sheet shall then be properly formed and may be tacked preparatory to welding.

Straight seamed pipe shall be fabricated in segments at least 2438 mm in length. Construct each can with only one longitudinal joint. Combine individual cans and machine butt-weld together into true straight pipes each with an overall length of 9754 mm, + 25 mm. Stagger longitudinal seams in full pipe lengths with the seams of adjoining cans at 180 degrees.

Helical seam welded pipe shall be fabricated in one continuous section per pipe length having a butt-welded seam. Use a skelp width of 1016 mm or greater. Coil splice joints must be a minimum of 300 mm from the end of a pipe length.

Mark bottom and top centre lines on each and every pipe.

Unless otherwise specified, bevel each end of every pipe to permit downwelding of the upper-half from outside of the pipe and the lower half from the inside of the pipe. Bevel to an angle of 30°off a line perpendicular to the axis of the pipe with a tolerance of +5°, -0° and maximum width of root face of 1.5 mm.

Grind inside longitudinal or spiral welds flush to the surface for a minimum distance of 50 mm from the ends of the pipe.

Provide each 9754 mm length of pipe with one 50 mm twenty one MPa half-coupling complete with square-head solid steel plug. Weld the coupling into the pipe on top centre line, 300 mm from one end. Ensure coupling does not protrude into the pipe.

TS 1802.10.04.02 *Back-up Bars*

Bars shall be of a material compatible with pipe material and weldable, 25 mm x 5 mm thick x 1/2 circumference of pipe, rolled to suitable radius.

Ship loose, two bars per pipe.

TS 1802.10.04.03 *Tolerances*

Circumference

The pipe shall be substantially round. The outside circumference of the pipe shall not vary more than ± 1 percent, not exceeding 19 mm from the nominal outside circumference based on the diameter specified except at ends.

Pipe ends

The ends of pipe shall not vary by more than 3 mm at any point from a true plain perpendicular to the axis of the pipe and passing through the centre of the pipe at the end. Circumference at ends shall not vary more than 5 mm under or 10 mm over required outside circumference.

Straightness

Finished pipe shall not deviate by more than 3 mm from a 3048 mm long straightedge held against the pipe.

Out of roundness

The out-of-roundness of pipe ends shall be consistent with the diameter and wall thickness of the pipe supplied and the type of joint specified. Any out-of-roundness shall be limited to a smooth oval that may be jacked back to a circular shape with minimal field labour.

Lengths

Supply finished pipe in overall lengths of 9754 mm, + 25 mm, -0 mm.

Weld seams

For pipe wall thicknesses of 10 mm or less, the maximum radial offset (misalignment) shall be 0.1875 times the pipe wall thickness or 1 mm whichever is larger. For pipe wall thicknesses greater than 10 mm, the maximum radial offset shall be 0.1875 times the pipe wall thickness or 4 mm, whichever is smaller.

TS 1802.10.04.04 *Qualification of Welders*

Welders shall be qualified by a recognized regulatory authority and to the satisfaction of the Contract Administrator or his designate. Where a company does not have welders qualified as above, submit test plates to the Contract Administrator. All welding of test plates shall be witnessed by the Contract Administrator and testing done by an independent, certified testing organization or witnessed by the Contract Administrator.

TS 1802.10.04.05 *Acceptance Criteria*

The acceptance criteria shall be as specified in the 1989 ASME Boiler and Pressure Vessel Code, Section IX Welding and Brazing Qualifications, Article III, or in accordance with AWS B2.1, or under CSA W47.1.

TS 1802.10.04.06 *Production Welding*

Tack welds must be removed by suitable means so that they do not become part of the finished joint.

The weld shall be of uniform width and height for the entire length of the pipe.

Welding shall proceed according to a welding procedure qualified by a regulatory agency acceptable to the City or witnessed, subsequently reviewed and approved by the Contract Administrator.

Welding procedures shall be approved by the authority having jurisdiction (MCCR or CWB) and include details of consumables, base metal cleaning and inter-pass cleaning. Test data shall be available upon request.

Keep a record of all welders or welding operators who work on any given pipe.

TS 1802.10.05 Inspection, Testing and Rejection

TS 1802.10.05.01 *Inspection*

Notify the Contract Administrator or his representative when beginning manufacturing.

The Contract Administrator has the right to enter any of the supplier's or sub-contractor's shops, yards or other premises where the pipes or parts of same are being made, for the purpose of inspection or witnessing production. Place the materials in such position as required by the inspector.

Inspection at facilities outside of the Toronto area shall be by the Contract Administrator, at the manufacturer's expense. Inspection shall be done by inspectors qualified to CSA W178.2.

Inspection shall include but not be limited to a visual inspection of materials, fabrication and welding and witness of all hydrostatic testing, review of mill inspection reports covering all steel and documents pertaining to other materials, inspection of steel during cutting for laminations and other defects, inspection of fabrication, inspection of welding, welding methods and materials and assurance that all welders are qualified.

Such inspection shall not relieve the manufacturer of his responsibility to furnish material and perform work in accordance with this specification.

Remove any noted defect. Gouge or grind, re-weld and re-test, any work which does not meet the approval of the Contract Administrator, or the pipe may be rejected.

TS 1802.10.05.02 *Testing*

Sequentially mark each length of pipe with a different serial number preceded by an identifying letter before testing.

Inspect and test each pipe length by one of the following means, to the satisfaction of the Contract Administrator.

Where low quality is suspected the Contract Administrator may specify the test method at no additional cost to the City.

TS 1802.10.05.02.01 *Radiographic Inspection*

Radiography shall be done by personnel qualified by CGSB 48-GP-4M to a minimum Level II. Fully inspect radiographically all welds for each length of pipe. Provide a report and turn over the films obtained from the radiographic inspection to the Contract Administrator for analysis. The films will then become the property of the City.

Radiographic inspection and quality of joint shall in general conform to the requirements of the 1989 ASME. Boiler and Pressure Vessel Code, Division 1, Section VIII, Subsection B, Part UW, Clause UW-11 (B).

TS 1802.10.05.02.02 *Hydrostatic Testing*

Test each length of pipe in the presence of the Contract Administrator or his representative, under a hydrostatic pressure of 1200 kPa minimum. Maintain the pressure for a minimum of two minutes with no drop in pressure. The pipe should show no leakage on the outside throughout the test. Should the pipe show leakage, the pipe shall be repaired to the satisfaction of the Contract Administrator and re-tested as specified herein.

Pressure gauges on the test rigs shall have been calibrated to the satisfaction of the Contract Administrator.

No pipe shall be delivered which has not been fully inspected and tested and stamped 'approved' by the inspection representative of the Contract Administrator.

TS 1802.10.05.03 *Rejection of Work*

Replace or repair, at no additional cost to the City, all work condemned by the Contract Administrator or his authorized representative as failing to meet the requirements of these specifications.

All work repeated shall be tagged or marked accordingly.

TS 1802.10.06 Storage and Delivery

Exercise due care in stockpiling of pipe for storage to prevent out-of-roundness and ensure roundness up to point of delivery. Unless otherwise notified anticipate storage and delivery of pipe over a period of approximately one year after completion and acceptance by the Contract Administrator.

Deliver pipe to the job site or to the water main Contractor's pipe special fabricator within 10 km of the city in the quantities and at the times requested. Pipe loading for shipment will be by the manufacturer. Pipe shall be loaded in such a manner as to limit out-of-roundness caused by shipment. Any pipe section that shows dents, kinks, or abnormalities on delivery shall be rejected. Unloading of pipe at its destination will be by others.

MATERIAL SPECIFICATION FOR SMOOTH WALLED STEEL PIPE

TABLE OF CONTENTS

1802.01 SCOPE

This specification covers the requirements for smooth walled steel pipe to be used for the installation of pipes or casings.

1802.01.01 Specification Significance and Use

This specification has been developed for use in provincial- and municipal-oriented Contracts. The administration, testing, and payment policies, procedures, and practices reflected in this specification correspond to those used by many municipalities and the Ontario Ministry of Transportation.

Use of this specification or any other specification shall be according to the Contract Documents.

1802.01.02 Appendices Significance and Use

Appendices are not for use in provincial contracts as they are developed for municipal use, and then, only when invoked by the Owner.

Appendices are developed for the Owner's use only.

Inclusion of an appendix as part of the Contract Documents is solely at the discretion of the Owner. Appendices are not a mandatory part of this specification and only become part of the Contract Documents as the Owner invokes them.

Invoking a particular appendix does not obligate an Owner to use all available appendices. Only invoked appendices form part of the Contract Documents.

The decision to use any appendix is determined by an Owner after considering their contract requirements and their administrative, payment, and testing procedures, policies, and practices. Depending on these considerations, an Owner may not wish to invoke some or any of the available appendices.

1802.02 REFERENCES

When the Contract Documents indicate that provincial-oriented specifications are to be used and there is a provincial-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.PROV, unless use of a municipal-oriented specification is specified in the Contract Documents. When there is not a corresponding provincial-oriented specification, the references below shall be considered to be to the OPSS listed, unless use of a municipal-oriented specification is specified in the Contract Documents.

When the Contract Documents indicate that municipal-oriented specifications are to be used and there is a municipal-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.MUNI, unless use of a provincial-oriented specification is specified in the Contract Documents. When there is not a corresponding municipal-oriented specification, the references below shall be considered to be the OPSS listed, unless use of a provincial-oriented specification is specified in the Contract Documents.

This specification refers to the following standards, specifications, or publications:

CSA Standards

Z662-11 Package	Consists of Z662-11, Oil and Gas Pipeline Systems, and Z662.1-07, Commentary on CSA Z662-11, Oil and Gas Pipeline Systems

ASTM International

A 252-98e1	Welded and Seamless Steel Pipe Piles

American Water Works Association (AWWA)

C200-05	Steel Water Pipe-6 in. (150 mm) and Larger

1802.07 PRODUCTION

1802.07.01 Requirements

All pipe shall be new and manufactured from steel according to ASTM A 252, Grade 2, with a minimum yield strength of 240 MPa.

Production welding shall be according to AWWA C200.

Pipe ends shall be bevel edged on the outside to an angle of 30°.

Pipe wall thickness shall be according to Table 1, except as amended below:

a) The least nominal wall thickness for pipe with outside diameters from 88.9 to 141.3 mm shall be 4.8 mm.

b) When protective coating or cathodic protection for steel casing or carrier pipe is not specified in the Contract Documents, the pipe wall thickness shall be increased to the nearest standard size that is a minimum of 1.6 mm greater than the least nominal wall thickness shown.

1802.07.02 Identification

The following information shall be clearly marked by stencilling, stamping, or painting of each section of pipe:

a) Name or trademark of the manufacturer.

b) Heat number.

c) Outside diameter.

d) Nominal wall thickness.

e) Length of pipe.

f) Weight per unit length.

g) Standard designation.

h) Grade of steel.

1802.08 QUALITY ASSURANCE

1802.08.01 Certificate

Upon request, suppliers shall provide a certificate to indicate that the product was produced and tested according to the appropriate standard requirements.

1802.08.02 Inspection and Testing

Owner reserves the right to make inspections and tests at such time as the Owner may consider necessary to ensure the materials supplied are in accordance with this specification. All materials failing to comply with the requirements of this specification shall be rejected.

1802.09 OWNER PURCHASE OF MATERIAL

1802.09.01 Measurement and Payment

Measurement of smooth wall steel pipe shall be by length in metres along the centreline of the pipe.

Payment at the price specified in the purchasing order shall be for supply of the pipe and jointing devices delivered to the destination on the date and time specified.

The cost of all testing, except that performed in the Owner's laboratory, shall be included in the price.

TABLE 1
Least Nominal Wall Thickness for Steel Casing Pipe
in Cased Crossings and Carrier Pipe in Uncased Crossings

Pipe Outside Diameter mm	Least Nominal Wall Thickness mm	
	Roads	Railways
88.9	3.2	3.2
101.6	3.2	3.2
114.3	3.2	3.2
141.3	4.0	4.0
168.3	4.8	4.8
219.1	4.8	4.8
273.1	4.8	4.8
323.9	4.8	4.8
355.6	4.8	5.6
406.4	4.8	5.6
457.0	4.8	6.4
508.0	4.8	7.1
559.0	5.6	7.9
610.0	6.4	8.7
660.0	6.4	9.5
711.0	6.4	10.3
762.0	6.4	10.3
813.0	6.4	11.1
864.0	6.4	11.9
914.0	6.4	11.9
965.0	7.9	12.7
1016.0	7.9	12.7
1067.0	7.9	12.7
1118.0	7.9	14.3
1168.0	7.9	15.9
1219.0	8.3	15.9
1270.0	8.7	15.9
1321.0	9.5	19.1
1372.0	9.5	19.1
1422.0	9.5	19.1
1524.0	10.3	20.6

Appendix 1802-A, November 2008
FOR USE WHILE DESIGNING MUNICIPAL CONTRACTS

Note: This is a non-mandatory Commentary Appendix intended to provide information to a designer, during the design stage of a contract, on the use of the OPS specification in a municipal contract. This appendix does not form part of the standard specification. Actions and considerations discussed in this appendix are for information purposes only and do not supersede an Owner's design decisions and methodology.

Designer Action/Considerations

Designer should specify if the steel pipe is to be cathodically protected or coated or uncoated in the Contract Documents. (1802.07.01)

The designer should ensure that the General Conditions of Contract and the 100 Series General Specifications are included in the Contract Documents.

Related Ontario Provincial Standard Drawings

No information provided here.