

B336 - MICRO-SURFACING - OPSS 336336.1 GENERAL

Micro-surfacing is generally used as a preventive maintenance treatment or surface seal for an existing pavement with an asphaltic concrete surface. Micro-surfacing provides a skid resistant durable surface, reduces the permeability of the asphalt surface and may also be used to fill ruts. Micro-surfacing does not prevent working cracks from reflecting.

336.2 REFERENCES

Pavement Design Report

336.3 TENDER ITEMS

The following tender items are used:

Micro-Surfacing - Type II	(Normal, m2, PQP)
Micro-Surfacing - Type III Modified	(Normal, m2, PQP)
Micro-Surfacing - Type III	(Normal, m2, PQP)

336.4 SPECIFICATIONS

Details of the work are contained in OPSS 336.

336.5 SPECIAL PROVISIONS

The designer should refer to Chapter "E" of the CDED Manual to review the special provisions applicable to these tender items. Designer options for micro-surfacing are contained in Special Provision 336F01.

336.6 STANDARD DRAWINGS

There are no standard drawings directly applicable to this type of work.

336.7 DESIGN336.7.1 Geotechnical Design Considerations

336.7.1.1 Placement:

Micro-surfacing is primarily used to address surface defects such as ravelling and flushing. Micro-surfacing can also be used to correct low surface friction caused by polishing of aggregate. In addition, micro-surfacing can be used to fill ruts that have stabilized.

Micro-surfacing can be applied in single application or double application depending on the distress condition of the project. Single application consists of a surface coat placed on the top of a pavement surface in a consistent thickness. Double application consists of a scratch coat to fill minor cracking and shallow pot holes to leave a uniform surface, followed by a surface coat placed on the top of a pavement surface in a consistent thickness.

Micro-surfacing is not suitable for pavements exhibiting structural distresses, i.e. alligator cracking, lack of structural capacity, working cracks, severe distortions and/or instability rutting.

Micro-surfacing is not dependent on traffic volumes and can be used on all classes of roadways including freeways.

When deciding if micro-surfacing is an acceptable and cost-effective treatment the life-cycle costing of various appropriate treatments should be reviewed using 7 to 10 years as the expected service life, depending on the existing pavement condition. Costs will vary depending on the location and size of the project.

Micro-surfacing, like other thin treatments and overlays, offers no long-term resistance to the development of reflective cracks.

The slurry is sensitive to weather conditions and must be placed during warm dry weather. Operational constraints are provided in OPSS 336 that require an atmospheric temperature of at least 10 °C, no fog or rain, and no forecast of temperatures below 0 °C within 24 hours of the time of application. In addition, micro-surfacing shall commence no earlier than May 15th and shall be completed no later than September 30th.

Partially paved shoulders (0.5 m) should be micro-surfaced. Micro-surfacing of fully paved shoulders is left to the discretion of the designer. In some cases, micro-surfacing from the inside of the white edge line to the inside of the white edge line is performed to eliminate the cost of line painting.

Typically, continuous placement is specified for ministry micro-surfacing work. Continuous placement reduces the number of joints, improves overall ride quality, and typically increases operating speed of the micro-surfacing. Non-continuous placement by an individual truck mounted box should be considered for work on lower volume facilities, intersection work, or maintenance patching. Non-continuous placement is specified through a special provision fill-in deleting the requirement in OPSS 336 for continuous placement.

Micro-surfacing contracts often involve re-grading of the shoulder with granular materials. Since, micro-surfacing operations often result in traffic travelling on the gravel portion of the shoulder during construction, designers should consider requiring the contractor to perform shoulder grading prior to micro-surfacing to facilitate traffic movement. Any localized pavement failures, such as potholes (300 mm²), etc., must be repaired using standard repair procedures prior to any micro-surfacing application.

Typically, a double application (i.e. scratch and surface coats) micro-surfacing is specified to address severe surface defects. The micro-surfacing application is specified through a special provision fill-in.

336.7.1.2 Scratch Coat to Fill Rut:

The scratch coat mixture should be spread to fill minor cracks and shallow potholes and leave a uniform surface. The application rate for the scratch course and rut filling application will vary depending on surface irregularities and the depth of rutting. If rut filling is required, a quantitative estimate of the amount of rutting or a copy of the ARAN rut survey should be provided to help determine quantities. The surface coat is placed over the scratch coat in a fairly consistent thickness of 9 to 12 mm.

Use of a rut-filling box should be specified when there is rutting over 50% of the project that is an average of 10 mm or greater in depth, in one wheel path. Micro-surfacing should not be used for ruts greater than 50 mm in depth.

If the depth of rutting exceeds 13 mm, a rut-filling box must be used to fill the ruts prior to apply a scratch and surface coat. The maximum depth of rut that can be filled with the rut box is 25 mm per pass. The minimum width of a rut filling application is 1.5 m. The requirement to use a rut-filling box is specified through a special provision fill-in.

336.7.1.3 Crack Sealant:

Crack sealant is typically removed prior to micro-surfacing as required by OPSS 336. Crack sealant that shows signs of deterioration or debonding and crack sealant that has been in place less than 1 year can interfere with the micro-surfacing operations. The requirement to leave crack sealant in place prior to micro-surfacing should be based on the recommendation of the pavement design report or Regional

Geotechnical Section. Crack sealing should not be performed prior to micro-surfacing. The option to leave crack sealant in place prior to micro-surfacing is specified through a fill-in to the micro-surfacing special provision.

336.7.1.4 Pavement Marking:

Micro-surfacing does not adhere well to thermoplastic pavement markings, stop blocks and turning arrows. Durable pavement markings are required to be removed prior to micro-surfacing as specified in OPSS 336. Durable pavement markings should only be left in place based on the recommendation of the pavement design report or Regional Geotechnical Section. The Regional Traffic Section should also be consulted about impacts to traffic created by removing pavement markings during construction. The option to leave durable pavement markings in place prior to micro-surfacing is specified through a fill-in to the micro-surfacing special provision.

336.7.1.5 Tack Coating:

Tack coating of existing pavement surfaces is typically required. New pavements or flushed pavements to be micro-surfaced may not require tack coating. When a thick scratch coat micro-surfacing is anticipated, tack coating may not be required. Tack coating should be as recommended in the Pavement Design Report or by the Regional Geotechnical Section. Tack coating is required as part of the micro-surfacing item and therefore an item for tack coat is not required. When tack coating is not required it should be specified through a fill-in portion of the micro-surfacing special provision.

336.7.1.6 Different Types of Micro-Surfacing:

Typically, the different micro-surfacing types are used for the following applications as recommended in the Pavement Design Report or by the Regional Geotechnical Section. Type II micro-surfacing with Superpave 12.5 quality aggregate is used on local residential streets and low volume arterial and collectors. Type II micro-surfacing with Superpave 12.5 FC2 quality aggregate is used on higher volume arterials and collectors. Pavements with AADT greater than 2500 per lane require a Superpave 12.5 FC2 quality aggregate. Type III micro-surfacing is used on freeways and other high speed, high volume roads. Type III Modified micro-surfacing is used in lieu of Type III micro-surfacing to reduce traffic generated noise. Type III Modified and Type III micro-surfacing both require Superpave 12.5 FC2 quality aggregate.

Where Type II micro-surfacing is required, the designer must specify the aggregate requirements as either Superpave 12.5 FC2 quality aggregate or Superpave 12.5 quality aggregate. The default requirements of OPSS 336 specify Type II Micro-surfacing shall meet the requirements of a high traffic volume application (i.e. Superpave 12.5 FC2 aggregates). Where Type II micro-surfacing with Superpave 12.5 quality aggregate is required on a project, the aggregate requirements of

OPSS 336 must be changed through a fill-in portion of the micro-surfacing special provision.

Some Type II micro-surfacing and all Type III and Type III Modified micro-surfacing require aggregates that meet Superpave 12.5 FC2 quality requirements. In Southern Ontario, the aggregates meeting Superpave 12.5 FC2 quality should come from a source listed on the DSM list as required in OPSS 336. In Northern Ontario, the requirement for Superpave 12.5 FC2 quality aggregates to come from the DSM should be reviewed based on if the highway is designated as a Superpave 12.5 FC2 or Superpave 12.5 Modified pavement. If it is determined, that the aggregate does not need to come from the DSM, the aggregate can also be obtained from a quarry consisting of 100 percent siliceous aggregate determined according to LS-609. If aggregates are not required to come from the DSM, a fill-in portion of the micro-surfacing special provision should be used. Aggregate requirements should be as recommended in the Pavement Design Report or by the Regional Geotechnical Section and should be specified through a fill-in portion of the micro-surfacing special provision.

336.7.2 Other Design Considerations

The micro-surfacing specification requires the use of a pilot vehicle as part of the micro-surfacing process. There may be highway sections such as a freeway, where the regional traffic section should be consulted regarding the deletion of the pilot vehicle requirement. The pilot vehicle requirement can be deleted through a special provision fill in.

336.7.3 Source of Information

The Regional Geotechnical Section is the main source of information for the above noted tender items based on recommendations from the Pavement Design Report.

336.8 COMPUTATION

336.8.1 Method of Calculation

Micro-surfacing tender items are all Plan Quantity Payment items of the horizontal area in square metres.

In the case where two lifts of micro-surfacing (i.e. double application) is required, the total area in square metres (m²) would remain the same. The unit price would be based on a two lift thickness.

336.9 DOCUMENTATION

Contract drawings are not required with the above tender items.

Each area of micro-surfacing is documented on one line of the Quantities Miscellaneous 1 sheet. The start and end chainages of each area are provided. The width of micro-surfacing is delineated by providing both the left and right offsets of the edge of micro-surfacing. The edges would typically correspond to the edges of pavement. The area is typically the width of pavement multiplied by the length of pavement that is to receive micro-surfacing.

One or more columns is/are headed by the tender item name(s). The area of micro-surfacing (m²) is entered in the line, corresponding to each area of micro-surfacing, in the appropriate column that corresponds to the appropriate tender item name.

If rut filling is required, information on rut depths should be provided such as a copy of ARAN data on typical rut depths. ARAN data should be included in the Contract drawings similar to borehole information.

336.9.1 Documentation Accuracy

Calculated areas in square metres are recorded to the nearest whole number.