MATERIAL SPECIFICATION FOR TALL OIL PITCH EMULSION

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2510.01 SCOPE

This specification covers the requirements for tall oil pitch emulsion suitable for use as granular sealer.

2510.01.01 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.

2510.01.02 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.

2510.02 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 Standards Specifications, Material

OPSS 1004 Aggregates - Miscellaneous

ASTM International

D244-09 (2017) Standard Test Methods and Practices for Emulsified Asphalts

Ontario Ministry of the Environment, Conservation and Parks Publications

Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act

Protocol for Analytical Methods Used in the Assessment of Properties Under Part XV.1 of the Environmental Protection Act

Environmental Protection Act, Ontario Regulation 347, General - Waste Management - R.R.O. 1990 as amended by Ontario Regulation 558/00

Environment Canada Publications

EPS1/RM/13 Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout, Second Edition: December 2000, Amendments: May 2007 and February 2016

EPS1/RM/14 Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*, Second Edition: December 2000, Amendments: February 2016

Organisation for Economic Co-operation and Development (OECD) Publications

Method 301B Ready Biodegradability: CO_2 Evolution, OECD Guidelines for the Testing of Chemicals, 1992

Method 302B Inherent Biodegradability: Zahn-Wellens/EMPA Test, OECD Guidelines for the Testing of Chemicals, 1992

United States Environmental Protection Agency Publications

SW-846 Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, 1996

Other

ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories

2510.03 DEFINITIONS

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

Effluent means any liquid waste that may be discharged to the aquatic environment.

Tall Oil means a mixture of rosins and fatty acids produced from the processing of pulp and paper.

Tall Oil Pitch means the residue formed during the distillation of tall oil. Major components consist of fatty acids, resin acids, esters, and neutral materials.

Tall Oil Pitch Emulsion means a tall oil pitch homogeneously dispersed in a water-emulsifier solution.

2510.04 DESIGN AND SUBMISSION REQUIREMENTS

2510.04.01 Submission Requirements

Valid test results from an acceptable laboratory showing complete conformance of the tall oil pitch emulsion with the requirements of this specification shall be made available upon request.

2510.05 MATERIALS

2510.05.01 Tall Oil Pitch

Tall oil pitch shall be produced from distilled tall oil from the processing of pulp and paper not associated with the use of chlorine-based chemical to bleach pulp for the production of white paper.

2510.05.02 Water

Water shall be clean and free of contaminants that could adversely affect tall oil pitch emulsion and the environment.

2510.05.03 Emulsifier

Emulsifier shall be according to the manufacturer's requirements.

2510.05.04 Tall Oil Pitch Emulsion

Tall oil pitch emulsion shall meet the physical property requirements of Table 1 and the environmental testing requirements of Table 2.

Components used to produce the tall oil pitch emulsion shall not contain any petroleum based products, calcium chloride, magnesium chloride, lignosulphonate, or lignan derivatives.

Addition of any asphalt products, solvents, polymers, or other additives during or after the manufacture of tall oil pitch emulsion shall not be permitted.

Tall oil pitch emulsion shall show no signs of separation.

2510.07 PRODUCTION

2510.07.01 Storage

Tall oil pitch emulsion that is to be stored longer than seven Days shall be kept out of direct sunlight and maintained at a temperature of not less than 5 °C.

If stored more than 60 Days, the tall oil pitch emulsion shall be circulated prior to use using a low speed mechanical impeller or a pump rated at 5 hp or less. When a pump is used, the tall oil pitch emulsion shall be drawn from the bottom of the storage tank and fed to the top of the same tank with a submerged hose to avoid bubbling.

2510.07.02 Shipment

Tall oil pitch emulsion shall be shipped in sealed containers of a size that minimizes the air space between the surface of the liquid and the top of the container.

All shipping containers shall be clean and reusable. Reused containers shall be free of any form of contamination and, if required, cleaned prior to loading.

Tall oil pitch emulsion shall be protected from freezing.

A bill of lading or an invoice, as applicable, shall be supplied in as many copies as required by the Owner for each container of tall oil pitch emulsion delivered.

2510.07.03 Sampling and Testing

2510.07.03.01 General

Samples shall be collected, handled, prepared, and tested in accordance with the requirements of Table 1 and Table 2, except as noted below.

2510.07.03.01.01 Laboratory Requirements

Solids content testing of tall oil pitch emulsion shall be carried out in a laboratory that is acceptable to the Owner.

An acceptable laboratory for conducting environmental testing listed in Table 2, Section A, shall be one that has been certified by an organization accredited by the Standards Council of Canada in accordance with ISO/IEC 17025 and participates in mandatory proficiency testing programs for the applicable parameter in Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.

An acceptable laboratory for conducting environmental testing listed in Table 2, Section B, shall be one that has been certified by an organization accredited by the Canadian Association for Environmental Analytical Laboratories (CAEAL) or by the Standards Council of Canada (SCC).

2510.07.03.01.02 Solids Content

Solids content shall be determined by measuring the mass of the residue remaining after drying a representative sample of tall oil pitch emulsion using the following procedure:

a) Obtain a minimum 500 ml sample of tall oil pitch emulsion following thorough mixing or circulation of the contents of the shipping or storage container.

b) Measure and record the mass of a suitable clean dry specimen container on a balance readable to 0.1 g and accurate to within 0.1% of the test load. A suitable container shall be one that is resistant to corrosion and change in mass upon heating, cooling, and exposure to materials of varying pH.

c) Decant approximately 100 ml from the representative sample into the specimen container. Measure and record the mass of the container and tall oil pitch emulsion.

d) Place the specimen and container in an oven maintained at 110 °C $\pm$ 5 °C and dry to a constant mass. Specimens may be dried at higher temperatures with a hot plate or burner provided that steam is allowed to escape freely.

e) Allow the container and remaining residue to cool to room temperature. Measure and record the dried mass and container using the same balance as above.

f) Calculate the percent solids as follows:

$$\text{Percent solids} = [(M_{CR} - M_C)/ (M_{CT} - M_C)] \times 100 = M_R/M_T \times 100$$

where:
- M_C = mass of container, *g*
- M_{CT} = mass of container and tall oil pitch emulsion, *g*
- M_{CR} = mass of container and residue, *g*
- M_T = mass of tall oil pitch emulsion specimen, *g*
- M_R = mass of residue, *g*

g) Report the solids content as percent solids to the nearest 0.1%.

2510.07.03.01.03 Particle Charge

The particle charge of the tall oil pitch emulsion shall be determined according to ASTM D244 in the same manner as required for an asphalt emulsion.

2510.07.03.01.04 Environmental Testing

2510.07.03.01.04.01 Sample Preparation

Sample preparation for Daphnia *magna*, and Rainbow Trout testing shall be as follows:

a) Obtain a sufficient amount of inert, non-absorptive material for the substrate meeting the gradation requirements of 9.5 mm clear stone according to OPSS 1004.

b) Prepare the substrate by applying the tall oil pitch emulsion at a rate of 1,000 ml per 1,000 g of substrate distributed evenly in four coats (i.e., 250 ml per 1,000 g substrate per coat).

c) Stir the mixture after each coat has dried to ensure that substrate particles do not adhere to each other.

d) Allow each coat of the tall oil pitch emulsion to dry completely prior to the application of the next coat.

e) To prepare the effluent for testing, expose a maximum of 1,000 ml of dechlorinated tap water for each 100 g of prepared substrate for a minimum of 24 hours.

f) Decant sufficient effluent as required for each test.

2510.07.04 Marking

Bill of lading or invoice, as applicable, shall be legibly marked with the following information:

a) Product name.

b) Name of the manufacturer.

c) Date shipped (i.e., yyyy-mm-dd).

d) Product type.

e) Net content mass in tonnes or volume in litres, as applicable.

f) Solids content in percent.

g) Particle charge (i.e., cationic).

2510.08 QUALITY ASSURANCE

2510.08.01 Inspections, Sampling, Testing, and Acceptance

The Owner reserves the right to make inspections, take samples, and perform tests at times and locations as the Owner may consider necessary to ensure that the materials supplied are in accordance with this specification.

TABLE 1
Physical Requirements

Solids content, % Minimum	**Particle Size, μm Maximum (**Note 1)	**Particle Charge**
8 (Note 2)	5.0	Cationic or non-ionic

Notes:

1. As determined by a particle size analyzer capable of resolution below 10 μm.

2. When the tall oil pitch emulsion is supplied at a higher concentration, it may be diluted with water to meet the solids content of this specification.

TABLE 2
Environmental Testing

Section	**Test**	**Requirement**	**Test Method**
A	Full Metal Scan	Less than or equal to the concentrations for Agriculture or Other Property Use shown in Table 1 of Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act.	As described in Protocol for Analytical Methods Used in the Assessment of Properties Under Part XV.1 of the Environmental Protection Act.
	Inorganic Anions		
	Polychlorinated Biphenyls (PCBs)		
	Dioxins and Furans		
	Polyaromatic Hydrocarbons (PAHs)		
	Acid / Base / Neutral Extractable Organics		
B	Inherent Biodegradability	Minimum 20% biodegradation in 28 Days	OECD Method 302B
	Ready Biodegradability	Maximum 60% $ThCO_2$	OECD Method 301B
C	*Daphnia magna* LC50	No greater than 50% impairment or mortality after continuous exposure for 48 hours.	EPS1/RM/14
	Leachate Testing: Metals Non-Metals, Metalloids	Less than the concentration shown in Schedule 4 of Ontario Regulation 347 as amended by Ontario Regulation 558/00, under the Environmental Protection Act	SW-846, Toxicity Characteristic Leaching Procedure, Method 1311
	Rainbow Trout LC50	No greater than 50% impairment or mortality after continuous exposure for 96 hours.	EPS1/RM/13

Appendix 2510-A, November 2021
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.