# CITY OF LEMOORE

# 2024 ANNUAL ROAD MAINTENANCE PROJECT
# TECHNICAL SPECIFICATIONS

Prepared by Certification:

In accordance with the provisions of Section 6735 of the Business and Professions Code of the State of California, these specifications have been prepared by or under the direction of the following Civil Engineer, licensed in the State of California.


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## SECTION 10. (CONSTRUCTION DETAILS)

### 10-1.01 GENERAL

The Contractor's attention is directed to Section 5-1.36, Property and Facility Preservation, of the Standard Specifications and these Special Provisions.

The Contractor will be required to work around public utility facilities and other improvements that are to remain in place within the construction area or that are to be relocated and relocation operations have not been completed, and in accordance with the provisions of Section 5-1.36D of the Standard Specifications, he will be liable to owners of such facilities and improvements for any damage or interference with service resulting from his operations. The Contractor shall ascertain the exact locations of underground facilities and improvements within the construction area before using equipment that may damage such facilities or interfere with the services. Other forces may be engaged in moving or removing utility facilities or other improvements or maintaining services of utilities and the Contractor shall cooperate with such forces and conduct his operations in such a manner as to avoid any unnecessary delay or hindrance to the work being performed by such other forces.

The Contractor is required to notify all property owners, businesses, residences, etc. in letter form in both English and Spanish of the construction dates and times, at least 5 days prior to the beginning of work. A copy of this notification letter must also be sent to the City of Lemoore. Contractor shall also post "Temporary No Parking" signs, a minimum of 48 hours prior to the commencing of demolition or construction activities on the street adjacent to their property. The notification shall be by posting visible signs at the edge of the curbs and gutters. The signs which will be posted must be on their own lath or attached to delineator cones, or pylons, and not stapled or nailed to any tree, utility pole or street signs. Trees must be protected from being scarred or broken during construction and must be repaired or replaced at Contractor's expense if damage is done.

In the event that vehicles are on the street at the time construction is to begin, the contractor shall take appropriate action to notify the owner/s of said vehicle to have it moved. If this is not possible, or the vehicle is inoperable and the owner is not capable of moving the vehicle, the contractor shall inform the Project Engineer, who will notify the City of Lemoore Police Department to have the vehicle towed at the owner's expense. Note: The above action may take place only if the "Temporary No Parking" signs have been in place, and placement has been verified by the Project Engineer, for the required 48 hour time period. Removal of said signs by the property owners or vandals will not constitute Non-compliance with this section.

The Contractor will be held responsible for any damage he may do to existing installations that are to remain in place.

The Contractor shall ensure that all striping and road markings are repainted with paint as specified on the plans.

All property to remain shall be properly protected from injury or damage. Should any such property be damaged, it shall be repaired and/or replaced with material, fixtures, or equipment of the same kind, quality and size or better.

Full compensation for performing all of the work required under these Special Provisions shall be considered as included in the prices paid for the various Contract items of work involved and no separate payment will be made therefore.

### 10-1.02 CONTROL OF WORK

Order of work shall conform to the provisions in Section 5, "Control of Work," of the Standard Specifications and these special provisions.

### 10-1.03 CONSTRUCTION AREA TRAFFIC CONTROL DEVICES

Flagging, signs, and temporary traffic control devices furnished, installed, maintained, and removed when no longer required shall conform to the provisions in Section 12, "Temporary Traffic Control Devices," of the Standard Specifications and these special provisions.

Category 1 temporary traffic control devices are defined as small and lightweight (less than 45 kg) devices. These devices shall be certified as crashworthy by crash testing, crash testing of similar devices, or years of demonstrable safe performance. Category 1 temporary traffic control devices include traffic cones, plastic drums, portable delineators, and channelizers.

If requested by the Engineer, the Contractor shall provide written self-certification for crashworthiness of Category 1 temporary traffic control devices at least 5 days before beginning any work using the devices or within 2 days after the request if the devices are already in use. Self-certification shall be provided by the manufacturer or Contractor and shall include the following:

A. Date,
B. Federal Aid number (if applicable),
C. Contract number, district, county, route and kilometer post of project limits,
D. Company name of certifying vendor, street address, city, state and zip code,
E. Printed name, signature and title of certifying person; and
F. Category 1 temporary traffic control devices that will be used on the project.

The Contractor may obtain a standard form for self-certification from the Engineer.

Category 2 temporary traffic control devices are defined as small and lightweight (less than 45 kg) devices that are not expected to produce significant vehicular velocity change, but may cause potential harm to impacting vehicles. Category 2 temporary traffic control devices include barricades and portable sign supports.

Category 2 temporary traffic control devices shall be on the Federal Highway Administration's (FHWA) list of Acceptable Crashworthy Category 2 Hardware for Work Zones. This list is maintained by FHWA and can be located at:

http://safety.fhwa.dot.gov/roadway dept/road_hardware/listing.cfm?code=workzone

The Department also maintains this list at:

http://www.dot.ca.gov/hq/traffops/signtech/signdel/pdf/Category2.pdf

Category 2 temporary traffic control devices that have not received FHWA acceptance shall not be used. Category 2 temporary traffic control devices in use that have received FHWA acceptance shall be labeled with the FHWA acceptance letter number and the name of the manufacturer. The label shall be readable and permanently affixed by the manufacturer. Category 2 temporary traffic control devices without a label shall not be used.

If requested by the Engineer, the Contractor shall provide a written list of Category 2 temporary traffic control devices to be used on the project at least 5 days before beginning any work using the devices or within 2 days after the request if the devices are already in use.

Category 3 temporary traffic control devices consist of temporary traffic-handling equipment and devices that weigh 45 kg or more and are expected to produce significant vehicular velocity change to impacting vehicles. Temporary traffic-handling equipment and devices include crash cushions, truck-mounted attenuators, temporary railing, temporary barrier, and end treatments for temporary railing and barrier.

Type III barricades may be used as sign supports if the barricades have been successfully crash tested, meeting the NCHRP Report 350 criteria, as one unit with a construction area sign attached.

Category 3 temporary traffic control devices shall be shown on the plans or on the Department's Highway Safety Features list. This list is maintained by the Division of Engineering Services and can be found at:

http://www.dot.ca.gov/hq/esc/approved_products_list/HighwaySafe.htm

Category 3 temporary traffic control devices that are not shown on the plans or not listed on the Department's Highway Safety Features list shall not be used.

Full compensation for providing self-certification for crashworthiness of Category 1 temporary traffic control devices and for providing a list of Category 2 temporary traffic control devices used on the project shall be considered as included in the prices paid for the various items of work requiring the use of the Category 1 or Category 2 temporary traffic control devices and no additional compensation will be allowed therefore.

**10-1.04 CONSTRUCTION AREA SIGNS**

Construction area signs for temporary traffic control shall be furnished, installed, maintained, and removed when no longer required in conformance with the provisions in Section 12, "Temporary Traffic Control Devices," of the Standard Specifications and these special provisions.

One C18 sign and One C13 sign shall be posted on each approach/departure from the construction work area. Locations of the signs shall be approved by the Engineer.

Signs may be ported on temporary post supported by cross braces, rather than by digging holes for posts. Where such cross braces are used, no braces shall extend into the traveled way or a sidewalk.

Unless otherwise shown on the plans or specified in these special provisions, the color of construction area warning and guide signs shall have black legend and border on orange background, except W10-1 or W47(CA) (Highway-Rail Grade Crossing Advance Warning) sign shall have black legend and border on yellow background.

Orange background on construction area signs shall be fluorescent orange.

The Contractor shall notify the appropriate regional notification center for operations of subsurface installations at least 2 working days, but not more than 14 calendar days, prior to commencing any excavation for construction area sign posts. The regional notification centers include but are not limited to the following:

| | |
|---|---|
| Underground Service Alert-<br>Northern California (USA) | Telephone: 1 (800) 227-2600 |
| Underground Service Alert-<br>Southern California (USA) | Telephone: 1 (800) 422-4133 |

All excavation required to install construction area signs shall be performed by the hand methods without the use of power equipment; except that power equipment may be used if it is determined there are no utility facilities in the area of the proposed post holes.

The Contractor shall maintain accurate information on construction area signs. Signs that are no longer required shall be immediately covered or removed. Signs that convey inaccurate information shall be immediately replaced or the information shall be corrected. Covers shall be replaced when they no longer cover the signs properly. The Contractor shall immediately restore to the original position and location any sign that is displaced or overturned, from any cause, during the progress of work.

Construction area signs shown on the plans, except those signs required for traffic control system for lane closure and unless otherwise specified in the special provisions, will be paid for on a lump sum basis, which lump sum price shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing construction area signs required for the direction of public traffic through or around the work and for erecting or placing, maintaining (including covering and uncovering as needed) and, when no longer required, removing construction area signs at locations shown on the plans.

Full compensation for furnishing, erecting, maintaining and removing any additional construction area signs the Contractor may deem necessary will be considered as included in prices paid for the various Contract items of work and no additional compensation will be allowed therefore.

**10-1.05 MAINTAINING TRAFFIC**

Attention is directed to Sections 7-1.03, "Public Convenience," 7-1.04, "Public Safety," and 12, "Temporary Traffic Control Devices," of the Standard Specifications and to the Section entitled "Public Safety" elsewhere in these special provisions, and these special provisions. Nothing in these special provisions shall be construed as relieving the Contractor from his responsibility as provided in said Section 7-1.04.

The Contractor will not be allowed to close streets. One lane of through traffic shall be maintained at all times with appropriate Signage, Personnel and safety equipment to safely direct traffic through the construction area, unless the contractor submits to the Public Works Director a proposed detour plan.

Detour plan shall meet the criteria for detour plans as shown in the latest edition of the California Department of Transportation Manual of Traffic Controls for Construction and Maintenance Zones. The City Engineer, and the Director of Public Works; shall approve Detour Plan, copies shall be sent to the City of Lemoore Police Department and Local Fire Agencies and Emergency Organizations, i.e. Hospitals and Ambulance services, and the California Highway Patrol. Said Detour Plan shall clearly state the dates and times of closure. Closures shall only be allowed during working hours, and the roadway shall be made passable for passenger type vehicles at the close of the work each day.

The Contractor shall be responsible for all barricades, delineators, cones, reflective media, signs and other traffic control measures necessary for the safe control of traffic and protection of the work.

The Contractor shall notify in writing all residents, commercial establishments and others affected by the construction, 5 days prior to the beginning of construction.

The Contractor shall also place "TEMPORARY NO PARKING" signs, in the areas of construction a minimum of 48 hours prior to beginning work for, AC Paving, and Curb and Gutter Replacement, as necessary for striping and placement of signs.

The Contractor is responsible for the repair of any damage done by emergency or other vehicles, inadvertent or not.

The Contractor shall review with the City Engineer, Project Engineer, Director of Public Works and the Chief of Police, his proposed method of barricading and signing in the field and shall comply with any request they may make. Said review shall be at least 48 hours in advance of construction. Contractor shall also notify in writing the City Engineer, the City Police, Fire and County Fire Departments, and Sheriffs Department of his proposed construction schedule.

**The contractor shall provide a traffic control plan to the City for review and approval prior to commencement of work on roadways.**

Personal vehicles of the Contractor's employees shall not be parked on the traveled way or shoulders including any section closed to public traffic.

The Contractor shall notify local authorities of the Contractor's intent to begin work at least 5 days before work is begun. The Contractor shall cooperate with local authorities relative to handling traffic through the area and shall make arrangements relative to keeping the working area clear of parked vehicles.

Whenever work vehicles or equipment are parked on the shoulder within 6 ft of a traffic lane, the shoulder area shall be closed with fluorescent orange traffic cones or portable delineators placed on a taper in advance of the parked vehicles or equipment and along the edge of the pavement at 24-ft intervals to a point not less than 24 ft past the last vehicle or piece of equipment. A minimum of 9 traffic cones or portable delineators shall be used for the taper. A W20-1 (ROAD WORK AHEAD) or W21-5b (RIGHT/LEFT SHOULDER CLOSED AHEAD) or C24(CA) (SHOULDER WORK AHEAD) sign shall be mounted on a portable sign stand with flags. The sign shall be placed where designated by the Engineer. The sign shall be a minimum of 48in x 48in in size. The Contractor shall immediately restore to the original position and location a traffic cone or delineator that is displaced or overturned, during the progress of work.

A minimum of one traffic lane, not less than 11 ft wide, shall be open for use by public traffic in each direction of travel.

Full compensation for performing all of the work required under these Special Provisions shall be considered as included in the prices paid for the various Contract items of work involved and no separate payment will be made therefore.

### 10-1.06 EXISTING ROADWAY FACILITIES

The work performed in connection with various existing highway facilities shall conform to the provisions in Section 15, “Existing Facilities,” of the Standard Specifications.

### 10-1.07 PRESERVATION OF PROPERTY

Attention is directed to the provisions in Section 5-1.36, "Property and Facility Preservation," of the Standard Specifications and these special provisions.

Protection: The Contractor shall protect all private and public property and shall replace, repair, or pay for any damage thereto.

Notice to Property Owners and Tenants: The Contractor shall give a written notice to all property owners adjacent to and affected by his work at least five (5) working days in advance of beginning the work, indicating the work to be performed and the approximate length of time that the property owner or tenant will be affected by his operations.

Access: Access shall be provided to all businesses and residences whenever practicable. The Contractor shall conduct his operations so as to cause the least inconvenience to both vehicular and pedestrian access.

Existing trees, shrubs and other plants, that are not to be removed as shown on the plans or specified elsewhere in these special provisions, and are injured or damaged by reason of the Contractor's operations, shall be replaced by the Contractor. Damaged or injured plants shall be removed and disposed of.

Replacement planting of injured or damaged trees, shrubs and other plants shall be completed not less than 20 working days prior to acceptance of the contract. Replacement plants shall be watered as necessary to maintain the plants in a healthy condition.

**10-1.08 UTILITIES**

It shall be the obligation of the Contractor to notify the various utility companies at least three (3) days in advance of closing and/or tearing up of the street affecting said utility companies.

It shall be the obligation of the Contractor to immediately notify the affected utility company if relocation of any utilities will be required.

**10-1.09 PEDESTRIAN ACCESS**

Pedestrian access shall be maintained on all existing crosswalks and all existing wheelchair ramps during construction. If the Contractor's operations require the closure of one walkway, then another walkway shall be provided nearby, off the traveled roadway.

Access: Access shall be provided to all businesses and residences whenever practicable. The Contractor shall conduct his operations so as to cause the least inconvenience to both vehicular and pedestrian access.

Full compensation for providing said pedestrian facilities shall be considered as included in the prices paid for the various Contract items of work involved and no separate payment will be made therefore

**10-1.10 REMOVE ROADSIDE SIGNS**

All details and dimensions for roadside signs and the installation thereof shall conform to the current State of California, Department of Transportation, Sign Specifications, Traffic Manual, Standard Specifications, Standard Plans, and these special provisions.

Existing roadside signs and posts, at locations shown on the plans, shall be removed, relocated, or salvaged as shown on the plans or as directed by the Engineer.

Each roadside sign shall be installed at the new location on the same day that the sign is removed from its original location, and shall be placed in a manner to allow sufficient width for ADA access.

New roadside signs and posts, or other alternate mountings as shown on the plans, shall be installed at the locations shown on the plans or as directed by the Engineer. New and relocated signs shall be installed on appropriately sized perforated square posts with an anchor sleeve as directed by the Engineer.

Existing roadside signs shall not be removed until replacement signs have been installed or until the existing signs are no longer required for the direction of public traffic, unless otherwise directed by the Engineer.

Full compensation for relocating or removing existing roadside signs or for furnishing and installing new roadside signs shall be considered as included in the contract price paid and no additional payment will be made therefore.

**10-1.22 PAINT TRAFFIC STRIPE AND PAVEMENT MARKING**

Painted traffic stripes (traffic lines) and pavement markings shall be applied in conformance with the provisions in Section 84, "Markings," of the Standard Specifications and these special provisions.

Traffic stripe and pavement marking paint shall conform to the requirements in State Specification No. PTWB-01.

The color of the painted traffic stripes and pavement markings shall conform to the requirements in ASTM Designation: D 6628-01.

Retroreflectivity of the paint traffic stripes and pavement markings shall conform to the requirements in ASTM Designation: D 6359-99. White painted traffic stripes and pavement markings shall have a minimum initial retroreflectivity of 250 mcd $m^{-2}$ $lx^{-1}$. Yellow painted traffic stripes and pavement markings shall have a minimum initial retroreflectivity of 150 mcd $m^{-2}$ $lx^{-1}$.

Traffic stripes and all markings shall be per CALTRANS standards as noted on the plans.

Contractor to place street centerline striping, lane line striping, limit lines, directional arrows and crosswalks as shown on the plans.

Any existing pavement striping and markings indicated on the plans to remain unmodified, which are destroyed by the Contractor shall be replaced by the Contractor. Payment for such items shall be included in the various items of work and no separate payment will be made therefore.

Nothing in these Special Provisions shall relieve the Contractor from his responsibilities as provided in Section 7-1.04, “Public Safety”, of the Standard Specifications.

Payment for any striping, marking & signage shall be considered as included in the contract price paid for each of these bid items and no additional payment will be made therefore.

### 10-1.23 ADJUST FRAME AND COVER TO GRADE

Frames and covers of existing manholes shall be adjusted to final finished grade in accordance with the provisions in Section 15 "Existing Facilities," of the Standard Specifications, these special provisions, and the City Standards. **Existing frame covers shall be demolished and the encasement lowered as necessary prior to any roadway excavation or cold-planing activities**. Special care shall be taken to ensure that dirt, debris, or other materials are not allowed to enter the affected utility. Any material that does enter the affected utility must be immediately removed at contractor expense.

Existing manhole frames and covers, if salvaged undamaged, may be reused. If damaged, a new frame and cover shall be furnished. Full compensation for furnishing new cast iron frame and cover for sewer and drainage manholes shall be considered as included in the various Contract price paid and no additional allowance will be allowed.

### 10-1.24 ADJUST SURVEY MONUMENT OR WATER VALVE BOX

Existing frames and covers, if salvaged undamaged, may be reused. If damaged, a new frame and cover shall be furnished. Existing survey monuments to remain undisturbed, if disturbed, contractor to be responsible for the resetting of monuments by qualified individual. Existing frame covers shall be demolished and the encasement lowered as necessary prior to any roadway excavation or cold-planing activities. Special care shall be taken to ensure that dirt, debris, or other materials are not allowed to enter the water valve encasement that might impede the valve’s ability to be exercised.

Full compensation for furnishing new cast iron frame and cover for survey monuments, and resetting of survey monuments if needed shall be considered as included in the various Contract price and no additional allowance will be allowed therefore.

### 10-1.25 DUST CONTROL

Dust control shall conform to the provisions of Section 18 of the Standard Specifications and these special Provisions. Full compensation for dust control shall be considered as included in the prices paid for the various Contract items of work and no separate payment will be made therefore.

### 10-1.26 CONTRACT ITEMS OF WORK

Contract items of work are described herein, including the method of measurement and payment.

This section specifies the method of measurement and payment for this Contract. Any method of measurement and payment described in the Standard specifications in conflict herewith is declared null and void.

It is intended herein that compensation for the entire work is to be accomplished through the combination of the various Contract pay items of work and compensation outside of these Contract items will not be allowed except for extra work ordered in writing by the City. In preparing this bid, the Contractor is enjoined to be diligent in making sure that all of his costs are covered by the Contract items of work.

Attention is directed to the bidding schedule. The Contractor is to indicate unit price bid and total price bid for the estimated quantities as shown.

### 10-1.27 ROADWAY FINISHING

Surplus material, tools and temporary structures shall be removed by the Contractor and all excess dirt, rubbish and excess earth from excavations shall be removed and disposed of by the Contractor at the end of each day. Work site to be left in a safe condition at all times. Payment for roadway finishing to include shoulder backing shall be considered as included in the various items of work and no additional allowance will be allowed therefore. Finishing roadway shall conform to the provisions in Section 22, "Finishing Roadway", of the Standard Specifications and these special provisions.

In addition to the conditions, provisions and requirements of Section 22-1.03, "Construction", of the Standard Specifications, the following shall apply:

> The Contractor shall remove, from all affected areas, whether inside or outside the project limits, all excess and/or objectionable material originating within the project limits and transported by public traffic or by the Contractor's operations.

The Contractor may use any method, approved by the Engineer that does not create a dust problem to remove the excess and/or objectionable material from the affected areas. However, in residential areas, when a broom is used, a self-contained, pick-up type, power broom with water distribution system shall be used. The Contractor shall water test paved areas for ponding and flow prior to acceptance. Areas requiring mediation will be done at the contractor expense, and approved by the city engineer.

## 10-1.28 POST-CONSTRUCTION SURVEY

Pursuant to the Land Surveyor's Act of the Business and Professions Code of the State of California, Section 8771, a corner record and/or record of survey locating/referencing all existing monuments in the project area shall be filed with the County Surveyor prior to and after construction activities. The City of Lemoore will prepare the corner record prior to construction activities. **The Contractor is responsible for provision of the corner record or record of survey post-construction to satisfy this regulation.**

## 10-1.29 BITUMINOUS SEALS

### 10-1.29-1 GENERAL

### 10-1.29-1.01 GENERAL

#### 10-1.29-1.01A Summary

Section 10-1.29-1 includes general specifications for applying bituminous seals.
Section 36-3 does not apply.

#### 10-1.29-1.01B Definitions

Reserved

#### 10-1.29-1.01C Submittals

Reserved

#### 10-1.29-1.01D Quality Assurance

Reserved

### 10-1.29-1.02 MATERIALS

Not Used

### 10-1.29-1.03 CONSTRUCTION

#### 10-1.29-1.03A General

Asphaltic emulsion for seal coats may be reheated if necessary. After loading the asphaltic emulsion into a tank car or truck for transport to the job site, do not heat it above 160 degrees F. During reheating, agitate the asphaltic emulsion to prevent localized overheating.
Except for fog seal coats, apply Setting Grade 1 asphaltic emulsions at a temperature from 75 to 130 degrees F and apply Setting Grade 2 asphaltic emulsions from 110 to 185 degrees F.
Asphaltic emulsion must not cool to a temperature below 40 degrees F.

#### 10-1.29-1.03B Equipment

Distributor trucks must be equipped with:
1. Pressure-type system with insulated tanks
2. Spray bars:
2.1. With minimum length of 9 feet and full-circulating type
2.2. With full-circulating-type extensions if needed to cover a greater width
2.3. Adjustable to allow positioning at various heights above the surface to be treated
2.4. Operated by levers such that 1 or all valves may be quickly opened or closed in one operation
3. Devices and charts to provide for accurate and rapid determination and control of asphaltic emulsion quantities being applied. Include an auxiliary wheel type bitumeter that registers:
3.1. Speed in ft/min
3.2. Trip by count
3.3. Total distance in feet
4. Distribution system:
4.1. Capable of producing a uniform application of liquid asphalt in controlled amounts ranging from 0.02 to 1 gal/sq yd of surface and a pressure range from 25 to 75 psi
4.2. With a hose and nozzle for application to areas inaccessible to the distributor
4.3. With pressure gauges and a thermometer for determining temperatures of the asphaltic emulsion
The use of gravity distributors is not allowed.
You may use cab-controlled valves for the application of seals. The valves controlling the flow from nozzles must act positively to provide a uniform unbroken application of asphaltic emulsion on the surface.
Maintain distributor and storage tanks at all times to prevent dripping.

### 10-1.29-1.04 PAYMENT

Not Used

### 10-1.29-2 SEAL COATS

### 10-1.29-2.01 GENERAL

**10-1.29-2.01A General**

**10-1.29-2.01A(1) Summary**

Section 10-1.29-2.01 includes general specifications for applying seal coats.

Signs for seal coat work must comply with section 12-3.11.

**10-1.29-2.01A(2) Definitions**

Reserved

**10-1.29-2.01A(3) Submittals**

Reserved

**10-1.29-2.01A(4) Quality Assurance**

**10-1.29-2.01A(4)(a) General**

Reserved

**10-1.29-2.01A(4)(b) Quality Control**

Reserved

**10-1.29-2.01A(4)(c) Department Acceptance**

The Department accepts screenings based on the quality characteristic requirements specified in section 10-1.29-2.01B.

If test results for the screenings gradation do not comply with the requirements in the table titled "Seal Coat Screenings," you may remove the seal coat represented by these tests or request that it remain in place with a Payment deduction. If your request is authorized, $1.75 per ton for noncompliant screenings left in place is deducted.

**10-1.29-2.01B Materials**

Screenings must be broken stone, crushed gravel, or both. At least 90 percent of screenings by weight must be crushed particles as determined under California Test 205.

Screenings for seal coats must comply with the requirements shown in the following table:

**Seal Coat Screenings**

| Quality characteristic | Test method | Requirement |
|---|---|---|
| Los Angeles Rattler (max, %) | | |
| Loss at 100 revolutions | California Test 211 | 10 |
| Loss at 500 revolutions | | 40 |
| Film stripping (max, %) | California Test 302 | 25 |

**10-1.29-2.01C Construction**

**10-1.29-2.01C(1) General**

For seal coats on 2-lane, two-way roadways, place a W8-7 (LOOSE GRAVEL) sign and a W13-1P (35 MPH) plaque at 2,000-foot maximum intervals along each side of the traveled way where screenings are spread on a traffic lane and at public roads or streets entering the seal coat area. Place the 1st W8-7 sign in each direction where traffic first encounters the loose screenings, regardless of which lane the screenings are spread. A W13-1P (35 MPH) plaque is not required where the posted speed limit is less than 40 mph.

Maintain signs in place at each location until the final brooming of the seal coat surface for that location is complete. Signs may be set on temporary portable supports with the W13-1P plaque below the W8-7 sign or on barricades with the W13-1P plaque alternating with the W8-7 sign.

Schedule the seal coat activities such that seal coat is placed on both lanes of the traveled way each work shift and such that 1-way traffic control is discontinued 1 hour before darkness. At the end of the work shift, the end of the seal coat on both lanes must generally match.

If traffic is routed over a surface where a seal coat application is intended, the seal coat must not be applied to more than half the width of the traveled way at a time, and the remaining width must be kept free of obstructions and open to traffic until the previously applied width is ready for traffic use.

Wherever final sweeping or brooming of the seal coat surface is complete, place permanent traffic stripes and pavement markings within 10 days.

If you fail to place the permanent traffic stripes and pavement markings within the specified time, the Department withholds 50 percent of the estimated value of the seal coat work completed that has not received permanent traffic stripes and pavement markings.

**10-1.29-2.01C(2) Equipment**

Equipment for seal coats must include and comply with the following:

1. Screenings haul trucks. Haul trucks must have:
    1.1. Tailgates that discharge screenings
    1.2. Devices to lock onto the rear screenings spreader hitch
    1.3. Dump beds that will not push down on the spreader when fully raised
    1.4. Dump beds that will not spill screenings on the roadway when transferred to the spreader hopper
    1.5. Tarpaulins to cover precoated screenings if haul distance exceeds 30 minutes or ambient temperature is less than 65 degrees F
2. Self-propelled screenings spreader. The spreader must have:

2.1. Screenings hopper in the rear
2.2. Belt conveyors that carry the screenings to the front
2.3. Spreading hopper capable of providing a uniform screening spread rate over the entire width of the traffic lane in 1 application.

3. Self-propelled power brooms. Do not use gutter brooms or steel-tined brooms. Brooms must be capable of removing loose screenings adjacent to barriers that prevent screenings from being swept off the roadway, including curbs, gutters, dikes, berms, and railings.
4. Pneumatic-tired rollers. Pneumatic-tired rollers must be an oscillating type at least 4 feet wide. Each roller must be self-propelled and reversible. Pneumatic tires must be of equal size, diameter, type, and ply. The roller must carry at least 3,000 lb of load on each wheel, and each tire must have an air pressure of 100 ± 5 psi.

**10-1.29-2.01C(3) Surface Preparation**

**Prior to slurry seal clean out cracks and potholes of extraneous material. Fill cracks with crack-fill and fill potholes with cold patch asphalt mix as designated on the plans**. Before applying seal coat, cover manholes, valve and monument covers, grates, or other exposed facilities located within the area of application with plastic or oil-resistant construction paper secured by tape or adhesive to the facility being covered. Reference the covered facilities with enough control points to locate the facilities after the application of the seal coat.
After completion of seal coat activities, remove covers from the facilities.
Immediately before applying seal coat, clean the surface to receive seal coat by removing extraneous material and drying. Use brooms to clean the existing pavement. Immediately before applying slurry seals or micro-surfacings, clean the surface to receive slurry seals or micro-surfacings by removing any extraneous material affecting adhesion of the slurry seal or microsurfacing with the existing surface (including thermoplastic). Use self-propelled power brooms or other methods such as flushing to clean the existing pavement.

**10-1.29-2.01C(5) Spreading Screenings**

Prevent vehicles from driving on asphaltic emulsion or asphalt binder before spreading screenings.
Spread screenings at a uniform rate over the full lane width in 1 application.
Broom excess screenings at joints before spreading adjacent screenings.
Operate the spreader at speeds slow enough to prevent screenings from rolling over after dropping.
If the spreader is not moving, screenings must not drop. If you stop spreading and screenings drop, remove the excess screenings before resuming activities.

**10-1.29-2.01C(6) Finishing**

Remove piles, ridges, or unevenly distributed screenings. Repair permanent ridges, bumps, or depressions in the finished surface. Spread additional screenings and roll if screenings are picked up by rollers or vehicles.
Seal coat joints between adjacent applications of seal coat must be smooth, straight, uniform, and completely covered. Longitudinal joints must be at lane lines and not overlap by more than 4 inches. Blend the adjacent applications by brooming.
A coverage must consist of the number of passes a roller needs to cover the width. A pass must be 1 roller movement parallel to the seal coat application in either direction. Overlapping passes are part of the coverage being made and are not part of a subsequent coverage. Do not start a coverage until completing the previous coverage.
Before opening to traffic, finish seal coat in the following sequence:

1. Perform initial rolling consisting of 1 coverage with a pneumatic-tired roller
2. Perform final rolling consisting of 3 coverages with a pneumatic-tired roller
3. Broom excess screenings from the roadway and adjacent abutting areas
4. Apply flush coat if specified

The Engineer may order salvaging and stockpiling excess screenings. Salvaging and stockpiling excess screenings is change order work.
Dispose of excess screenings the Engineer determines are not salvageable or dispose of them on embankment slopes or in authorized areas.

**10-1.29-2.01C(7) Seal Coat Brooming**

Broom seal coat surfaces for at least 4 consecutive days starting from the day screenings are applied. Brooming must:

1. Keep the surface free from loose screenings
2. Distribute screenings over the surface so as to absorb any free asphaltic material
3. Cover any areas deficient in cover coat material
3. Prevent formation of corrugations

**10-1.29-2.01D Payment**

Not Used

**10-1.29-2.04C Polymer Asphaltic Emulsion Seal Coat**

**10-1.29-2.04C(1) General**

**10-1.29-2.04C(1)(a) Summary**

Section 10-1.29-2.04C includes specifications for applying a polymer asphaltic emulsion seal coat.

**10-1.29-2.04C(1)(b) Definitions**

Reserved

**10-1.29-2.04C(1)(c) Submittals**

Reserved

**10-1.29-2.04C(1)(d) Quality Assurance**

The authorized laboratory must test screenings for retention under the Vialit test method for aggregate in chip seals (french chip). The Vialit test results are not used for acceptance. The Vialit test is available at the METS website.

A test for polymer asphaltic emulsion represents the smaller of 55 tons or 1 day's production.

A test for the screenings gradation or cleanness value represents the smaller of 300 tons or 1 day's production.

If the test results for polymer asphaltic emulsion do not comply with the specifications, the Engineer assesses a pay factor value for the following quality characteristics and increments:

**Polymer Asphaltic Emulsion Pay Factor Table**

| Quality characteristic | Test method | Increment | Pay factor |
|---|---|---|---|
| Test on polymer asphaltic emulsion: | | | |
| Viscosity at 50 °C (Saybolt Furol seconds) | AASHTO T 59 | Each 10 seconds above max or below min | 1 |
| Settlement in 5 days | AASHTO T 59 | Each 1.5% above max | 1 |
| sieve test | AASHTO T 59 | Each 0.2% above max | 1 |
| demulsibility | AASHTO T 59 | Each 2% below min | 1 |
| Test on residue from evaporation: | | | |
| Penetration at 25 °C | AASHTO T 49 | Each 2 dm above max or below min | 1 |
| Field softening point °C | ASTM D36/D36M | 2 °C below min | 1 |
| Torsional recovery[a] | California Test 332 | For each 1 increment below the min value of 18 | 1 |
| | | For each 2 increments below the min value of 18 | 3 |
| | | For each 3 increments below the min value of 18 | 10 |
| Elastic recovery | AASHTO T 301 | For each 1 increment below the min value of 60 | 1 |
| | | For each 2 increments below the min value of 60 | 3 |
| | | For each 3 increments below the min value of 60 | 10 |

[a]The highest pay factor applies.

The Engineer assesses a pay factor of 1 for sampling not performed in compliance with the specifications, including shipping and sampling containers.

For noncompliant polymer asphaltic emulsion, you may request seal coat to remain in place. If the request is authorized, the Department makes a Payment deduction corresponding to the total pay factor value shown in the following table:

**Polymer Asphaltic Emulsion Pay Factor Deductions**

| Total pay factor value | Deduction |
|---|---|
| 0 | none |
| 1–2 | $5.00/ton |
| 3–5 | $10.00/ton |
| 6–9 | $15.00/ton |
| 10–14 | $25.00/ton |
| 15–20 | $50.00/ton |

You must remove polymer asphaltic emulsion seal coat with a total pay factor value greater than 20.

For polymer asphaltic emulsion seal coat, if a test result for the screenings cleanness value is from 75 to less than 86, you may request that the seal coat remain in place. If the request is authorized, the Department makes a Payment deduction corresponding to the cleanness value shown in the following table:

**Polymer Asphaltic Emulsion Seal Coat Cleanness Value Deductions**

| Cleanness value | Deduction |
|---|---|
| 86 or over | None |
| 81–85 | $2.20/ton |
| 77–80 | $4.40/ton |
| 75–76 | $6.60/ton |

If the test results for polymer asphaltic emulsion aggregate gradation and cleanness value do not comply with the specifications, both Payment deductions are made.

**10-1.29-2.04C(2) Materials**

Polymer asphaltic emulsion must include elastomeric polymer.

Polymer asphaltic emulsion must comply with section 94, Table 3, under the test on residue from evaporation test for Grades PMRS2, PMRS2h, PMCRS2, and PMCRS2h and the following:

1. Penetration at 39.2 degrees F, 200g for 60 seconds, determined under AASHTO T 49 must be at least 6.
2. Elastic recovery of at least 60 percent when tested under AASHTO T 301.
3. Polymer content in percent by weight does not apply.
4. Ring and ball softening point temperature determined under AASHTO T 53 for Test on Residue from Evaporation Test must comply with the following minimum temperature requirement:
   - 4.1. 126 degrees F for a geographical ambient temperature from 32 to 104 degrees F
   - 4.2. 129 degrees F for a geographical ambient temperature from 18 to 104 degrees F
   - 4.3. 135 degrees F for a geographical ambient temperature from 18 to greater than 104 degrees F

Screenings for polymer asphaltic emulsion seal coat must have the gradation as determined under California Test 202 in the following table:

| Sieve size | Medium 3/8" max |
|---|---|
| 3/4" | -- |
| 1/2" | 100 |
| 3/8" | 85–100 |
| No. 4 | 0–15 |
| No. 8 | 0–5 |
| No. 16 | -- |
| No. 30 | -- |
| No. 200 | 0–2 |

The cleanness value determined under California Test 227 must be 86 or greater.

**10-1.29-2.04C(3) Construction**

Polymer asphaltic emulsion must be applied within the application rate ranges shown in the following table:

**Polymer Asphaltic Emulsion Application Rates**

| Screenings | Application rate range (gal/sq yd) |
|---|---|
| Medium | 0.25–0.40 |

Apply polymer asphaltic emulsion when the ambient air temperature is from 60 to 105 degrees F and the pavement surface temperature is at least 55 degrees F.

Do not apply polymer asphaltic emulsion when weather forecasts predict the ambient air temperature will fall below 39 degrees F within 24 hours after application.

You may stockpile screenings for polymer emulsion seal coat if you prevent contamination. Screenings must have damp surfaces at spreading. If water visibly separates from the screenings, do not spread them. You may redampen them in the delivery vehicle.

Spread screenings before the polymer emulsion sets or breaks.

Screenings must have a spread rate within the ranges shown in the following table:

**Screening Spread Rates**

| Seal coat type | Range (lb/sq yd) |
|---|---|
| Medium | 20–30 |

The Engineer determines the exact application rate. Spread screenings within 10 percent of the rate determined by the Engineer.

Do not spread screenings more than 2,500 feet ahead of the completed initial rolling.

**10-1.29-2.04C(4) Payment**

Not Used

**10-1.29-3 FIBERIZED BLACK ROCK SLURRY SEAL AND MICRO-SURFACING**

**10-1.29-3.01 GENERAL**

**10-1.29-3.01A Summary**

Section 10-1.29-3 includes specifications for applying SLURRY SEAL and micro-surfacing.

Applying a SLURRY SEAL consists of spreading a mixture of asphaltic emulsion or polymer modified asphaltic emulsion, aggregate, set-control additives, and water on a surface or pavement.

Applying a Micro-surfacing consists of spreading a mixture of Micro-surfacing emulsion, water, additives, mineral filler, and black aggregate on the pavement.

**10-1.29-3.01B Definitions**

Reserved

**10-1.29-3.01C Submittals**

**10-1.29-3.01C(1) General**

The testing laboratory must sign the original laboratory report and mix design.

If the mix design consists of the same materials covered by a previous laboratory report, you may submit the previous laboratory report that must include material testing data performed within the previous 12 months for authorization.

If you change any of the materials in the mix design, submit a new mix design and laboratory report at least 10 days before starting SLURRY SEAL and Micro-surfacing work.

**10-1.29-3.01C(2) BLACK ROCK SLURRY SEAL <u>(0.15 - 0.20% Fiberized)</u>**

Submit a laboratory report of test results and a proposed mix design 10 days before starting placement of SLURRY SEAL. The report and mix design must include the specific materials to be used.

The laboratory report must include:

1. Test results used in the mix design
2. Proportions of the following materials based on the aggregate's dry weight:

2.1. Black Rock Aggregate
2.2. Filler determined from tests, minimum and maximum
2.3. Water, minimum and maximum
2.4. Asphalt solids content
2.5. Set control agent

3. Comparison of SLURRY SEAL test results to the specified values
4. Fiber

Each day, submit moisture data for the aggregate collected every 2 hours if you are unable to maintain the moisture content to within a maximum daily variation of ± 0.5 percent.

**10-1.29-3.01C(3) Micro-surfacing**

Submit a laboratory report of test results and a proposed mix design 10 days before starting placement of micro-surfacing. The report and mix design must include the specific materials to be used and show a comparison of test results and specifications. The report must also include:

1. Test results used in the mix design
2. Proportions of the following materials based on the aggregate's dry weight:

2.1. Black Rock Aggregate
2.2. Water, minimum and maximum
2.3. Additives
2.4. Mineral filler, minimum and maximum
2.5. Micro-surfacing emulsion residual asphalt content, minimum and maximum

3. Recommended changes to the following proportions based on heating the mixture to 100 degrees F and mixing for 60 seconds:

3.1. Water
3.2. Additives
3.3. Mineral filler

4. Comparison of each individual material's test results to its specified values
5. Quantitative moisture effects on the aggregate's unit weight determined under ASTM C29M

The recommended changes in item 3 in the list above do not apply to nighttime applications or if atmospheric temperatures below 90 degrees F are forecast for daytime applications.

Submit a certificate of compliance with each shipment of Micro-surfacing emulsion as specified for asphaltic emulsion in section 94-1.01C.

**10-1.29-3.01D Quality Assurance**

**10-1.29-3.01D(1) General**

Your laboratory must be able to perform International Slurry Surfacing Association tests and mix designs.

In the presence of the Engineer, calibrate each mixer-spreader used. Notify the Engineer at least 5 business days before calibrating. Calibration must comply with the Department's Material Plant Quality Program.
If the Department authorizes a mixer-spreader, its calibration is valid for 6 months provided you:
1. Use the same truck verified with a unique identifying number
2. Use the same materials in compliance with the authorized mix design
3. Do not perform any repair or alteration to the proportioning systems

**10-1.29-3.01D(2) SLURRY SEAL**
Calibrate the adjustable cut-off gate settings of each mixer-spreader truck on the project to achieve the correct delivery rate of aggregate and emulsion per revolution of the aggregate feeder in compliance with California Test 109.
Checks must be performed for each aggregate source using an approved California Test 109 vehicle scale.
Individual checks of the aggregate belt feeder's delivery rate to the pugmill mixer must not vary more than 2 percent from the average of 3 runs of at least 3 tons each.
Individual checks of the emulsion pump's delivery rate to the pugmill mixer must not vary more than 2 percent from the average of 3 runs of at least 500 gal each.
Measure aggregate moisture every 2 hours during SLURRY SEAL placement or maintain the moisture content within a maximum daily variation of ± 0.5 percent.
**10-1.29-3.01D(3) Micro-surfacing**
Before using a variable-rate emulsion pump, the pump must be calibrated and sealed in the calibrated condition under the Department's Material Plant Quality Program.
For the aggregate belt feeder, the delivery rate for any individual check run must not deviate more than 2 percent from the average of the rates of 3 runs of at least 3 tons each.
For the emulsion pump, the delivery rate for any individual check run must not deviate more than 2 percent from the average of the rates of 3 runs of at least 300 gal each.

**10-1.29-3.01D(4) Department Acceptance**
The Department accepts aggregate for SLURRY SEAL and Micro-surfacing based on compliance with the aggregate gradation and sand equivalent requirements.
An aggregate gradation or cleanness value test represents 300 tons or 1 day's production, whichever is less.
If the test results for aggregate gradation or sand equivalent do not comply with the specified requirements, you may remove the installed Micro-surfacing represented by the test results or request it remain in place with a Payment deduction. If your request is authorized, the Department deducts:
1. $1.75 per ton of SLURRY SEAL for each noncompliant aggregate gradation and sand equivalent test
2. $2.00 per ton of Micro-surfacing for each noncompliant aggregate gradation and sand equivalent test

**10-1.29-3.02 MATERIALS**
**10-1.29-3.02A General**
Aggregate for SLURRY SEAL and Micro-surfacing must comply with the gradation requirements shown in the following table:

| **Aggregate Gradation** | | | |
|---|---|---|---|
| Sieve size | Test Method | | |
| | California Test 202 | Type II | Type III |
| 3/8" | | 100 | 100 |
| No. 4 | | 94–100 | 70-90 |
| No. 8 | | 65–90 | 45-70 |
| No. 16 | | 40–70 | 28-50 |
| No. 30 | | 25–50 | 19-34 |
| No. 200 | | 5–15 | 5-15 |

Aggregate shall consist of sound, durable, crushed stone or crushed gravel and approved mineral filler. The material shall be free from vegetable matter and other deleterious substances. Aggregate shall be one hundred percent (100%) crushed with no rounded particles, volcanic in origin and black in color.

**10-1.29-3.02B BLACK ROCK SLURRY SEAL <u>(0.15 - 0.20% Fiberized)</u>**
**10-1.29-3.02B(1) General**
The SLURRY SEAL mix design must comply with the requirements shown in the following table:

**SLURRY SEAL Mix Design Requirements**

| Quality characteristic | Test method[a] | Requirement |
|---|---|---|
| Consistency (max, mm) | Technical Bulletin 106 | 30 |
| Wet stripping | Technical Bulletin 114 | Pass |

| | | |
|---|---|---|
| Compatibility | Technical Bulletin 115 | Pass[b] |
| Cohesion test[c], within 1 hour (min, kg-mm) | Technical Bulletin 139 | 200 |
| Wet track abrasion (max, $g/m^2$) | Technical Bulletin 100 | 810 |

[a]Test methods are by the International Slurry Surfacing Association.

[b]Mixing test must pass at the maximum expected air temperature at the job site during placement.

[c]Using project source aggregate, asphaltic emulsion, and set-control agents if any.

The mix design must have the percent of asphaltic emulsion, based on percentage by weight of the dry aggregate, within the ranges shown in the following table:

**Asphaltic Emulsion Percentage**

| Aggregate type | Range |
|---|---|
| II | 12–18 |

The Engineer determines the exact percentage based on the design asphalt binder content and the asphalt solids content of the asphaltic emulsion furnished.

**10-1.29-3.02B(2) Aggregate**

If the specific gravities differ by 0.2 or more, California Test 202 is replaced with California Test 105 for blends of different aggregates.

Aggregate for SLURRY SEAL must comply with the requirements for the type shown in the following table:

| Quality characteristic | Test method | II |
|---|---|---|
| Sand equivalent (min) | California Test 217 | 55 |
| Durability index (min) | California Test 229 | 55 |

Each day's aggregate moisture content measurements must not vary more than ±0.5 percent.

**10-1.29-3.02B(3) Polymer Modified Asphaltic Emulsion**

Polymer modified asphaltic emulsion must:

1. Consist of a polymer mixed with a bituminous material uniformly emulsified with water and an emulsifying or stabilization agent.
2. Use either neoprene polymer or butadiene and styrene copolymer. The polymer must be homogeneous and milled into the asphaltic emulsion at the colloid mill.
3. Polymer modified asphaltic emulsion must be Grade PMCQS1h cationic and must comply with the requirements shown in the following table:

**Polymer Modified Asphaltic Emulsion Requirements**

| Quality characteristic | Test method | Requirement |
|---|---|---|
| Tests on emulsion: | | |
| Saybolt Furol viscosity @ 25 °C (Saybolt Furol seconds) | AASHTO T 59 | 15–90 |
| Sieve test (%) | AASHTO T 59 | 0–0.3 |
| Storage stability after 1 day (%) | AASHTO T 59 | 0–1 |
| Residue by evaporation (min, %) | California Test 331 | 57 |
| Particle charge | AASHTO T 59 | Positive |
| Tests on residue by evaporation: | | |
| Penetration at 25 °C | AASHTO T 49 | 40–90 |
| Ductility at 25 °C (min, mm) | AASHTO T 51 | 400 |
| Torsional recovery (min, %)<br>or<br>Polymer content (min, %) | California Test 332<br><br>California Test 401 | 18<br><br>2.5 |

**10-1.29-3.02C(3) Fiber.** The fiber used in the fiberized SLURRY SEAL shall be RoadChem Fiber 1, Slurry-FIL or equivalent chemical resistant glass fiber meeting the following specifications. It shall be 3/8 +/- 1/8 inch in length. The mix design must have the percent of fiber, based on percentage by weight of the dry aggregate of 0.15 – 0.20%. The fiber shall be added at a rate of 0.15% and shall conform to the table below:

**10-1.29-3.02C Micro-surfacing**

**10-1.29-3.02C(1) General**

The Micro-surfacing mix design must have the material proportion limits shown in the following table:

**Micro-surfacing Mix Design Proportion Limits**

| Material | Proportion limits |
|---|---|
| Micro-surfacing emulsion residual asphalt | 5.5–9.5% of aggregate dry weight |
| Water and additives | No limit |
| Mineral filler | 0–3% of aggregate dry weight |

The Micro-surfacing mix design must comply with the requirements shown in the following table:

| **Alkali and Acid Resistant Glass Fiber** | | | | | |
|---|---|---|---|---|---|
| Linear Weight of Roving (lex) ISO 1889 | Linear Weight of Strand (lex) ISO 1889 | Moisture Content % ISO 334 | Specific Gravity | Softening Point (°C) | Tensile Strength (MPa) |
| 2500 min. | 82 min. | 0.35 max. | 2.68 $g/cm^3$ | 860 min. | 11700 min. |
| 4800 min. | 100 min. | | | | |

**Micro-surfacing Mix Design Tests**

| Quality characteristics | Test method[a] | Requirement |
|---|---|---|
| Wet cohesion<br>@ 30 minute (set) (min, kg-cm)<br>@ 60 minute (traffic) (min, kg-cm) | Technical Bulletin 139 | <br>12<br>20 |
| Excess asphalt (max, $g/m^2$) | Technical Bulletin 109 | 540 |
| Wet stripping (min, %) | Technical Bulletin 114 | 90 |
| Wet track abrasion loss<br>6-day soak (max, $g/m^2$) | Technical Bulletin 100 | <br>810 |
| Displacement<br>Lateral (max, %)<br>Specific gravity after 1000 cycles of 57 kg (max) | Technical Bulletin 147A | <br>5<br>2.10 |
| Classification compatibility (min, grade points) | Technical Bulletin 144 | (AAA, BAA) 11 |
| Mix time @ 25 °C (min) | Technical Bulletin 113 | Controllable to 120 seconds |

[a]Test methods are by the International Slurry Surfacing Association.

**10-1.29-3.02C(2) Black Rock Aggregate**

If you blend aggregate from different sources, the aggregate from each source aggregate must comply with the aggregate specifications except gradation.

Aggregate shall consist of sound, durable, crushed stone or crushed gravel and approved mineral filler. The material shall be free from vegetable matter and other deleterious substances. Aggregate shall be one hundred percent (100%) crushed with no rounded particles, volcanic in origin and black in color.
Aggregate for Micro-surfacing except mineral filler must comply with the requirements shown in the following table:

**Micro-surfacing Aggregate**

| Quality characteristic | Test method | Requirement |
|---|---|---|
| Sand equivalent (min) | California Test 217 | 65 |
| Durability index (min) | California Test 229 | 65 |
| Percentage of crushed particles (min, %)[a] | California Test 205 | 95 |
| Los Angeles Rattler<br>Loss at 500 revolutions (max, %)[b] | California Test 211 | 35 |

[a]Crushed particles must have at least 1 fractured face.
[b]California Test 211 must be performed on the aggregate before crushing.

**10-1.29-3.02C(3) Micro-surfacing Emulsion**
Micro-surfacing emulsion must be a homogeneous mixture of asphalt, polymer and emulsifier solution.
Add polymer modifier to asphalt or emulsifier solution before emulsification. Polymer solids must be a minimum 3 percent by weight of the Micro-surfacing emulsion's residual asphalt.
Micro-surfacing emulsion must comply with the requirements shown in the following table:

**Micro-surfacing Emulsion**

| Quality characteristic | Test method | Requirement |
|---|---|---|
| Saybolt Furol viscosity at 25 °C (Saybolt Furol seconds) | AASHTO T 59 | 15–90 |
| Sieve test (max, %) | AASHTO T 59 | 0.30 |
| Settlement after 5 days (max, %)[a] | ASTM D244 | 5 |
| Storage stability after 1 day (max, %) | AASHTO T 59 | 1 |
| Residue by evaporation (min, %) | California Test 331 | 62 |

[a]Waived if used within 48 hours of shipment.

The Micro-surfacing emulsion's residue by evaporation must comply with the requirements shown in the following table:

**Micro-surfacing Emulsion Residue By Evaporation**

| Quality characteristic | Test method | Requirement |
|---|---|---|
| G* at 20 ºC (10 rad/sec, MPa) | AASHTO T 315 | Report only |
| Penetration at 25 (ºC) | AASHTO T 49 | 40–90 |
| Phase angle at 50 °C (10 rad/sec)<br>PA (max) - PA base | AASHTO T 315 | Report only |
| Softening point (min, ºC) | AASHTO T 53 | 57 |
| Stiffness at -12 °C (MPa, and M-value) | AASHTO T 313 | Report only |

**10-1.29-3.02C(4) Mineral Filler**
If portland cement is used as mineral filler, it must be any combination of Type I, Type II, or Type III cement.

**10-1.29-3.03 CONSTRUCTION**

**10-1.29-3.03A General**
Before applying SLURRY SEAL or micro-surfacing, cover manholes, valve and monument covers, grates, or other exposed facilities located within the area of application using plastic or oil resistant construction paper secured by tape or adhesive to the facility being covered. Reference the covered facilities with enough control points to relocate the facilities after application of the seal coat.
In areas inaccessible to spreading equipment, spread the SLURRY SEAL or Micro-surfacing mixture with hand tools or other authorized methods. If placing with hand tools, lightly dampen the area first. Do not handle or shift the material.

**10-1.29-3.03B Proportioning**

**10-1.29-3.03B(1) General**
The Engineer determines the asphalt ratio under California Test 310. The asphalt ratio, in kilograms of asphalt per 100 kg of dry aggregate, must not vary by more than ±0.5 kg of asphalt from the determined amount.

**10-1.29-3.03B(2) SLURRY SEAL**
Proportion SLURRY SEAL ingredients in compliance with the authorized mix design. Proportion and blend different aggregate types before adding other ingredients.
After proportioning, the SLURRY SEAL mixture must be workable. The SLURRY SEAL surface must be cured to allow traffic within 1 hour after placement. The SLURRY SEAL must not show bleeding, raveling, separation, or other distresses for 15 days after placing.

**10-1.29-3.03B(3) Micro-surfacing**
Proportion the Micro-surfacing materials using the authorized mix design.
Field conditions may require adjustments to the proportions during construction. Obtain authorization before adjusting proportions.

**10-1.29-3.03C Mixing and Spreading Equipment**
**10-1.29-3.03C(1) General**
Mixing and spreading equipment for SLURRY SEAL and Micro-surfacing must proportion asphaltic emulsion, water, aggregate, and any set-control additives by volume and mix them in continuous pugmill mixers. Continuous pugmill mixers must be of adequate size and power for the type of materials to be mixed.
**10-1.29-3.03C(2) Truck Mounted Mixer Spreaders**
Truck mounted mixer spreaders must comply with the following:
1. Rotating and reciprocating equipment must be covered with metal guards.
2 Proportion aggregate using a belt feeder with an adjustable cutoff gate. The Engineer verifies the height of the gate opening.
3. Belt feeder must have a depth monitor device. The depth monitor device must automatically shut down power to the belt feeder when the aggregate depth is less than 70 percent of the target depth.
4. Separate monitor device must detect the revolutions of the belt feeder. This device must automatically shut down power to the belt feeder if it detects no revolutions. If the belt feeder is an integral part of the equipment's drive chain, the monitor device is not required.
5. Aggregate belt feeder must be connected directly to the drive on the emulsion pump. The aggregate feeder drive shaft must have a revolution counter reading the nearest 0.10 revolution for micro-surfacing, and nearest 1 revolution for SLURRY SEAL.
6. Emulsion storage must be equipped with a device that automatically shuts down power to the emulsion pump and aggregate belt feeder when the level of stored emulsion is lowered. To allow for normal fluctuations, there may be a delay of 3 seconds between detection of low emulsion storage levels or low aggregate depths and automatic power shut down.
7. Emulsion storage must be located immediately before the emulsion pump.
8. Emulsion storage tank must have a temperature indicator at the pump suction level. The indicator must be accurate to ±5 degrees F.
9. No-flow and revolution warning devices must be in working condition and comply with California Test 109. Low-flow indicators must be visible while walking alongside the equipment.

**10-1.29-3.03C(3) Continuous Self-Loading Mixing Machine**
Continuous self-loading mixing machines must be automatically sequenced and self-propelled. The mixing machine must deliver each material to a double shafted mixer and discharge the mixed material on a continuous flow basis. The mixing machine must have sufficient storage capacity to maintain a continuous supply of material to the proportioning controls. The mixing machine operator must have full control of forward and reverse speeds during placement.

**10-1.29-3.03C(4) SLURRY SEAL Equipment**
**10-1.29-3.03C(4)(a) General**
Introduce emulsion into the mixer with a positive displacement pump. If you use a variable-rate pump, the adjusting unit must be sealed in its calibrated position.
Introduce water into the mixer with a meter that measures gallons.
Identifying numbers for equipment must be at least 2 inches high and located on the front and rear of the vehicle.
**10-1.29-3.03C(4)(b) Spreader Box**
The spreader box used to spread the slurry mixture must be:
1. Capable of spreading an entire lane width.
2. Equipped with flexible rubber belting on each side. The belting must contact the pavement to prevent loss of slurry from the box.
3. If wider than 7.5 feet, equipped with baffles, reversible motor-driven augers, or equivalent features to uniformly apply the SLURRY SEAL on superelevated sections and shoulder slopes.
4. Equipped with rear flexible strike-off blades in close contact with the pavement and adjustable to various crown shapes to uniformly apply the SLURRY SEAL.
5. Equipped with flexible drags attached to the rear and cleaned daily and changed if longitudinal scouring occurs.
6. Clean and free of SLURRY SEAL or emulsion at the start of each work shift.

**10-1.29-3.03C(5) Micro-surfacing Equipment**
**10-1.29-3.03C(5)(a) General**
Choose a continuous self-loading mixing machine or truck mounted mixer-spreader.
Proportion Micro-surfacing emulsion using a positive displacement pump.
Identifying numbers for equipment must be at least 3 inches high and located on the front and rear of the vehicle.
**10-1.29-3.03C(5)(b) Spreader Box**

The spreader box must be capable of spreading the Micro-surfacing a minimum of 12 feet wide and preventing the loss of micro-surfacing. Spreader boxes over 8 feet in application width must have a device, such as baffles or reversible motor driven augers, to ensure uniform application on superelevated sections and shoulder slopes. Clean Micro-surfacing and Micro-surfacing emulsion from the spreader box before each work shift.
The spreader box must have a series of strike-off devices at its rear.
The leading strike-off device must be:
1. Fabricated of a suitable material such as steel or stiff rubber
2. Designed to maintain close contact with the pavement during spreading
3. Capable of obtaining the specified thickness
4. Capable of being adjusted to the various pavement cross sections

The final strike-off device must be:
1. Fabricated of flexible material that produces a uniform texture in the finished surface
2. Cleaned daily and changed if longitudinal scouring occurs in the micro-surfacing

Do not use flexible drags attached to the rear of the spreader box.

**10-1.29-3.03C(5)(c) Shoulder Equipment**

Spread Micro-surfacing on shoulders with a device such as an edge box that forms clean and straight joints and edges.

**10-1.29-3.03C(5)(d) Scratch Course Box**

Spread scratch course with the same type of spreader box used to spread Micro-surfacing except use an adjustable steel strike-off device instead of a final strike-off device.

**10-1.29-3.03C(5)(e) Wheel Path Depression Boxes**

Each wheel path depression box must have adjustable strike-off device between 5 and 6 feet wide to regulate depth. The rut box must also have devices such as hydraulic augers capable of:
1. Moving the mixed material from the rear to the front of the filling chamber
2. Guiding larger aggregate into the deeper section of the wheel path depression
3. Forcing the finer material towards the outer edges of the spreader box

**10-1.29-3.03D Placing**

**10-1.29-3.03D(1) General**

If truck-mounted mixer-spreaders are used, keep at least 2 operational spreaders at the job site during placement.
In areas inaccessible to spreading equipment, spread the SLURRY SEAL or Micro-surfacing mixture with hand tools. If placing with hand tools, lightly dampen the area first. Do not handle or shift the mixture.

**10-1.29-3.03D(2) Surface Preparation**

**10-1.29-3.03D(2)(a) General**

Before you place SLURRY SEAL or micro-surfacing, clean the pavement surface by removing loose particles of extraneous materials, including paving and dirt. Use any nondestructive method, such as flushing or sweeping.

**10-1.29-3.03D(2)(b) SLURRY SEAL**

If SLURRY SEAL activities affect access to public parking, residential property, or commercial property, notify residents, businesses, and local agencies at least 24 hours before starting activities. The notice must:
1. Describe the work to be performed
2. Detail streets and limits of activities
3. Indicate work hours
4. Be authorized

Before starting SLURRY SEAL activities, post signs at 100-foot intervals on the affected streets. Signs must display *No Parking – Tow Away*. Signs must state the day of the week and hours parking or access will be restricted.
Within 1 hour after placement, SLURRY SEAL must be set enough to allow traffic. SLURRY SEAL must not exhibit distress from traffic such as bleeding, raveling, separation or other distresses.

**10-1.29-3.03D(2)(c) Micro-surfacing**

**10-1.29-3.03D(2)(c)(i) General**

You may fog the roadway surface with water ahead of the spreader box. The fog spray must be adjusted for pavement:
1. Temperature
2. Surface texture
3. Dryness

**10-1.29-3.03D(2)(c)(ii) Repair Wheel Path Depression**

If repairing a wheel path depression is shown, fill wheel path depressions and irregularities with Micro-surfacing material before spreading micro-surfacing. If the depressions are less than 0.04 foot deep, fill with a scratch course. If the depressions are 0.04 foot deep or more, fill the depressions using with a wheel path depression (rut) box.
Spread scratch course by adjusting the steel strike-off of a scratch course box until it is directly in contact with the pavement surface.

Spread Micro-surfacing with a wheel path depression rut box leaving a slight crown at the surface. Use multiple applications to fill depressions more than 0.12 foot deep. Do not apply more than 0.12 foot in a single application.
Allow traffic to compact each filled wheel path depression for a minimum of 12 hours before placing additional micro-surfacing.

**10-1.29-3.03D(3) Test Strips**

**10-1.29-3.03D(3)(a) General**

Reserved

**10-1.29-3.03D(3)(b) SLURRY SEAL**

Test strips do not apply to SLURRY SEAL.

**10-1.29-3.03D(3)(c) Micro-surfacing**

Reserved

**10-1.29-3.03D(4) Placement**

**10-1.29-3.03D(4)(a) General**

Reserved

**10-1.29-3.03D(4)(a)(i) General**

Longitudinal and transverse joints must be:

1. Uniform
2. Straight
3. Neat in appearance
4. Butt-type joints
5. Without material buildup
6. Without uncovered areas

Place longitudinal joints:

1. On centerlines, lane lines, edge lines, or shoulder lines
2. With overlaps not more than 3 inches

Set the leading edge of kraft paper on transverse joints to create a straight butt joint with the next application when the paper is removed.

**10-1.29-3.03D(4)(a)(ii) Weather Conditions**

Only place SLURRY SEAL or Micro-surfacing if both the pavement and air temperatures are at least 50 degrees F and rising. Do not place SLURRY SEAL or Micro-surfacing if either the pavement or air temperature is below 50 degrees F and falling. The expected high temperature must be at least 65 degrees F within 24 hours after placement.
Do not place SLURRY SEAL or Micro-surfacing if rain is imminent or the air temperature is expected to be below 36 degrees F within 24 hours after placement.

**10-1.29-3.03D(4)(b) SLURRY SEAL**

Spread SLURRY SEAL uniformly within the specified spread rate range. Do not spot, rehandle, or shift the mixture.
If there is a bid item for tack coat, coat the pavement surface with an SS or CSS grade asphaltic emulsion mixed with additional water. The ratio of water to asphaltic emulsion must be 3 to 1. Apply the tack coat at a rate from 0.08 to 0.15 gal/sq yd. The exact rate must be authorized.
The Engineer determines the exact spread rate for SLURRY SEAL. The completed rate must be within 10 percent of the Engineer's determined spread rate. The SLURRY SEAL spread rates must be within the ranges shown in the following table:

**SLURRY SEAL Spread Rates**

| Type of aggregate | Range (lb of dry aggregate/sq yd) |
|---|---|
| II | 10–15 |

Longitudinal joints must correspond with lane lines. You may request other longitudinal joint patterns if they do not adversely affect the SLURRY SEAL.
Spread SLURRY SEAL in full lane widths. Do not overlap SLURRY SEAL between adjacent lanes more than 3 inches.
Use kraft paper at transverse joints and over previously placed SLURRY SEAL to prevent double placement. Remove the paper after use. Use hand tools to remove spillage.
The finished surface must be smooth.
The mixture must be uniform and homogeneous after spreading, and there must not be separation of the emulsion and aggregate after setting.
Protect the SLURRY SEAL from damage until it has cured and will not adhere or be picked up by vehicle tires.

**10-1.29-3.03D(4)(c) Micro-surfacing**

**10-1.29-3.03D(4)(c)(i) General**

The Engineer determines the exact spread rate for micro-surfacing. The completed spread rate must be within 10 percent of the Engineer's determined spread rate. The Micro-surfacing spread rates must be within the ranges shown in the following table:

**Micro-surfacing Spread Rates**

| Micro-surfacing type | Location | Range (lb of dry aggregate/sq yd) |
|---|---|---|
| Type II | Full lane width | 10–20 |
| Type III [a] | Full lane width | 20–32 |

[a] Over asphalt concrete pavement

Spread Micro-surfacing either in the direction of traffic or in the opposite direction.
Keep hand tools available to remove spillage.

**10-1.29-3.03D(4)(c)(ii) Joints**

The maximum difference between the pavement surface and the bottom edge of a 12-foot straightedge placed perpendicular to the joint must be:

1. 0.04 foot for longitudinal joints
2. 0.03 foot for transverse joints

**10-1.29-3.03D(4)(c)(iii) Finished Surface**

Finished Micro-surfacing must be free of irregularities such as scratch or tear marks. You may leave up to 4 marks that are 1/2 inch wide or less and 6 inches long or less per 75 linear feet of Micro-surfacing placed. Do not leave any marks that are over 1 inch wide or 6 inches long.
Sweep the Micro-surfacing 24 hours after placement without damaging the micro-surfacing. For 5 days afterward, sweep the Micro-surfacing daily.

**10-1.29-3.03D(4)(c)(iv) Repair of Early Distress**

If bleeding, raveling, delamination, rutting, or wash boarding occurs within 60 days after placing the fiberized micro surfacing, the Contractor shall diligently pursue repairs by any method approved by the Engineer. The Contractor shall not be relieved from maintenance until repairs have been completed.

**10-1.29-3.04 PAYMENT**

Fiberized SLURRY SEAL mixed in continuous-flow mixers shall be measured by square yard (SY). Payment for SLURRY SEAL will be made at the Contract Unit Price per square yard (SY). No separate Payment will be made for calibration, scheduling, public convenience, or traffic control unless otherwise specified.
Payment for Micro-surfacing will be made at the Contract Unit Price per square yard (SY). No Payment will be made for test strips which have been rejected or for removal of rejected test strips. No separate Payment will be made for calibration, scheduling, public convenience, or traffic control unless otherwise specified.

## 10-1.30 ASPHALTIC EMULSIONS

### 10-1.30-1.01 GENERAL

**10-1.30-1.01A Summary**

Section 10-1.30 includes specifications for furnishing asphaltic emulsions.

**10-1.30-1.01B Definitions**

Reserved

**10-1.30-1.01C Submittals**

Submit an SDS for each shipment of asphaltic emulsion to the job site.
If you use the asphaltic emulsion before the Department's sampling and testing is complete, submit a certificate of compliance for each shipment to the job site. The certificate of compliance must include:

1. Shipment number and shipment date
2. Source refinery, consignee, and destination
3. Type and description of material with specific gravity and quantity
4. Contract or purchase order number
5. Signature by the manufacturer of the material and a statement that the material complies with the Contract
6. Test results showing the material complies with section 10-1.30-1.02

If no certificate of compliance is submitted, do not use asphaltic emulsion until authorized.

**10-1.30-1.01D Quality Assurance**

Sample asphaltic emulsion under AASHTO T 40.
Store samples in clean and airtight sealed containers. Storage temperature must be at least 40 degrees F until tested.
The Engineer may waive the settlement test if the asphaltic emulsion is used in less than 5 days from the time the sample is taken.

**10-1.30-1.02 MATERIALS**

**10-1.30-1.02A General**

Asphaltic emulsions must be composed of a bituminous material uniformly emulsified with water and an emulsifying or a stabilizing agent. Polymer modified asphaltic emulsion must contain a polymer.

Asphaltic emulsion must be homogeneous. Within 30 days after delivery and if freezing has not caused separation, the asphaltic emulsion must be homogeneous after thorough mixing.

Asphaltic emulsion must be anionic, cationic, polymer modified, or quick setting.

**10-1.30-1.02D Polymer Modified Asphaltic Emulsions**

Polymer modified asphaltic emulsion must comply with the requirements shown in the following table:

**Polymer Modified Asphaltic Emulsion Requirements**

| Quality characteristic | Test method | Requirement | | | |
|---|---|---|---|---|---|
| | | Anionic | | Cationic | |
| | | Grade PMRS2 | Grade PMRS2h | Grade PMCRS2 | Grade PMCRS2h |
| Saybolt Furol viscosity, @ 50 °C (Saybolt Furol seconds) | AASHTO T 59 | 75–300 | 75–300 | 75–350 | 75–350 |
| Settlement, 5 days (max, %) | | 5 | 5 | 5 | 5 |
| Storage stability test, 1 day (max, %) | | 1 | 1 | 1 | 1 |
| Sieve test (max, %) | | 0.30 | 0.30 | 0.30 | 0.30 |
| Demulsibility (min, %) | | 60[a] | 60[a] | 40[b] | 40[b] |
| Particle charge | | -- | -- | positive | positive |
| Ash content (max, %) | ASTM D3723 | 0.2 | 0.2 | 0.2 | 0.2 |
| Residue by evaporation (min, %) | California Test 331 | 65 | 65 | 65 | 65 |
| Tests on residue from evaporation test: | | | | | |
| Penetration, 25 °C | AASHTO T 49 | 100–200 | 40–90 | 100–200 | 40–90 |
| Ductility, 25 °C, (min, mm) | AASHTO T 51 | 400 | 400 | 400 | 400 |
| Torsional recovery (min, %)<br>or<br>Polymer content at 5% by weight (min, %) | California Test 332<br><br>California Test 401 | 18<br><br>2.5 | 18<br><br>2.5 | 18<br><br>2.5 | 18<br><br>2.5 |

[a]Use 35 ml of 0.02 *N* $CaCl_2$ solution.

[b]Use 35 ml of 0.8% sodium dioctyl sulfosuccinate solution.

**10-1.30-1.04 PAYMENT**

Not Used

**10-1.31 PAYMENT**

The method of payment for each item of work is described in Section 9 of the Standard Specifications.

Progress payments shall be payment for amount of work completed to the 20th of each month. All work in not fully completed, but in progress, shall be discussed with the contractor and assessed by the Project Engineer, and shall be paid for on a percentage of completion or quantities completed basis. Progress payments shall be made to the Contractor upon approval of the City.