MATERIAL SPECIFICATION FOR DECK JOINT ASSEMBLIES

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1210.01 SCOPE

This specification covers the requirements for Materials, design, and fabrication of deck joint assemblies.

1210.01.01 Specification Significance and Use

This specification is written as a municipal-oriented specification. Municipal-oriented specifications are developed to reflect the administration, testing, and payment policies, procedures, and practices of many municipalities in Ontario.

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

1210.01.02 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.

1210.02 REFERENCES

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:

Ontario Provincial Standard Specifications, Construction

OPSS 920	Deck Joint Assemblies, Preformed Seals, Joint Fillers, Joint Seals, Joint Sealing Compounds, and Waterstops - Structures

Ontario Provincial Standard Specifications, Material

OPSS 1202	Bearings - Elastomeric and Plain Steel Laminated
OPSS 1203	Bearings - Rotational and Sliding Surface

Ontario Ministry of Transportation Publications

Structural Manual:
Division 1, Exceptions to the Canadian Highway Bridge Design Code CAN/CSA S6 for Ontario

CSA Standards

G30.18-M92 (R2002)	Billet - Steel Bars for Concrete Reinforcement
G40.20/G40.21-04	General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
G164-M92	Hot Dip Galvanizing of Irregularly Shaped Articles
S6-06	Canadian Highway Bridge Design Code
W47.1-03	Certification of Companies for Fusion Welding of Steel
W59-03	Welded Steel Construction (Metal Arc Welding)
W186-M1990 (R2007)	Welding of Reinforcing Bars in Reinforced Concrete Construction

ASTM International

A 240/A 240M-07e1	Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels and for General Application
A 325M-05	Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength

D 412-06a	Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
D 471-06	Standard Test Method for Rubber Property - Affects of Liquids
D 573-04	Standard Test Method for Rubber Deterioration in an Air Oven
D 832-07	Standard Practice for Rubber Conditioning for Low Temperature Testing
D 1149-07	Standard Test Method for Rubber Deterioration - Cracking in an Ozone Controlled Environment
D 2240-05	Standard Test Method for Rubber Property - Durometer Hardness
F 835-04e1	Standard Specification for Alloy Steel Socket Button and Flat Countersunk Head Cap Screws

Others

U.S. Military Specification:

MIL-A-907D-93	Antiseize Thread Compound, High Temperature

1210.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Armouring Angle means the expansion joint angle at the gap.

Bearing means a structural device that transmits a load while permitting translation or rotation or both.

Elastomer means a compound containing virgin polychloroprene or neoprene.

Engineer means a professional engineer licensed by the Professional Engineers Ontario to practice in the Province of Ontario.

Manufacturer means a fabrication company that is certified by the Canadian Welding Bureau (CWB) according to CSA W47.1, Division 2.1, and supplies deck joint assemblies.

Nosing Angle means the angle that forms the outside edges of the joint blockout.

Preformed Seal means an extruded elastomer that, when retained in recesses in the deck joint assembly, prevents the passage of water and other materials.

Product Drawings means drawings prepared by the manufacturer that have been approved by the Owner for use with the product.

1210.04 DESIGN AND SUBMISSION REQUIREMENTS

1210.04.01 Design Requirements

1210.04.01.01 General

Deck joint assemblies shall be designed to function satisfactorily under the critical combinations of the maximum and minimum factored loads, translations, and rotations at the serviceability and ultimate limit states according to CAN/CSA S6 and the Structural Manual, Division 1.

1210.04.01.02 Fasteners and Anchorage

Fasteners and anchorage devices shall be designed to transfer all the static and dynamic loads from each side of the deck joint assembly to the structure.

1210.04.01.03 Preformed Seal

All deck joint assemblies and the bearings in modular deck joint assemblies shall be designed so that the entire preformed seal is replaceable without damage to the structure and without removal of any concrete, welds, or anchorages permanently attached to the structure.

1210.04.02 Submission Requirements

1210.04.02.01 Product Drawings

The deck joint assembly manufacturer shall submit the product drawings for approval.

The product drawings shall indicate all material properties, dimensions, connection attachments, injection hose system, splices, fasteners and accessories, and the individual alphanumeric identification numbers.

The product drawings for modular joints shall bear the seal and signature of an Engineer.

1210.05 MATERIALS

1210.05.01 Bearings

All material forming parts of the bearing component of the deck joint assembly shall be according to OPSS 1202 and OPSS 1203.

The virgin polytetrafluoroethylene (PTFE) element shall have a minimum thickness of 1.5 mm.

1210.05.02 Preformed Seal

The preformed seal shall be manufactured from an elastomer with physical properties shown in Table 1.

Manufacturer's storage and handling requirements shall be followed. The seal shall not be exposed to ultraviolet rays for more than 3 Days prior to installation.

1210.05.03 Steel

Mild steel components shall be according to CSA G40.20/G40.21, Grade 300 W.

Stainless steel shall have a minimum corrosion resistance according to ASTM A 240M.

Steel fasteners other than stainless steel shall be according to ASTM A 325M or ASTM F 835.

1210.05.04 Anchors

Anchors shall be headed type stud shear connectors according to CSA W59, Appendix H.

1210.05.05 Reinforcing Steel Bars

Reinforcing steel bars shall be according to CAN/CSA G30.18, Grade 400W.

1210.05.06 Antiseize Compound

Antiseize compound shall be according to MIL-A-907D.

1210.05.07 Injection Hose System for Deck Joint Assembly

The injection hose system shall be installed on the deck joint assembly for both nosing and armouring angles. This system shall be long enough to extend between the barrier or parapet walls on each side of the structure, including the sidewalks and curbs.

There shall not be bleeder holes in the nosing and armouring angles.

1210.07 PRODUCTION

1210.07.01 General

The deck joint assembly manufacturer shall have a copy of the deck joint assembly Working Drawings as specified in OPSS 920 at the manufacturing plant during the deck joint assembly fabrication.

1210.07.02 Welding

Welding of structural quality steels shall be according to CSA W59.

Welding of stainless steel shall be according to OPSS 1203.

Welding of reinforcing steel bars shall be according to CSA W186-M.

1210.07.03 Fasteners

All steel bolts shall be zinc phosphate coated.

The threaded portion of bolts and the underside of the bolt heads shall be coated with an antiseize compound prior to installation.

1210.07.04 Steel Fabrication

Machining shall be carried out after welding, whenever possible.

All rough flame cut surfaces and metal-to-metal contact surfaces shall be machined ground smooth.

Re-entrant corners that are cut shall be free from notches and shall have the largest practical radius with a minimum radius of 14 mm. Bearing surfaces shall be in contact over the full area of the mating surfaces.

1210.07.05 Corrosion Protection

All structural steel components of the deck joint assembly shall be hot dip galvanized after fabrication according to CAN/CSA G164-M.

1210.07.06 Preformed Seal

The preformed seal shall exceed the required length by 1 m to permit sampling and testing in the field.

1210.07.07 Marking

Each deck joint section shall be marked with the date of manufacture (i.e., yyyy-mm-dd), an individual alphanumeric identification, and a sequential number. The characters shall be die stamped into an exposed surface at the gutter line at the barrier wall or curb. The characters shall not be less than 10 mm high with the indentations not less than 0.5 mm in width and 0.2 mm in depth.

The preformed seal shall be clearly and indelibly stamped every metre with a lot number, date of manufacture (i.e., yyyy-mm-dd), and model number.

1210.07.08 Designation of Lifting Points

The lifting points shall be clearly marked on the deck joint assembly.

TABLE 1
Preformed Seal Physical Requirements

Property	Physical Requirements	Test Procedure
Tensile Strength	Minimum 13.5 MPa	ASTM D 412 Test Method A
Ultimate Elongation	Minimum 250%	ASTM D 412 Test Method A
Hardness, Type A Durometer	55, + 7, -5	ASTM D 2240
Oven Aging Test, 70 h @ 100 °C Change in Tensile Strength	Maximum 20%	ASTM D 573 ASTM D 412 Test Method A
Change in Elongation	Maximum 20%	ASTM D 412 Test Method A
Change in Hardness	Minimum 10 points	ASTM 2240
Permanent set at break	Maximum 10%	ASTM D 412 Test Method A
Low Temperature Crystallization Hardness, Type A Durometer 7 d @ -10 °C Change in Hardness	Maximum 15 points	ASTM D 832 ASTM D 2240
Oil Swell, ASTM Oil No. 3, 70 h @ 100 °C Weight Change	Maximum 45%	ASTM D 471
Ozone Resistance, 20% Strain, 300 pphm in air 70 h @ 40 °C	No cracks	ASTM D 1149 Specimen A

Notes:

A. All tests shall be made on specimens prepared from the preformed seals.

Appendix 1210-A, November 2014
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

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.