



**CONSTRUCTION SPECIFICATION FOR
EXTRUDED EXPANDED POLYSTYRENE FROST HEAVE TREATMENT**

TABLE OF CONTENTS

316.01	SCOPE
316.02	REFERENCES
316.03	DEFINITIONS - Not Used
316.04	DESIGN AND SUBMISSION REQUIREMENTS - Not Used
316.05	MATERIALS
316.06	EQUIPMENT - Not Used
316.07	CONSTRUCTION
316.08	QUALITY ASSURANCE - Not Used
316.09	MEASUREMENT FOR PAYMENT
316.10	BASIS OF PAYMENT

APPENDICES

316-A	Commentary
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316.01 SCOPE

This specification covers the requirements for the installation of extruded expanded polystyrene insulation for frost heave treatment of pavements.

316.01.01 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 as specified in the Contract Documents.

316.01.02 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.

316.02 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 206	Grading
OPSS 308	Tack Coating and Joint Painting
OPSS 314	Untreated Granular Subbase, Base, Surface, Shoulder, and Stockpiling
OPSS 501	Compacting

Ontario Provincial Standard Specifications, Material

OPSS 1010	Aggregates - Base, Subbase, Select Subgrade, and Backfill Material
OPSS 1103	Emulsified Asphalt
OPSS 1605	Extruded Expanded Polystyrene Pavement Insulation

316.05 MATERIALS

316.05.01 Extruded Expanded Polystyrene

Extruded expanded polystyrene insulation shall be according to OPSS 1605 and supplied in sheets 600 x 2400 mm.

Grade and compressive strength of the extruded expanded polystyrene insulation shall be as specified in the Contract Documents.

316.05.02 Emulsified Asphalt

The emulsified asphalt shall be undiluted SS-1 according to OPSS 1103.

316.05.02 Tack Coat

Tack coat shall be according to OPSS.PROV 308.

316.05.03 Granular

Granular base and subbase shall be according to OPSS 1010.

When Granular B is used as backfill, 100% of the material shall pass the 75 mm sieve.

316.07 CONSTRUCTION

316.07.01 General

The site shall be prepared and extruded expanded polystyrene insulation placed and covered with compacted granular material.

316.07.02 Site Preparation

316.07.02.01 Excavation

The excavation shall be carried out to the dimensions specified in the Contract Documents. The tolerance of the earth grade on which the extruded expanded polystyrene is to be placed shall be according to OPSS 206 and the surface shall not deviate by more than 10 mm at any place on a 3 m straight edge.

All protruding material such as cobbles, boulders, and roots exceeding 50 mm in any dimension shall be removed from the surface.

316.07.02.02 Pavement Surface

The pavement surface shall be cleaned of all earth, granular, and any other debris before tack coat is placed.

316.07.03 Placing Extruded Expanded Polystyrene

316.07.03.01 General

Extruded expanded polystyrene sheet treatment shall be placed and secured. The sheets shall be placed lengthwise and parallel to the centreline of the roadway to obtain butt joints and staggered transverse joints. The area to be treated and the insulation thickness shall be as specified in the Contract Documents.

316.07.03.02 Securing

Each sheet of extruded expanded polystyrene may be secured by placing sufficient granular material to ensure that no movement takes place during subsequent operations.

Alternatively, hardwood skewers 10 mm in diameter and 150 mm in length shall be used to secure the extruded expanded polystyrene to the prepared surfaces.

When extruded expanded polystyrene is placed directly on pavement surface, tack coat shall be applied to the existing pavement surfaces to provide a secure bond between the extruded expanded polystyrene and the pavement surface. The tack coat shall be applied at a rate of 0.35 kg/m². The extruded expanded polystyrene shall be placed while the tack coat is still tacky.

316.07.04 Granular Material

Granular base or subbase material shall be placed according to OPSS 314; except, the initial lift of granular material for protection of extruded expanded polystyrene from construction traffic shall be the depth specified in the Contract Documents placed in one lift by end dumping and spreading.

Vehicular traffic shall not be permitted on the extruded expanded polystyrene sections until the full depth of the entire granular base and subbase courses have been placed and compacted according to OPSS 501.

316.07.05 Management of Excess Material

Management of excess material shall be as specified in the Contract Documents.

316.09 MEASUREMENT FOR PAYMENT

316.09.01 Actual Measurement

316.09.01.01 Extruded Expanded Polystyrene Treatment

Measurement of extruded expanded polystyrene shall be by area in square metres.

316.09.01.02 Tack Coat

Measurement of tack coat shall be by area in square metres.

316.10 BASIS OF PAYMENT

**316.10.01 Extruded Expanded Polystyrene Treatment - Item
Tack Coat - Item**

Payment at the Contract price for the above tender items shall be full compensation for all labour, Equipment, and Material to do the work.

316.10.02 Excavation

Payment for earth and rock excavation shall be according to OPSS 206.

316.10.03 Granular Base and Subbase

Payment for granular base and subbase material placed over the polystyrene shall be according to OPSS 314.

**Appendix 316-A, November 2018
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 specify the following in the Contract Documents:

- Grade and compressive strength of the insulation. (316.05.01)
- Excavation limits. (316.07.02.01)
- Insulation thickness and area to be treated. (316.07.03.01)
- Depth of the initial lift of granular base or subbase material to be placed over the extruded expanded polystyrene to allow for construction traffic. (316.07.04)

The placing of extruded expanded polystyrene sheets over frost susceptible soil prevents the penetration of frost beyond a predetermined depth. When it is decided to treat a frost heave without excavating, polystyrene is placed right on the surface of the existing pavement and covered with granular.

Typical thicknesses of the extruded expanded polystyrene treatments are 25 mm in Southern Ontario and 40 mm in Northern Ontario. Increasing the thickness of insulation may result in an increased risk of differential icing.

Due to differential icing concerns with extruded expanded polystyrene frost heave treatments, the designer should consider limiting treatment to tangent sections avoiding curves, crests of hills, and intersections.

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

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| OPSD 514.010 | Extruded Expanded Polystyrene Frost Heave Treatment, 25 mm Thickness |
| OPSD 514.020 | Extruded Expanded Polystyrene Frost Heave Treatment, 40 mm Thickness |