ONTARIO
PROVINCIAL
STANDARD
SPECIFICATION

METRIC
OPSS.MUNI 1203
NOVEMBER 2023
(Formerly OPSS 1203, November 2008)

Note: The MUNI implemented in November 2023 replaces OPSS 1203 COMMON, November 2008 with no technical content changes.

MATERIAL SPECIFICATION FOR BEARINGS-ROTATIONAL AND SLIDING SURFACE

TABLE OF CONTENTS

1203.01 SCOPE

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

1203.01.01 Specification Significance and Use

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

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

1203.01.02 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.

1203.02 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 911 Coating Structural Steel

Ontario Provincial Standard Specifications, Material

OPSS 1202 Bearings - Elastomeric Plain and Steel-Laminated

Ontario Ministry of Transportation Publications

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

Canadian Standards Association (CSA)

B95-1962 (R2002)	Surface Texture (Roughness, Waviness and Lay)
G40.20/40.21-04	General Requirements for Rolled or Welded Structural Quality Steel /Structural Quality Steel
G164-M92 (R2003)	Hot Dip Galvanizing of Irregularly Shaped Articles
S6-06	Canadian Highway Bridge Design Code
S157-M83 (R2001)	Strength Design in Aluminium
W48-06	Filler Metals and Allied Materials for Metal Arc Welding
W59-03	Welded Steel Construction (metal Arc Welding) (Metric Version)

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 Applications
A 325-07	Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength
B 36/B 36M-06	Standard Specification for Brass Plate, Sheet, Strip, and Roller Bar
B 137-95(2004)	Standard Test Method for Measurement of Coating Mass Per Unit Area on Anodically Coated Aluminium
B 487-85(2007)	Standard Test Method for Measurement of Metal and Oxide Coating Thickness by Microscopical Examination of a Cross Section
D 395-03	Standard Test Method for Rubber Property - Compression Set
D 412-06a	Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
D 429-03e1	Standard Test Methods for Rubber Property - Adhesion to Rigid Substrates
D 638-03	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 2240-05	Standard Test Method for Rubber Property - Durometer Hardness
D 4894-07	Standard Specification for Polytetrafluoroethylene (PTFE) Granular Molding and Ram Extrusion Materials

American National Standards Institute (ANSI)

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

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.

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

Proposal means a Contractor's submission for which engineering design is required that provides a written:

a) alternative to requirements specified by the Owner in the Contract Documents;

b) course of action or undertaking by the Contractor as delegated by the Owner in the Contract Documents.

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 DESIGN AND SUBMISSION REQUIREMENTS

1203.04.01 Design Requirements

1203.04.01.01 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 states, the design shall be such that the bearings shall 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.

1203.04.01.02 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 states 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.

Aluminium alloy components of bearing shall be proportioned according to the requirements of CAN-S157M.

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

a) Pot bearings 40 MPa

b) Disc bearings 35 MPa

1203.04.01.03 Translations and Rotation

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

The translational capacity in an 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 aluminium 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°.

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

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 states 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°.

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.

1203.04.01.04 Sliding Surfaces

1203.04.01.04.01 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 aluminium 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.

1203.04.01.04.02 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 20 to 30% of the surface.

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

1203.04.01.04.03 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, mm	Minimum Thickness of Stainless Steel, mm
≤ 300	1.5
> 300 and ≤ 500	2.0
> 500 and $\leq 1{,}500$	3.0

1203.04.01.04.04 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.

1203.04.01.04.05 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:

Maximum plan dimension, mm	$\leq 1{,}200$	$> 1{,}200$
Thickness, mm	5.0	5.5
Depth of recess, mm	2.5	3.0

1203.04.01.04.06 Contact Pressure

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

Limit State	Dead Load, MPa	Total Load, MPa
Serviceability	30	45
Ultimate	45	65

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.

1203.04.01.04.07 Coefficient of Friction

The coefficient of friction between stainless steel or anodized aluminium alloy sliding surfaces and lubricated virgin PTFE shall not exceed the following and shall be interpolated linearly for contact pressures within the ranges given:

Contact Pressures, MPa	Coefficient of Friction
3	0.08
7	0.07
14	0.06
$\geq$ 21	0.04

1203.04.01.05 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 5,000 kN or less at serviceability limit state, 10% of the vertical load capacity.

b) For bearings with a capacity over 5,000 kN at serviceability limit state, 500 kN plus 5% of the vertical load in excess of 5,000 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 Thickness of Polytetrafluoroethylene Polymer and Depth of Recess clause.

1203.04.01.06 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 bearing and the structure requirements.

1203.04.01.07 Fasteners and Anchorage

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

a) For bearings with a capacity of 5,000 kN or less at serviceability limit state, 10% of the vertical load capacity.

b) For bearings with a capacity over 5,000 kN at serviceability limit state, 500 kN plus 5% of the vertical load capacity in excess of 5,000 kN.

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

1203.04.01.08 Deflection

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

1203.04.01.09 Bearing Assembly Replacement

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.

1203.04.01.10 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 aluminium alloy and concrete shall be prevented by use of suitable insulation.

1203.04.01.11 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.

1203.04.02 Submission Requirements

1203.04.02.01 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.

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

When another authority is involved, all submissions shall be made a minimum of 5 weeks prior to the commencement of work.

1203.04.02.02 Working Drawings

The Contractor shall submit 3 sets of Working Drawings for the bearings to the Contract Administrator at least 1 week prior to commencement of bearing fabrication, for information purposes only. An Engineer shall affix their seal and signature on the Working Drawings verifying that the drawings are consistent with the Contract Documents and sound engineering practices.

The Working Drawings shall be according to the Contract Documents and Product Drawings.

The Working Drawings shall clearly indicate all material properties, dimensions, connection attachments, fasteners and accessories, the bearing alphanumeric identification, and the load capacity at the serviceability and ultimate limit states as follows:

a) Maximum vertical permanent and total load.

b) Maximum lateral load and corresponding vertical load.

c) Maximum rotational capacity about any horizontal axis and about the vertical axis at the centre of the bearing.

The bearing supplier shall have a copy of the Working Drawings at the manufacturing plant prior to and during the bearing fabrication.

1203.04.02.03 Manufacturer's Certification

Upon completion of fabrication and prior to installation of the bearings, the Contractor shall submit to the Contract Administrator a Certificate of Compliance signed by the manufacturer. The certificate shall state that the fabricated bearings are according to the Working Drawings, Product Drawings, and Contract Documents.

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 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 Aluminium Alloy

Aluminium 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 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

Material used in sliding surfaces shall be virgin PTFE 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 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 come 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 μm arithmetic average for plane surfaces and 0.50 μm arithmetic average for spherical surfaces. The roughness of anodized aluminium metallic surfaces shall not be greater than 0.40 μm arithmetic average.

The roughness of metal surfaces in contact with elastomer measured according to CSA B95 shall not be greater than 3.0 μm 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

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

Physical Property of Sealed Anodic Coating	Units	Test Method	Requirements
Thickness, t	μm	ASTM B 487	25 minimum
Mass, w	mg/cm^2	ASTM B 137	5.8 minimum
Apparent density, d	g/cm^3		2.32 minimum

The apparent density shall be determined as: $d = \frac{10\ w}{t}$

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 (i.e., yyyy-mm-dd) 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:

a) 0.2 mm, when the diameter or diagonal is equal to or less than 800 mm.

b) 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 aluminium alloy surfaces in contact with PTFE for plane surfaces and from the theoretical surface for spherical surfaces shall not exceed:

a) 0.0003 LH mm for a rectangular PTFE element.

b) 0.0006 RH mm for a circular PTFE element

where:

L = the greater plan dimension for a rectangular bearing,
R = the radius of a circular bearing, and,
H = 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:

a) 0 to + 0.125 mm for diameters up to and including 500 mm.

b) 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% $\pm$ 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	a) 0.0 to -1.5 mm for diameters ≤ 500 mm	
	b) 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 according to ANSI B4.1.	
Guides for Lateral Restraint -	Gap between metal restraints surfaces 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 shall 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 the supply of complete bearings or individual components 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
Physical Requirements for Polyether Urethane Polymer

Physical Property	ASTM Test Methods	Requirements	
		Minimum	Maximum
Hardness, Scale D	D 2240	60	64
Tensile Stress, MPa @ 100% elongation @ 200% elongation	D 412	 14 26	 -- --
Tensile Strength, MPa	D 412	35	--
Ultimate Elongation, %	D 412	220	--
Compression Set, % 22 h @ 70 °C	D 395	--	40

TABLE 2
Physical Requirements for Polytetrafluoroethylene Polymer

Physical Property	ASTM Test Method	Requirement
Tensile Strength, MPa	D 638	minimum 20
Elongation, %	D 638	minimum 200
Relative Density	D 792	2.16 ± 0.03

Appendix 1203-A, November 2023
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 following shall be specified in the Contract Documents:

- Maximum and minimum factored loads, factored translations and rotations, serviceability limit states and ultimate limit states. (1203.04.01.02)

- Bearing component uplift separation. (1203.04.01.02)

- The rotational and translational capacity in an unrestrained direction or directions. (1203.04.01.03)

- Lateral loads. (1203.04.01.05)

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

- Requirements for alternative corrosion protection system to galvanizing for steel fasteners. (1203.07.08)

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.