AMENDMENTS TO OPSS 1802 (JAN 95) – MATERIAL SPECIFICATION FOR SMOOTH WALLED STEEL PIPE [1]

OPSS 1802 is amended by adding the following:

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

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: A.W.W.A. C200-91 Standard for Steel Water Pipe-6 In. (150mm) And Larger; A.S.M.E. Code for Unfired Pressure Vessels; and A.S.T.M. A139.

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

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.

1. **All references to OPS specifications that have been amended (as noted in LIST W3) are superseded by references to the replacement City of Toronto specifications (as given in LIST W3).**

1802.10.02 Shop Drawings

Immediately following receipt of a Purchase Order, five (5) sets of working and assembly drawings giving details, design and method of construction, type of joint, bill of materials, etc., of the pipe shall be submitted to the Commissioner 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.

1802.10.03 Material

Fabricate pipe from steel mill-certified to ASTM A-139, Grade C

1802.10.04 Fabrication and Welding

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 1016mm or greater. Coil splice joints must be a minimum of 300mm 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 9754mm length of pipe with one 50mm twenty one MPa half-coupling complete with square-head solid steel plug. Weld the coupling into the pipe on top centre line, 300mm from one end. Ensure coupling does not protrude into the pipe.

1802.10.04.02 Back-up Bars

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

Ship loose, two bars per pipe.

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 19mm 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 3mm 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 5mm under or 10mm over required outside circumference.

Straightness

Finished pipe shall not deviate by more than 3mm 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, -0mm.

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.

1802.10.04.04 Qualification of Welders

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

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.

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 Commissioner or witnessed, subsequently reviewed and approved by the Commissioner.

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.

1802.10.05 Inspection, Testing and Rejection

1802.10.05.01 Inspection

Notify the Commissioner or his representative when beginning manufacturing.

The Commissioner 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 Commissioner, at the manufacturer's expense. Inspection shall be done by inspectors qualified to CSA Standard 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 Commissioner, or the pipe may be rejected.

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 Commissioner.

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

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 Commissioner 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 A.S.M.E. Boiler and Pressure Vessel Code, Division 1, Section VIII, Subsection B, Part UW, Clause UW-11 (B).

1802.10.05.02.02 Hydrostatic Testing

Test each length of pipe in the presence of the Commissioner or his representative, under a hydrostatic pressure of twelve hundred (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 Commissioner and re-tested as specified herein.

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

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

1802.10.05.03 Rejection of Work

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

All work repeated shall be tagged or marked accordingly.

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 Commissioner.

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.