# Slurry Surfacing

DIPL Roadworks Master – October 2019

## General

This section specifies the materials, equipment and procedures for slurry surfacing of existing sealed surfaces.

## Standards and Publications

Conform to the following Standards and publications unless specified otherwise.

AS 1160 Bitumen emulsions for the construction and maintenance of pavements.

AS 1289.3.3.1 Methods for testing soils for engineering purposes – Calculation of the plasticity index of a soil.

AS 1289.3.7.1 Methods for testing soil for engineering purposes – Determination of the sand equivalent of a soil using a power operated shaker.

AUSTROADS

AGPT/T272 Determination of Abrasion Loss of Bituminous Slurry (Wet track abrasion test)

INTERNATIONAL SLURRY SURFACING ASSOCIATION (ISSA)

TB 114 Test method for wet stripping of cured slurry surfacing mixtures.

## Commencement Of Work – witness point

**Witness point** - Give the Superintendent at least 7 days notice of the date and time of the commencement of work.

[Adjust the time for giving notice to suit the particular project as required.]

## Traffic Control

Refer to PROVISION FOR TRAFFIC.

Take all necessary steps to ensure:

The safety of traffic during the progress of the work until completion of the final operation or curing, whichever is the latter.

That traffic does not damage the work on newly treated sections of pavement.

## Materials

### Binder – Hold Point

Use bitumen emulsion binder complying with AS 1160.

**Hold point** - Additives to improve the workability of the mix, or to accelerate or retard setting of the mix may be used with the approval of the Superintendent.

### Aggregates

Use mineral aggregate consisting of crushed stone, clean, sharp, angular sand and mineral filler combined to meet the grading as specified in the **Mix Requirements** clause in this work section and as set out in the ***Table - Standard Mixes***.

Use clean aggregate free from vegetable matter, oversize stone and other deleterious substances.

Use combined aggregate and mineral filler having a sand equivalent value of not less than 45 when tested in accordance with AS 1289.3.7.1. and a plasticity index less than 5 when tested in accordance with AS 1289.3.3.1.

### Water

Use only potable water and free from harmful soluble impurities.

### Mineral Filler

Use an approved mineral product having a minimum of 85% passing a 0.075 mm sieve, thoroughly dry and free from lumps, organic matter and clay particles.

### Samples

Supply at any time when requested, sufficient quantities of sample material used or to be used in the work.

Allow the Superintendent to take such samples at any time and provide facilities and any assistance required for this purpose.

### Stockpiles

Provide a separate site for each aggregate size and allow 15 metres between adjacent sites.

Ensure sites are well drained and on hard ground. Avoid contamination by dust.

Maintain access roads and stockpile sites.

Avoid sites under trees, telephone lines, overhead transmission lines or where overhead clearance is less than 6 metres.

Clear all vegetation to 5 m beyond stockpile boundary.

Construct gravel foundation for stockpiles with 100 mm compacted thickness. Trim and compact to 95% relative compaction in accordance with the PAVEMENTS AND SHOULDERS Section.

Construct stockpiles at least 1 metre high and batter sides 1 vertical to 1.5 horizontal and trim neatly to facilitate measurement.

Remove from site any non‑conforming aggregate.

## Plant & Equipment

### Mixing Machine

Use a self-propelled slurry mixing machine with a continuous flow pugmill able to accurately proportion and deliver mineral aggregate, filler, bitumen emulsion, water and additive to the mixing chamber and discharge the thoroughly mixed product on a continuous basis.

DIP STICKS; Use dipsticks on the emulsion and water tanks calibrated in intervals of 50 litres and on the additive tank use a dipstick calibrated in intervals of 10 litres.

FINES FEEDER; Equip the mixing machine with a suitable fines feeder which provides an accurate metering device to introduce a predetermined amount of mineral filler into the mixer at the same time and in the same location as the mineral aggregate. Provide calibrated controls capable of accurately proportioning the materials.

WATER PRESSURE SYSTEM; Equip the mixing machine with a water pressure system and a fog type spray bar capable of completely fogging the road surface preceding the spreading equipment to a maximum application of 0.3 litres per square metre.

MACHINE STORAGE; For truck or semi-trailer mounted slurry surfacing machines provide sufficient machine storage capacity to allow the adequate mixing and application of a minimum of 7 cubic metres of slurry mixture. This provision does not apply to continuous run slurry surfacing machines.

GUIDE ARM; Fit the machine with a guide arm and chain to assist the driver in following the correct line. Mount the guide arm on the driver’s side of the vehicle, forward of, and in full view of the driver.

### Spreading Equipment

Attach to the mixing machine a mechanical spreader box distributor, equipped with flexible material in contact with the pavement surface to prevent loss of the slurry surfacing mix from the spreader and capable of distributing the slurry surfacing mix across the width of the box without segregation or overflow while assuring by its design and adjustments that the required width and depth of spread are maintained on varying grades, crowns and superelevations.

SPREADER BOX; Use a spreader box with an adjustable width, capable of spreading up to 4.0 metres in width and equipped with skis or other levelling device to enable it to fill traverse depressions up to 1.5 metres across.

STEERING; Use a spreader box with an adjustable steering device and a flexible strike-off.

### Ancillary Plant

Provide all ancillary plant such as rotary road brooms, signs, lamps, barricades, hand squeegees, shovels, hand brooms and any other equipment necessary for the performance of the work.

## Mix Requirements

### General

Blend the bitumen emulsion with the mineral aggregate and filler in the proportions, by dry mass of aggregate, including filler, to give the required bitumen content of the slurry surfacing mix as specified in the ***Table - Standard Mixes***.

Add sufficient water to provide a mix of workable consistency and this may be varied slightly to suit the surface texture of the pavement and the pavement temperature.

|  |  |  |
| --- | --- | --- |
| **Table - Standard Mixes** | | |
| **Sieve Size (mm)** | **Percentage Of Mineral Aggregate Passing Sieve By Mass** | |
| **Nominal Mix Size** | |
| **7 mm** | **5 mm** |
| 13.2 | 100 | 100 |
| 9.5 | 100 | 100 |
| 6.7 | 85-100 | 100 |
| 4.75 | 70-90 | 90-100 |
| 2.36 | 45-70 | 50-70 |
| 1.18 | 28-50 | 35-50 |
| 0.60 | 19-34 | 20-35 |
| 0.30 | 12-25 | 12-25 |
| 0.15 | 7-18 | 7-18 |
| 0.075 | 5-15 | 4-10 |
| Residual binder content as % mass of aggregate | 6.5-9 | 7-9.5 |

### Mix Design – Process Testing and Endorsement – Hold Point

Make trial batches to determine the final blend of water, additive and cement to be used for the best results.

**Hold point** - At least 14 days before commencing work, forward the details of the mix design, and copies of test reports to the Superintendent.

Testing is to be carried out in a NATA accredited laboratory and at is to be carried out at no cost to the Principal. Once the mix design is endorsed by the Superintendent it becomes the specified job mix.

Tests required are:

* Wet stripping test; ISSA TB 114 (minimum 90% coating) to assess the system’s coating compatibility with the aggregate source.
* Wet track abrasion test; by AGPT/T272, SST 04 (maximum 800g/m2 loss). If the wet track abrasion re-test value exceeds 800g/m2, halt production until the mix design is corrected and endorsed by the Superintendent.

### Departures from the Job Mix – Table

The following table provides the maximum mean departures from the job mix for any day’s work.

|  |  |  |
| --- | --- | --- |
| **Table - Maximum Mean Departures From The Job Mix** | | |
|  | **Sieve Size In mm** | **% By Mass** |
| **Aggregate** | 6.7 | 7 |
| 4.75 | 7 |
| 2.36 | 5 |
| 1.18 | 5 |
| 0.60 | 4 |
| 0.30 | 4 |
| 0.15 | 3 |
| 0.075 | 2 |
| **Bitumen Content** | | + 1.0 - 0.5 |

If the mix gradings and binder content depart from the job mix by more than any of the maxima shown in the table, halt production until the mix is corrected.

## Preparation And Set Out

### Sweeping Pavement – Hold Point

Immediately prior to any application of slurry surfacing mix, sweep the pavement as necessary to ensure that the surface is free of loose material, stones, dirt, dust and foreign matter by the use of a mechanically operated rotary road broom, unless otherwise authorised by the Superintendent. Carry out additional sweeping necessary to obtain a satisfactory clean surface by hand using stiff brass or similar brooms.

PREVIOUSLY SEALED AREAS; Prior to the application of slurry surfacing mix adjoining previously sealed areas, sweep the edges of the previously sealed areas to remove loose material for at least 150mm from the edge.

FOREIGN MATERIAL; Remove adherent patches of foreign material from the surface of the road by steel scraper or other suitable methods. Do not remove any large deposits of foreign material that cannot be removed by reasonable use of the mechanical broom, steel scrapers or other suitable methods. Report the existence of any such deposits to the Superintendent prior to the commencement of spreading.

**Hold point** - Do not commence spreading of the slurry surfacing mix until the prepared pavement has been endorsed by the Superintendent.

SET OUT; Unless following a satisfactory edge line or centre line place pavement marks on the surface at intervals of not more than 8 metres for the slurry surfacing machine to follow, while mixing and spreading.

## Application

Do not apply slurry surfacing if it is raining or if rain is expected.

Deposit the slurry surfacing mix at the optimum consistency into the spreading box and add nothing more to it. Ensure that the mixing time is sufficient to produce a complete and uniform coating of the aggregate and direct the mixture into the moving spreader box at a sufficient rate to maintain an ample supply across the full width of the strike-off squeegee at all times.

SLURRY BUILD UP; If required, squirt minor amounts of water into the corners of the spreader box to overcome temporary build up of slurry surfacing mixture. This has no detrimental effect on the performance of the slurry.

END OF RUN; Square off the end of each run at the point where feathering commenced ( ie. that point where there is insufficient material in the spreader box to maintain the full width of spread). Alternatively, the successive run may be lapped, but by no more than 100mm, if it can be demonstrated that no loss of riding surface or fattiness will result.

INACCESSABLE AREAS; Use suitable hand squeegees to spread the mix in areas inaccessible to the machine.

JOINTS; Make longitudinal joints coincide with lane or centreline markings. Provide suitable width spreading equipment to produce a minimum number of longitudinal joints throughout the work. Half passes and odd width passes may be used where necessary for shape correction but must not be used as the last pass of any paved area. Do not allow excessive build up or unsightly appearance on longitudinal or traverse joints.

KERBS AND SHOULDERS; Take care to ensure straight lines along kerbs and shoulders and do not allow run off on those areas.

TEMPERATURE; If the pavement temperature exceeds 40°C., immediately prior to the application of the slurry surfacing mix thoroughly wet the surface of the pavement and all crack faces with water. Ensure that all surfaces are uniformly damp and no free water is present on the surface or in the cracks when the slurry surfacing mix is applied.

DAMAGED WORK; Replace slurry surfacing damaged by rain after spreading.

## Conformance Testing

MATERIALS TESTING; Sampling of the mixed material will be requested randomly by the Superintendent during each day’s production.

The sample material will be tested by the Principal’s NATA accredited testing laboratory contractor using accredited NATA technicians and test results will be provided to the Contractor.

EXCESS AGGREGATE LOSS; Should the Superintendent identify excess aggregate loss from the surface after the slurry has fully cured, and the mix proportions are within the specified limits, suspend work until tests are taken and the problems rectified.

Wet stripping test; ISSA TB 114 (minimum 90% coating) to assess the system’s coating compatibility with the aggregate source.

Wet track abrasion test; by AGPT/T272, SST 04 (maximum 800g/m2 loss). If the wet track abrasion re-test value exceeds 800g/m2, halt production until the mix design is corrected and endorsed by the Superintendent.

## Surplus, Waste And Defective Materials

Remove from the work prior to its application to the road any bitumen emulsion which has deteriorated or become contaminated in any way. Bear the cost of replacing any such emulsion for use in the works.

SURPLUS MATERIALS;

Remove surplus materials in stockpiles and elsewhere from the job at the completion of the work.

WASTE;

Dispose of waste aggregate, bitumen emulsion, empty containers or other materials remaining after completion of the work in an acceptable manner, at a legal waste disposal site, and leave the work site in a neat and tidy condition.

## Maintenance

Maintain the completed work in a satisfactory condition for a period of one month after completion of the whole of the work. Maintenance is limited to work which results from failures attributable to the operations of the Contractor.

## Records – witness point

Record the particulars of the slurry surfacing work, as required by the Superintendent, on the Department’s standard “Daily Record Sheet – Spray Surfacing”. Record the details of aggregate, added filler, emulsion and additive used together with the length and width of run immediately each run is completed.

**Witness point** - Forward a copy of the slurry surfacing Daily Record Sheet to the Superintendent daily.