



**CONSTRUCTION SPECIFICATION FOR
CROSS-STITCHING LONGITUDINAL CRACKS IN
CONCRETE PAVEMENT AND CONCRETE BASE**

TABLE OF CONTENTS

365.01	SCOPE
365.02	REFERENCES
365.03	DEFINITIONS
365.04	DESIGN AND SUBMISSION REQUIREMENTS - Not Used
365.05	MATERIALS
365.06	EQUIPMENT
365.07	CONSTRUCTION
365.08	QUALITY ASSURANCE
365.09	MEASUREMENT OF PAYMENT
365.10	BASIS OF PAYMENT

APPENDICES

365-A	Commentary
--------------	-------------------

365.01	SCOPE
---------------	--------------

This specification covers the requirements for cross-stitching longitudinal cracks in concrete pavement and concrete base.

365.01.01 Specification Significance and Use

This specification is written as a provincial-oriented specification. Provincial-oriented specifications are developed to reflect the administration, testing, and payment policies, procedures, and practices of the Ontario Ministry of Transportation.

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

365.01.02 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.

365.02 REFERENCES

When the Contract Documents indicate that provincial-oriented specifications are to be used and there is a provincial-oriented specification of the same number as those listed below, references within this specification to an OPSS shall be deemed to mean OPSS.PROV, unless use of a municipal-oriented specification is specified in the Contract Documents. When there is not a corresponding provincial-oriented specification, the references below shall be considered to be to the OPSS listed, unless use of a municipal-oriented specification is specified in the Contract Documents.

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

Ontario Provincial Standard Specifications, Construction

OPSS 369 Sealing or Resealing of Joints and Cracks in Concrete Pavement and Concrete Base

Ontario Provincial Standard Specifications, Material

OPSS 1440 Steel Reinforcement for Concrete

OPSS 1442 Epoxy Coated Reinforcing Steel Bars for Concrete

Ontario Ministry of Transportation Publications

Designated Sources for Materials (DSM)

365.03 DEFINITIONS

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

Cross-Stitching means tying together concrete pavement or concrete base across a longitudinal crack using deformed tie bars epoxied into holes drilled at an angle across the crack. This prevents horizontal and vertical movement of the concrete crack and migration of the adjacent slabs.

365.05 MATERIALS

365.05.01 Tie Bars

Tie bars shall be deformed tie bars according to OPSS 1440 and as specified in the Contract Documents. Tie bars shall be epoxy coated according to OPSS 1442.

365.05.02 Epoxy Adhesive

Epoxy adhesive shall be of the type specified for horizontal dowel application and mixed in the cartridge. Epoxy adhesive shall be supplied from a source on the ministry DSM.

365.06 EQUIPMENT

365.06.01 Drill

A hydraulic or pneumatic drill shall be used to drill holes in the concrete pavement or concrete base. The drill shall be frame mounted and capable of drilling at a 35 or 45 degree angle to the horizontal. Drilling equipment shall be used in a manner to ensure adjacent concrete is not damaged.

365.06.02 Compressor - Air Blasting

The compressor for air blasting shall have a minimum capacity of 3.5 m³/min. The compressed air shall be free from oil and other contaminants.

365.07 CONSTRUCTION

365.07.01 Tie Bar Installation

Tie bars shall be installed as specified in the Contract Documents at locations identified by the Contract Administrator. A minimum of two deformed tie bars shall be cross-stitched through a single longitudinal crack.

Holes for the tie bars shall be drilled at an angle to the horizontal, alternating across opposite sides of the crack to produce a cross-stitching pattern. The diameter of the drill hole shall be no more than 5 mm larger than the diameter of the tie bar. Drill holes shall be located such that the tie bar intersects the longitudinal crack at approximately mid-depth of the concrete slab. Drill holes shall not exit the bottom of the concrete slab and shall be installed within the following tolerances:

- a) Drilling angle: $\pm 1^\circ$
- b) Drill hole depth: ± 5 mm
- c) Drill hole diameter: ± 1 mm
- d) Drill hole offset from longitudinal crack: ± 5 mm

Prior to tie bar installation, drill holes shall be thoroughly cleaned with compressed air by inserting the compressor nozzle for the full length of the drilled hole.

The tie bars shall be secured into the existing concrete with epoxy adhesive. The epoxy adhesive shall be injected into the cleaned drill hole from the bottom of the hole outward. The tie bars shall be inserted to ensure the bars are completely encased with epoxy adhesive for the full depth of the drill hole. Excess epoxy shall be removed from the surface of the pavement.

365.07.02 Sealing of Longitudinal Cracks

Upon completion of tie bar installation the longitudinal crack shall be sealed according to OPSS 369.

365.07.03 Management of Excess Material

Management of excess material shall be according to the Contract Documents.

365.08 QUALITY ASSURANCE

365.08.01 Inspection

The Contractor shall allow the Contract Administrator to inspect all drill holes prior to placing the tie bars to ensure they meet the requirements of the Contract Documents.

365.08.02 Rejection

Drill holes identified by the Contract Administrator as not meeting the requirements of the Contract Documents shall be filled with epoxy and abandoned.

365.09 MEASUREMENT OF PAYMENT

365.09.01 Actual Measurement

365.09.01.01 Cross-Stitching Longitudinal Cracks in Concrete Pavement and Concrete Base

For measurement purposes, a count shall be made of the number of cross-stitching tie bars installed.

365.09.02 Plan Quantity Measurement

When measurement is by Plan Quantity, such measurement shall be based on the units shown in the clauses under Actual Measurement.

365.10 BASIS OF PAYMENT

365.10.01 Cross-Stitching Longitudinal Cracks in Concrete Pavement and Concrete Base - Item

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

Drill holes not within the specified tolerances shall be filled with epoxy and abandoned at no additional cost to the Owner.

365.10.02 Sealing of Longitudinal Cracks

Payment for the sealing of longitudinal cracks shall be according to OPSS 369.

**Appendix 365-A, November 2014
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

No information provided here.

Related Ontario Provincial Standard Drawings

No information provided here.