

**08000 Construction Materials - General**

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**\*Bold text denotes a change in this version (February 2023)**

**08000-1     Scope**

This Section includes the procedures for obtaining Product Approval and describes certain general materials which have been approved for use in the construction of water and sewage mains in the City of Saskatoon. This Section shall be read in conjunction with Sections 08001, Construction Materials - Water Mains and 08002, Construction Materials - Sewage Mains. Materials which have not been approved for use in any of these three Sections, may only be used with the written approval of the Director of Construction & Design.

**08000-2     New Material**

All material supplied under this Contract shall be newly manufactured and free from all defects. Salvaged materials from prior use will not be accepted. Materials which have been in storage may not be accepted unless the Supplier can demonstrate that the materials have not been damaged in any way during storage.

**08000-3     Product Approval**

Suppliers wishing to have a product approved for use in the City of Saskatoon shall submit the following items:

1. A description of the product including detailed drawings and specifications.
2. A sample of the product.
3. Test results indicating compliance with the industry standard specifications such as AWWA, ASTM or CSA. Tests shall be certified by a Professional Engineer from an independent testing firm.
4. A list of users who may be contacted with respect to the product's performance.

At least 8 weeks will be required to evaluate the product. Approval for use in the City of Saskatoon shall be at the discretion of the Director of Construction & Design.

**08000-4      Corrosion Protection**

**4.1            Asphaltic Coatings**

Ferrous metal products for buried installation shall be coated with asphaltic varnish in accordance with Section 10-8.1 of AWWA C110-82.

**4.2            Field Coatings**

Field coatings shall be Denso paste and tape as supplied by DENSO of Canada Ltd., POLYKEN 927 primer and POLYKEN 932 tape, **Petro Coating Systems – Petrolatum Tape**, or approved equal.

**4.3            Bolts**

Bolts which will be used as a fastening device on any material which will be buried underground shall be type A-304 stainless steel as per ASTM A276.

**4.4            Anodes**

Galvanic Zinc anodes shall generally be comprised of an insulated electrical copper lead wire, Type II zinc casting, a cardboard tube, and low resistivity backfill. References to the weight of the zinc anode shall be understood to mean the weight of the zinc in the package anode.

The anode lead wire shall be a minimum 3.0 meters of No. 10 American Wire Gauge (AWG) Standard (7 Strand) Copper wire with white TWU minus 40 Degree Centigrade insulation conforming to CSA C22.2 No 75.

Galvanic Zinc anodes shall be made of zinc conforming to ASTM B418-09 Type II. The Anode shall have the following composition:

Table 1: Anode Composition

Aluminium	0.005% Maximum
Cadmium	0.003% Maximum
Iron	0.0014% Maximum
Lead	0.003% Maximum
Copper	0.002% Maximum
Zinc	Remainder

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Anode composition shall be determined by an independent testing laboratory and test results verifying compliance with these specification shall be provided. Sampling and methods of zinc anode chemical analysis shall be on accordance with ASTM B418-09.

The zinc shall be cast directly around a minimum of 3.17 mm diameter galvanised steel core. The lead wire shall be connected to the steel core with silver solder and the connections shall be insulated by filling the recess and any voids in the lead wire connection with an electrical potting compound.

The anode shall be packaged in a rugged water permeable cardboard tube with a minimum wall thickness of 2.3 mm. The diameter and length of the cardboard tube shall suit the dimensions of the zinc casting and backfill material so that a minimum 25 mm of backfill is provided between the anode and the tube.

Plastic spacers shall be used to centre the anode. The tube ends shall be sealed with plastic caps.

Anode backfill shall be low resistivity (45 ohm-cm Max) gypsum/ bentonite backfill to the following:

- Ground Hydrated Gypsum 75-77%
- Powdered Wyoming Bentonite 15-20%
- Anhydrous Sodium Sulphate 5-8%

The backfill shall have a grain size so that 100% is capable of passing through a 20 mesh screen and 50% will be retained by a 100 mesh screen. The backfill shall be firmly packaged around the anode by means of adequate vibration. Back fill material shall be sufficient quantity to cover all zinc anodes surfaces.

The anode shall be marked with the manufacturer's name, location, type of anode (Type II to ASTM B418-09 zinc), Zinc weight, date of manufacture and lot number.

#### **08000-5     Insulation**

Insulation shall be closed-cell, rigid sheets manufactured from polystyrene foam or approved equal suitable for buried installation. The material shall conform to the

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following specifications as per the City of Saskatoon Standard Drawing 102-0012-007 available on the City's web site:

Thermal Resistance 1.74 °C/m<sup>2</sup>/50 mm as per ASTM C177 and C518.

Compressive Strength 275 kPa (min.) as per ASTM D1621.

Shear Strength 200 kPa (avg.) as per ASTM D1621.

Water Absorption 0.7% by volume (max.) as per ASTM D2842.

#### **08000-6     Geotextile**

The Geotextile which may be used in trenches to separate aggregates shall be a 100% polyester, non-woven, needle punched engineering fabric with a minimum thickness of 1.90 mm. .

#### **08000-7     Granular Materials**

Granular materials shall consist of fragments of durable rock and shall be free from undesirable quantities of soft or flaky particles of shale, loam, organic or other deleterious material.

##### **7.1            Pipe Bedding**

Specifications for pipe bedding aggregate are contained in the Aggregates Specifications 03001-3.2.7 "Pipe Bedding Aggregate".

##### **7.2            Street Surface & Base Gravel**

Specifications for gravel to be used for pavement base and street surfacing are contained in the Aggregates Specifications 03001-3.2.2 "Base Aggregate".

##### **7.3            Crushed Rock**

Specifications for crushed rock to be used for the stabilization of the trench bottom or otherwise as directed by the Engineer are contained in the Aggregates Specifications 03001-3.2.8 "Crushed Rock".

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**7.4            Plaster Sand**

Specifications for sand to be used in the production of plaster or mortar are contained in the Aggregates Specifications 03001-3.2.6 “Plaster Sand”.

**08000-8       Non Shrink / Unshrinkable Fill**

Specifications for unshrinkable fill are contained in the Aggregates Specifications 03001-3.2.12 “Unshrinkable Fill”.

**08000-9       Concrete**

Type HS/HSb sulphate resistant cement shall be used in the manufacture of ready mixed concrete and all other concrete products used. The exposure class of concrete shall be A-1/S-2 as per CSA A23.1 concrete exposure classes.

Slump tests shall be taken using standard Method of Slump Test for consistency of Portland Cement Concrete as described in CSA A23.2-5C. The consistency of the concrete shall be such that the slump shall not exceed 100mm or be less than 50mm. Non-compliance with the slump specified shall constitute sufficient ground for rejection of the concrete.

Concrete shall meet CSA specification unless otherwise specified and the air content shall be as follows:

1. Minimum specified 28-day compressive strength: 35 MPa
2. Air content: 5% to 8%
3. Maximum aggregate size: 20mm

Addition of superplasticizer to achieve workable mix is permitted only on the Engineer’s approval.

**End of Specification 08000**

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