

905.02 REFERENCES

Section 905.02 of OPSS 905 is amended by the addition of the following reference under **ASTM International**:

A184/A184M-24	Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement
A416/A416M-18	Standard Specification for Low-Relaxation, Seven-Wire Steel Strand for Prestressed Concrete

905.03 DEFINITIONS

Section 905.03 of OPSS 905 is amended by the addition of the following definition:

Resistance Welding means the automated process of joining reinforcing steel bars through the controlled application of electric current and pressure without the use of filler metal.

905.04 DESIGN AND SUBMISSION REQUIREMENTS

905.04.01 Submission Requirements

905.04.01.04 Welding Details

Clause 905.04.01.04 of OPSS 905 is deleted in its entirety and replaced with the following:

905.04.01.04.01 General

Except for resistance welding of carbon steel reinforcing bars, steel reinforcement shall not be welded unless specified in the Contract Documents or approved by the Owner.

Tack welding of steel reinforcement is not permitted.

When welding of reinforcing steel bars is permitted, welding details shall be according to CSA W186 and shall be designed to prevent notching effects and section loss in the bars. The welding details shall be submitted to the Contract Administrator at least 7 Days prior to the commencement of steel reinforcement welding. The Engineer's seal and signature shall be affixed on the welding details Working Drawings verifying that they are consistent with the Contract Documents.

The welding details shall include the following:

- a) Materials certificates confirming the compatibility and weldability of steel reinforcement to be welded;
- b) Welding procedures. For reinforcement manufactured by the quenched and self-tempered (QST) method a successful welding procedure qualification tests using bars of the same manufacturing method shall be submitted;
- c) Identification of the bars to be welded;
- d) Location, and type of welds, weld sizes; and

- e) Operating procedures for machine operated welding system.

905.04.01.04.02 Resistance Welding

Resistance welding details shall be submitted to the Contract Administrator at least 7 Days prior to the commencement of steel reinforcement fabrication.

The welding details shall include the following:

- a) Materials certificates confirming the compatibility and weldability of steel reinforcement to be welded;
- b) Machine operating procedure, detailing the bar layout process and critical parameters used during the resistance welding process, including welding current, force, and time; and
- c) Test reports demonstrating that fabricated mats are according to ASTM A184 and CSA G30.18, Table 4 and 5. The completed tests shall be as follows:
 - i. Static load testing shall be completed according to ASTM A184. A minimum of two tests shall be performed.
 - ii. Tensile and elongation tests shall be completed and shall meet the requirements of CSA G30.18, Table 4. The test specimen shall have a welded intersection located approximately at the centre of the bar to be tested. A minimum of three samples shall be tested; and
 - iii. Bend tests shall be completed and shall meet the requirements of CSA G30.18, Table 5. A minimum of three samples shall be tested.

Tests shall be completed within the 6 months preceding the date of submission and shall be performed on bars of the same size and grade as those which will be included in the reinforcement fabrication.

905.07 CONSTRUCTION

905.07.02 Reinforcing Steel Bars, Splice Bars, Stainless Steel Splice Bars and Steel Welded Wire Reinforcement

905.07.02.03 Fastening

Clause 905.07.02.03 of OPSS 905 is deleted in its entirety and replaced with the following:

Reinforcing steel bars shall be securely tied to provide adequate strength and stiffness of the reinforcement and to maintain the bars in their correct positions ensuring the cover meets the requirements specified in the Contract Documents

Fastening of the rebar shall meet the following requirements:

- a) Bars shall be tied at least at every fourth intersection for all reinforced concrete members;
- b) For cages placed in circular caissons: splice locations, frame-up locations, and pick-up points shall be tied at every intersection, and shall be double wire tied for cages exceeding 1000 kg;
- c) The maximum untied length of any bar shall be 1 m except in circular caissons where the maximum untied length shall be 0.6 m;
- d) Bars shall be fastened with tie wire except that purpose-designed plastic clips may be used in precast components and slabs. Plastic clips shall be spaced sufficiently to allow concrete flow and avoid segregation. Where cages are lifted after preassembly, they shall be tied with tie wire to resist the lifting loads imposed on them.

There shall be at least 50 mm clear spacing between any adjacent bar chairs or plastic clips. Bar chairs, bolsters, and plastic clips shall be stored in opaque containers to minimize UV exposure at site. Plastic used in clips or bar chairs shall be solid and homogenous without fillers, voids, or additives.

905.07.02.07 Welding

Clause 905.07.02.07 of OPSS 905 is deleted in its entirety and replaced with the following:

Field welding of steel reinforcement, including tack welding, shall not be permitted. Steel reinforcement, except for resistance welding, shall not be welded unless specified in the Contract Documents or approved by the Owner. Except for splicing of stainless spirals, welding of stainless-steel reinforcing bars shall not be permitted.

905.08 QUALITY ASSURANCE

905.08.02 Testing

905.08.02.01 Prestressing Steel

Clause 905.08.02.01 is deleted in its entirety and replaced with the following:

The testing of prestressing steel shall be according to ASTM A416.

WARRANT: Always with OPSS 905, Construction Specification for Steel Reinforcement for Concrete.