1203.01 SCOPE

This specification covers the requirements for materials, design, and fabrication of rotational and sliding surface bearings for bridges.

1203.01.01 Significance and use of Appendices

Appendices are not a mandatory part of this specification unless invoked by the Owner.

Appendix 1203-A is a commentary appendix to provide designers with information on the use of this specification in a Contract.
1203.02  REFERENCES

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

Ontario Provincial Standard Specifications, Construction

OPSS 911  Coating Structural Steel

Ontario Provincial Standard Specifications, Material

OPSS 1202  Material Specification for Bearings - Elastomeric Plain and Steel-Laminated

Ministry of Transportation Publications

Structural Manual
Division 1, Exceptions to the Canadian Highway Bridge Design Code

Canadian Standards Association

B95-1962(R1996)  Surface Texture (Roughness, Waviness and Lay)
G40.20/40.21-98  General Requirements for Rolled or Welded Structural Steel /Structural Quality Steel
G164-M92 (R1998)  Hot Dip Galvanizing of Irregularly Shaped Articles
S6-00  Canadian Highway Bridge Design Code
S157-M83(R2001)  Strength Design in Aluminum
W48-01  Filler Metals and Allied Materials for Metal Arc Welding

American National Standards Institute

B4.1-1967(R1999)  Preferred Limits and Fits for Cylindrical Parts

ASTM International

A 240/A 240M-03b  Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet and Strip for Pressure Vessels
A 325-02  Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
B 36/B 36M-01  Standard Specification for Brass Plate, Sheet, Strip, and Roller Bar
D 395-02  Standard Test Method for Rubber Property - Compression Set
D 429-02a  Standard Test Methods for Rubber Property - Adhesion to Rigid Substrates
D 638-02a  Standard Test Method for Tensile Properties of Plastics
D 792-00  Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
D 2240-02b  Standard Test Method for Rubber Property - Durometer Hardness
D 4894-98a  Standard Specification for Polytetrafluoroethylene (PTFE) Granular Molding and Ram Extrusion Materials

U.S. Military Specifications

MIL-S-8660 C  Silicone Compound
1203.03 DEFINITIONS

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

**Disc Bearing** means a bearing consisting of a single moulded disc of unreinforced elastomer confined by upper and lower steel bearing plates and restricted from horizontal movement by limiting rings and a centrally located shear restriction mechanism.

**Elastomer** means a compound containing virgin natural polyisoprene (natural rubber) for confined elastomeric bearings or polyether urethane polymer for disc bearings.

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

**Plan Dimension** means the dimensions of an object when viewed perpendicular to the top of the object.

**Pot Bearing** means a bearing consisting of a metal piston supported by a single moulded disc of unreinforced elastomer that is confined within a metal cylinder.

**Proposal** means as defined in OPSS 1202.

**Spherical Bearing** means a bearing consisting of a curved spherical metal surface in contact with and sliding on a matching curved polytetrafluoroethylene polymer (PTFE) surface.

**Substructure** means the abutments, piers, columns, and other components of a bridge below the bearings.

**Superstructure** means all parts of a bridge above the bearings.

1203.04 SUBMISSION AND DESIGN REQUIREMENTS

1203.04.01 Submission of Drawings

1203.04.01.01 General

The Contractor shall notify the Contract Administrator in writing of the name and address of the supplier of the bearings within 30 Days of the Contract award.

All bearing drawings shall bear the seal and signature of an Engineer.

Proposals shall bear the seal and signature of the design and checking Engineers.

When another Authority is involved, the submission shall be made a minimum of five weeks prior to the commencement of work.

1203.04.01.02 Layout and Installation Drawings

At least three weeks before the commencement of placing bearings, five sets of layout and installation drawings shall be submitted to the Contract Administrator.

These drawings shall clearly indicate the following:

a) Bearing layout and orientation.

b) Top and bottom plate details including anchorages.
c) Installation details.

d) Method of attachment of bearings to the top and bottom plates.

e) Bearing identification letter and numbers.

1203.04.01.03 Shop Drawings

A minimum of three weeks prior to the commencement of bearing fabrication, five sets of shop drawings shall be submitted to the Contract Administrator.

The shop drawings shall clearly indicate the following:

a) Material properties.

b) Bearing dimensions.

c) Connection attachments.

d) Fasteners and accessories.

e) Load resistance at serviceability limit and ultimate limit states.

   i. Maximum vertical permanent and total load.
   ii. Maximum lateral load and corresponding vertical load.
   iii. Maximum rotational capacity about any horizontal axis and about the vertical axis at the centre of the bearing.

f) Bearing identification letter and numbers.

1203.04.01.04 Return of Submissions

Two copies of the submission will be returned as follows:

a) Stamped with the wording that allows for permission to construct.

In this case, work can commence on receipt of the drawing by the Contractor. A copy of these drawings shall be available at the site prior to and during construction.

b) Stamped with the wording that allows for permission to construct as noted.

In this case, work can start on receipt of the drawings by the Contractor. The drawings shall be updated as noted and shall bear the seal and signature of an Engineer stating the drawings have been revised according to the noted comments. A copy of the stamped updated drawings shall be available at the site prior to and during construction.

c) Showing only required changes.

In this case, the drawings shall be updated as required and the submission process repeated.
1203.04.02 Design Requirements

1203.04.02.01 General

The rotational bearings and sliding surfaces shall consist of components arranged so as to transmit all loads, including uplift, and accommodate the rotations and translations of the structure. At serviceability limit state, the design shall be such that the bearings will not suffer damage that would affect their performance. At ultimate limit states, the strength and stability of the bearings shall be adequate to resist the factored loads and accommodate movements of the structure.

1203.04.02.02 Design

The bearings shall be proportioned to function satisfactorily under the critical combinations of the maximum and minimum factored loads and the factored translations and rotations at the serviceability limit state and the ultimate limit states as shown in the Contract Documents.

Bearings subject to uplift shall limit the separation of the bearing components to the value specified in the Contract Documents.

All steel components of the bearings, including fasteners, shall be proportioned according to the requirements of the CAN/CSA S6 and Structural Manual, Division 1.

Aluminum alloy components of bearing shall be proportioned according to the requirements of CAN3-S157M.

The average stress in the elastomer at serviceability limit state loads shall not exceed the following values:

a) Pot Bearing 40 MPa
b) Disc Bearings 35 MPa

1203.04.02.03 Translation and Rotation

Provision for translation shall be through sliding of a stainless steel surface against a mating PTFE element.

The translational capacity in the unrestrained direction shall be as specified in the Contract Documents and the following:

a) Longitudinal direction ±25 mm
b) Transverse direction ±15 mm

Provision for rotation about any horizontal axis shall be by means of a single disc of confined elastomer for pot bearings, a single disc of polyether urethane polymer compound for disc bearings, and a spherical sliding surface of stainless steel or anodized aluminum alloy against PTFE for spherical bearings.

The rotational capacity about any horizontal axis shall be the rotation caused by ultimate limit states loads plus 1.2 degrees.

The rotational capacity about the vertical axis through the centre of the bearing shall be ± 1 degree.

Uplift restraint devices shall not restrict rotations.

At serviceability limit states, the shift in the axial load from the centre of bearing shall not exceed the following values:

a) 4% of the diameter of the confined elastomer for pot bearings.
b) 10% of the diameter of the polyether urethane polymer compound for disc bearings.

c) 10% of the plan diameter of the curved PTFE surface for spherical bearings.

Rotational bearings shall be capable of resisting the specified lateral loads in any direction in combination with the applicable vertical loads.

The rotation of confined elastomeric bearings about a horizontal axis shall be limited so that the vertical strain at the perimeter of the elastomer, at serviceability limit state loads does not exceed 0.15 of the elastomer thickness. Brass sealing rings that are a minimum of 6 mm wide shall be provided at the perimeter of the elastomer to prevent the elastomer from extruding between the piston and the pot wall. The thickness of the brass rings shall be at least 0.2 times the width of the ring. A minimum of three layers of flat sealing rings shall be used with split ends equally positioned around the circumference of the elastomer and shall fit snugly against the surface of the inside perimeter of the pot wall. The sealing rings shall be flat and smooth on all surfaces. The upper edge of the elastomer shall be recessed to accommodate the sealing rings. The depth of the pot wall shall be such that a minimum vertical distance of 2.5 mm remains between the top of the pot wall and the closest point of contact of the sealing rings with the pot wall upon rotating the piston an amount equal to the required rotation plus 1 degree.

The pot and piston surfaces in contact with the confined elastomer shall be lubricated with silicone grease. The bearing shall be sealed by a one-piece continuous preformed closed-cell compressible ring against entry of dirt, dust, and moisture between the elastomer and the pot and piston contact surfaces. Any joint in the ring shall be bonded and the strength shall be at least equal to the strength of the ring.

For disc bearings, the upper and lower plates in contact with the elastomer shall be provided with outer limiting rings to restrict the horizontal movement of the elastomer and a centrally located shear restriction mechanism.

1203.04.02.04 Sliding Surfaces

1203.04.02.04.01 General

Sliding surfaces shall allow translation or rotation by sliding of a metal surface against a mating PTFE element. For plane surfaces, the metal surface shall be stainless steel and for spherical surfaces it shall be stainless steel or anodized aluminum alloy. The metal surface shall overlap the PTFE by at least 5 mm at extremes of movement and except for guides for lateral restraint shall be positioned above the PTFE element.

1203.04.02.04.02 Polytetrafluoroethylene Polymer Element

Except when used as mating surfaces for guides for lateral restraint, the PTFE resin shall be virgin material and shall be used as unfilled sheets and shall contain spherical reservoirs for lubricant pressed into its surface. The diameter of the reservoirs shall not exceed 8 mm measured at the surface of the PTFE and the depth shall not be less than 2 mm or more than half the thickness of the PTFE. The reservoirs shall be evenly distributed across the surface of the PTFE and shall occupy not less than 20% or more than 30% of the surface.

Material used as mating surface for guides for lateral restraint shall not be dimpled or lubricated.

1203.04.02.04.03 Stainless Steel

For dimensional differences between the stainless steel and the PTFE in the direction of movement, the thickness of the stainless steel sheet shall be as follows:
### Dimensional Difference Between Stainless Steel and PTFE

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Stainless Steel mm</th>
<th>PTFE mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 300</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>&gt; 300 and ≤ 500</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>&gt; 500 and ≤ 1500</td>
<td>3.0</td>
<td></td>
</tr>
</tbody>
</table>

#### 1203.04.02.04.04 Lubrication

All PTFE surfaces except those that act as mating surfaces for guides for lateral restraint or that are subject to a contact pressure of less than 5 MPa shall be permanently lubricated with silicone grease.

#### 1203.04.02.04.05 Thickness of Polytetrafluoroethylene Polymer and Depth of Recess

The PTFE element shall be fully bonded and recessed in a rigid backing material. The thickness of the PTFE element and the depth of recess shall be as follows:

<table>
<thead>
<tr>
<th>Maximum Plan Dimension, mm</th>
<th>Minimum Thickness, mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 1200</td>
<td>5.0</td>
</tr>
<tr>
<td>&gt; 1200</td>
<td>5.5</td>
</tr>
<tr>
<td>Depth of Recess, mm</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>3.0</td>
</tr>
</tbody>
</table>

#### 1203.04.02.04.06 Contact Pressure

The average contact pressure for unfilled PTFE elements based on the recessed area of the PTFE shall not exceed the following:

<table>
<thead>
<tr>
<th>Limit State</th>
<th>Dead Load MPa</th>
<th>Total Load MPa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serviceability</td>
<td>30</td>
<td>45</td>
</tr>
<tr>
<td>Ultimate</td>
<td>45</td>
<td>65</td>
</tr>
</tbody>
</table>

The maximum contact pressures at the extreme edges of flat and curved PTFE elements shall not exceed 1.2 times the values indicated above.

The average contact pressure at serviceability limit state loads for filled PTFE elements used to face mating surfaces for guides for lateral restraint shall not exceed the following:

- a) PTFE filled with up to 15% by mass of glass fibres 45 MPa.
- b) Lead filled PTFE in a bronze matrix 60 MPa.

#### 1203.04.02.04.07 Coefficient of Friction

The coefficient of friction between stainless steel or anodized aluminum alloy sliding surfaces and lubricated virgin PTFE shall not exceed the following and shall be interpolated linearly for contact pressures within the ranges given:
<table>
<thead>
<tr>
<th>Contact Pressures MPa</th>
<th>Coefficient of Friction</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0.08</td>
</tr>
<tr>
<td>7</td>
<td>0.07</td>
</tr>
<tr>
<td>14</td>
<td>0.06</td>
</tr>
<tr>
<td>≥ 21</td>
<td>0.04</td>
</tr>
</tbody>
</table>

1203.04.02.05  **Guides for Lateral Restraint**

The guides for lateral restraint shall be arranged to permit the required rotations about both the horizontal and vertical axis.

Translational elements with lateral restraints shall be capable of resisting either of the following lateral loads:

a) The bearings with a capacity of 5000 kN or less at serviceability limit state, 10% of the vertical load capacity.

b) For bearings with a capacity over 5000 kN at serviceability limit state, 500 kN plus 5% of the vertical load in excess of 5000 kN.

Unless the guide bars are machined to form an integral part of the top plate, they shall be recessed not less than 5 mm into the plate to which they are attached and fastened with bolts.

The translational elements of guides for lateral restraint shall be faced with stainless steel and shall provide lateral restraint by sliding against mating surfaces faced with PTFE. Lead filled PTFE shall be at least 2 mm thick and shall be mechanically fastened and bonded to the substrate. Glass filled or virgin PTFE shall be recessed and bonded to the substrate according to the clause for Thickness of PTFE and Depth of Recess.

1203.04.02.06  **Top and Base Plates**

The top and base plates that are permanently attached to the structure shall be provided with the bearings and shall be according to the requirements of the bearing and the structure.

1203.04.02.07  **Fasteners and Anchorage**

Fasteners used to attach the bearing to the top and base plates and anchorage devices shall be capable of resisting either of the following the lateral loads:

a) For bearings with a capacity of 5000 kN or less at serviceability limit state, 10% of the vertical load capacity.

b) For bearings with a capacity over 5000 kN at serviceability limit state, 500 kN plus 5% of the vertical load capacity in excess of 5000 kN.

The beneficial effect of friction shall be neglected in proportioning the fasteners and anchors.

1203.04.02.08  **Deflection**

The average vertical deflection at serviceability limit state loads for disc bearings shall not exceed 10% of the elastomer thickness.
1203.04.02.09 Replaceability

The entire bearing assembly, except for the top plate used to attach it to the superstructure and the base plate used to anchor it to the substructure but including both contact surfaces of the sliding interface, shall be replaceable without damage to the structure and without removal of any concrete, welds, or anchorages permanently attached to the structure and without lifting the superstructure more than 5 mm. Bearings shall not be recessed into plates that are permanently attached to the structure.

1203.04.02.10 Durability

Bearings shall be designed to prevent moisture and dirt from entering the internal surfaces. The bearings shall be fabricated from materials that are durable and are protected against corrosion so as to perform the intended function.

Contact between dissimilar metals that could have corrosion potential and between the aluminum alloy and concrete shall be prevented by use of suitable insulation.

1203.04.02.11 Concrete Bearing Pressure

For bearings subject to compressive loading, the top plate and the base plate shall be proportioned to ensure the average concrete bearing pressure does not exceed 24 MPa at the ultimate limit states providing the following:

a) Concrete on which the plate is supported has a specified nominal 28 Day compressive strength of at least 30 Mpa.

b) Edges of the plates are located a minimum of 100 mm from the edge of the concrete.

c) The largest dimension of plate does not exceed 1,000 mm.

Alternatively, the top plate and the base plate of the bearing shall be proportioned to ensure the factored bearing resistance of concrete specified in CAN/CSA S6 and the Structural Manual, Division 1, is not exceeded.

Compressive loads in the vertical direction may be dispersed through the bearing from the edges of the elastomer or PTFE at a slope of 1.5H:1.0V providing that the dispersal lines are not interrupted by discontinuities within the bearing.

1203.05 MATERIALS

1203.05.01 Steel

Mild steel components shall be according to CSA G40.20/40.21, Grade 300 W, except for components permanently attached to steel superstructures which shall be Grade 350 A.

Stainless steel for sliding surfaces shall have a minimum corrosion resistance according to ASTM Standard A 240/A 240M, Type 304.

Steel fasteners shall be according to ASTM A 325 and hot-dipped galvanized according to CAN/CSA G164-M. For guide bars, alternative steel fasteners and corrosion protection systems shall be as specified in the Contract Documents.

1203.05.02 Aluminum Alloy

Aluminum alloy shall be according to CAN/CSA S157-M.
1203.05.03  Brass
Brass sealing rings for confined elastomer bearings shall be according to ASTM B 36/B 36M, Half-hard.

1203.05.04  Elastomers
Polyisoprene shall be according to OPSS 1202 except that the hardness may be 50 ± 5.
Polyether urethane polymer shall be according to Table 1.

1203.05.05  Polytetrafluoroethylene Polymer
PTFE for use in sliding surfaces shall be virgin material and shall be according to ASTM D 4894. The PTFE shall be unfilled and according to Table 2.

Material used as the mating surface for guides for lateral restraint may be one of the following:

a) Unfilled PTFE.
b) PTFE filled with up to 25% by mass of glass fibres.
c) Lead filled PTFE in a bronze matrix.

1203.05.06  Lubricant
Lubricant shall be silicone grease according to US Military Specification MIL-S-8660C.

1203.05.07  Adhesives
Adhesives for bonding PTFE to metal shall produce a bond with a minimum peel strength of 4 N/mm when tested according to ASTM D 429, Method B. Adhesives shall not degrade in the service environment.

1203.07  PRODUCTION

1203.07.01  Welding
Welding of structural quality steels shall be according to CSA-W59-M.

All welding shall be done with electrodes certified by the Canadian Welding Bureau to the requirements of CSA W48.

The stainless steel sheets that will be in contact with PTFE shall be one piece continuously welded around the perimeter to its backing plate to prevent ingress of moisture. The weld shall be clean, uniform, and without overlaps and located outside the area in contact with PTFE.

1203.07.02  Fasteners
The threaded portion of the bolts shall be coated with silicone grease prior to installation.

1203.07.03  Anchors
The top and base plate anchorage to concrete shall be by studs approved by the owner that are fusion welded to the plates.
1203.07.04 Machining

Metal to metal contact surfaces shall be machined or fine ground. The pots and pistons for confined elastomer bearings and the upper and lower plates with limiting rings for disc bearings shall be machined from solid metal plate or castings. The concave and convex plates for spherical bearings shall be machined from solid metal plate or castings.

There shall be no openings or discontinuities in the metal surfaces in contact with the elastomer or PTFE.

1203.07.05 Roughness of Metal Surfaces

The roughness of sliding stainless steel metallic surfaces in contact with PTFE, measured according to CSA B95, shall not be greater than 0.25 $\mu$m arithmetic average for plane surfaces and 0.50 $\mu$m arithmetic average for spherical surfaces. The roughness of anodized aluminium metallic surfaces shall not be greater than 0.40 $\mu$m arithmetic average.

The roughness of metal surfaces in contact with elastomers measured according to CSA B95 shall not be greater than 3.0 $\mu$m arithmetic average.

1203.07.06 Attachment of Polytetrafluoroethylene Polymer

Virgin or glass filled PTFE elements shall be recessed in a rigid backing material and shall be bonded over the entire area with an adhesive. The rigid backing material shall be grit blasted prior to applying the adhesive.

Lead filled PTFE shall be mechanically fastened, and bonded to the backing plates.

The PTFE elements used as mating surfaces for guides for lateral restraint shall extend to within 10 mm from the ends of the backing plates.

1203.07.07 Anodizing

Aluminum alloy surfaces shall be anodized using the sulphuric acid process and shall meet the following:

<table>
<thead>
<tr>
<th>Physical Property</th>
<th>Test Method</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coating Thickness, $\mu$m</td>
<td>ASTM B 487</td>
<td>25 Minimum</td>
</tr>
<tr>
<td>Coating Mass, mg/cm$^2$</td>
<td>ASTM B 137</td>
<td>5.8 Minimum</td>
</tr>
<tr>
<td>Apparent Density, g/cm$^3$</td>
<td></td>
<td>2.32 Minimum</td>
</tr>
</tbody>
</table>

The Apparent Density, $d$, in g/cm$^3$ shall be determined as follows:

$$d = \frac{10w}{t}$$

where

- $w =$ Mass per unit area of sealed anodic coating, mg/cm$^2$.
- $t =$ Thickness of anodic coating expressed in micrometres and determined microscopically according to ASTM B 487.
**1203.07.08 Corrosion Protection**

All exposed metal corners that receive corrosion protection shall have a 3 mm rounding. All exposed metal surfaces of the bearings, except stainless steel and components permanently attached to steel superstructures, shall be protected against corrosion by a low volatile organic compound coating system according to OPSS 911. The continuous weld attaching the stainless steel sheet shall be ground smooth and have the same corrosion protection as the bearing. Steel fasteners shall be galvanized or as specified in the Contract Documents.

For corrosion protection purposes, bearing components permanently attached to steel superstructures shall be considered part of the structural steel.

**1203.07.09 Identification**

Each bearing shall be marked with the date of manufacture and an individual alphanumeric identification. The latter shall consist of the designated identification letter of the supplier and source followed by a sequential five-digit number. The characters shall be stamped or engraved into two adjacent sides and shall be clearly legible after installation. The characters shall not be less than 10 mm in height with the indentations not less than 1 mm in width and 0.5 mm in depth.

**1203.07.10 Tolerances**

The deviation from flatness of PTFE surfaces shall not exceed 0.2 mm when the diameter or diagonal is equal to or less than 800 mm or 0.00025 of the diameter or diagonal when the diameter or diagonal is greater than 800 mm.

The deviation from flatness of stainless steel or aluminum alloy surfaces in contact with PTFE for plane surfaces and from the theoretical surface for spherical surfaces shall not exceed 0.0003 LH mm for a rectangular PTFE element or 0.0006 RH mm for a circular PTFE element, where L is the greater plan dimension for a rectangular bearing, R is the radius of a circular bearing, and H is the free height of PTFE element.

For confined elastomer bearings, the tolerance of fit between the piston and the pot shall be +0.75 to +1.25 mm. The inside diameter of the pot cylinder shall be the same as the nominal diameter of the elastomer and shall be machined to a tolerance of -0 to +0.125 mm for diameters up to and including 500 mm and -0 to +0.175 mm for diameters over 500 mm.

For disc bearings, the gap between the edge of the polyether urethane polymer disc and the inside face of the limiting ring shall be 1.25% ± 0.25% of the diameter of the disc.

The plan dimensions of the recess for PTFE shall be the same as the nominal plan dimensions of the PTFE and shall be machined to a tolerance of -0 to +0.2% of the diameter or diagonal.

- Overall bearing plan dimension ± 3 mm.
- Overall bearing height ± 3 mm.
- Machined surface dimensions ± 0.4 mm.
- Elastomer
  - Diameter +0.0 to -1.5 mm for diameters ≤ 500 mm.
  - +0.0 to -2.0 mm for diameters > 500 mm.
- Thickness -0.0 to +1.0 mm.
Brass rings

Difference between internal diameter of brass ring and diameter of recess in the moulded elastomer -0 to +0.5 mm.

Difference between sum of thicknesses of brass rings and recess depth in the moulded elastomer -0 to +0.25 mm.

Recessed Guide Bars - American Standard Clearance Locational Fit Class LC3 (ANSI B4.1).

Guides for Lateral Restraint - Gap between metal surfaces restraints and mating PTFE elements 0.50 mm ± 0.25 mm.

PTFE plan dimension + 0 to - 0.2% of diameter or diagonal.

PTFE thickness - 0 to + 10.0% of thickness.

Depth of recess for PTFE - 0 to + 0.3 mm.

1203.09 OWNER PURCHASE OF MATERIAL

1203.09.01 Measurement and Payment

For measurement purposes, a count will be made of the number of complete bearings delivered and accepted.

Payment at the price specified in the Purchasing Order shall be full compensation for all labour, Equipment, and Material for the supply and delivery of the complete bearing, or individual components to the destination at the time specified.

The cost of all testing, except that performed in the Owner's laboratory, shall be included in the price.
### TABLE 1
PHYSICAL REQUIREMENTS FOR POLYETHER URETHANE POLYMER

<table>
<thead>
<tr>
<th>Physical Property</th>
<th>ASTM Test Methods</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Minimum</td>
</tr>
<tr>
<td>Hardness, Scale D</td>
<td>D 2240</td>
<td>60</td>
</tr>
<tr>
<td>Tensile Stress, MPa at 100% elongation</td>
<td>D 412</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>Tensile Stress, MPa at 200% elongation</td>
<td>D 412</td>
<td></td>
</tr>
<tr>
<td>Tensile Strength, MPa</td>
<td>D 412</td>
<td>35</td>
</tr>
<tr>
<td>Ultimate Elongation, %</td>
<td>D 412</td>
<td>220</td>
</tr>
<tr>
<td>Compression Set, % 22 h at 70 C.</td>
<td>D 395</td>
<td>--</td>
</tr>
</tbody>
</table>

### TABLE 2
PHYSICAL REQUIREMENTS FOR POLYTETRAFLUOROETHYLENE POLYMER

<table>
<thead>
<tr>
<th>Physical Property</th>
<th>ASTM Test Method</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength, MPa</td>
<td>D 638</td>
<td>minimum 20</td>
</tr>
<tr>
<td>Elongation, %</td>
<td>D 638</td>
<td>minimum 200</td>
</tr>
<tr>
<td>Relative Density</td>
<td>D 792</td>
<td>2.16 ± 0.03</td>
</tr>
</tbody>
</table>
Appendix 1203-A, Commentary for OPSS 1203, November 2003

Note: This appendix does not form part of the standard specification. It is intended to provide information to the designer on the use of this specification in a Contract.

Designer Action/Considerations

The following shall be specified in the Contract Documents:

- Maximum and minimum factored loads, factored translations and rotations, serviceability limit state and ultimate limit states. (1203.04.02.02)

- Bearing component uplift separation. (1203.04.02.02)

- The rotational and translational capacity in the unrestrained direction or directions. (1203.04.02.03)

- Lateral loads. (1203.04.02.05)

- Guide bar alternative steel fasteners and corrosion protection systems. (1203.05.01)

- Alternative corrosion protection to galvanizing for steel fasteners. (1203.07.08)

- Exceptions to machined surfaces tolerances. (1203.07.10)

Related Ontario Provincial Standard Drawings

None.