Item No. **316S**
Polymerized Asphalt Interlayer Seal

316S.1 Description

This item shall govern the sealing of an existing pavement surface with a single application of polymerized asphalt covered with aggregate prior to the construction of asphalt overlays.

This specification is applicable for projects or work involving either inch-pound or SI units. Within the text and accompanying tables, the inch-pound units are given preference followed by SI units shown within parentheses

316S.2 Submittals

The submittal requirements of this specification item include:

A. Recommended design mix (emulsion type, aggregate type, type and % of polymer)
B. Test results on the emulsion (Saybolt Furol Viscosity, storage stability, demulsibility, sieve test, distillation test and residue tests).
C. Test results on the aggregate (gradation and percent wear).
D. Characteristics (i.e. manufacturer, rate of application, speed, etc.) of the proposed distributor and aggregate spreader.
E. List of facilities and equipment proposed for temperature measurements.
F. List of facilities and equipment proposed for storage and handling of asphaltic materials.

316S.3 Material

A. Polymerized Asphalt Emulsion

The asphalt must be mixed with 3% of HFRS-2P polymer or as determined by the Engineer or designated representative prior to emulsification. The emulsion is classified as a high float, rapid setting, anionic type emulsion for underseal coat. The product shall meet the following characteristics and test requirements.

1. Tests on emulsion:

	Minimum	Maximum
Viscosity, Saybolt Furol at 122^{0}F (50^{0}C), sec	150	400
Storage stability, 1 day, %	-	1
Demulsibility, 35 ml of 0.02 N $CaCl_2$, %	40	-
Sieve Test, %	-	0.1
** Distillation Test: Oil Distillate by Volume of Emulsion, % Residue, % by weight (mass)	 - 65	 1/2 -

** The temperature on the lower thermometer shall be brought slowly to 350^{0}F (177^{0}C) plus or minus 10^{0}F (5^{0}C) and maintained at this temperature for 20 minutes. The total distillation shall be completed in 60 minutes plus or minus 5 minutes from the first application of heat.

The material after setting undisturbed for 24 hours shall show no white milky separation, but shall be smooth and homogeneous throughout.

2. Test Results on Residue from Distillation

Tests on Residue from Distillation	Minimum	Maximum
Float Value at 140^{0}F (60^{0}C), sec	1200	-
Penetration at 77^{0}F (25^{0}C), 100g., 5 sec., 0.1 mm	100	140
Ductility, 77^{0}F , 5 cm/min, cm (25^{0}C, 50 mm/min, mm)	100 (1000)	-
Viscosity at 140^{0}F, poises (60^{0}C, Pa-s)	1500 (150)	-
Solubility in Trichloroethylene, %	97.5	-

B. Aggregate

Aggregate material shall be crushed limestone or dolomite. The percent of wear as determined by test method Tex-410-A (Los Angeles Abrasion Test) shall not exceed (35) percent. The aggregate, when tested by TxDoT Test Method Tex-200-F, Part I, shall meet the following gradation requirements:

Sieve Sizes	% by Weight (mass)
Retained on 1/2" (12.5 mm) sieve	0
Retained on 3/8" (9.5 mm) sieve	0 – 5
Retained on No. 4 (4.7.5 mm) sieve	15 - 45
Retained on No. 10 (2.00 mm) sieve	90 - 100
Retained on No. 20 (.00 mm) sieve	95 - 100

316S.4 Equipment

The equipment for construction of the interlayer seal shall include the following: asphalt storage tanks and heaters, distributors, aggregate spreaders, blade equipped tractor and drag broom, pneumatic rollers, water truck with pump and rotary broom.

All equipment used in storing or handling asphaltic material shall be kept clean and in good operating condition at all times and shall be operated in such manner that there will be no contamination of the asphalt material. It shall be the responsibility of the Contractor to provide and maintain a recording thermometer to continuously indicate the temperature of the asphalt material at the storage-heating unit, when storing of asphalt is permitted.

The distributor shall have pneumatic tires of such width and number that the load produced on the street surface shall not exceed 650 pounds per inch (12 kilograms per millimeter) of tire width and shall be so designed, equipped, maintained and operated that asphaltic material at even heat may be applied uniformly on variable widths of surface at readily determined and controlled rates of from 0.05 to 0.24 gallons per square yard (0.25 to 1.1 liters per square meter), with a pressure range of from 25 to 75 pounds per square inch (170 to 515 kiloPascals), and with an allowable variation from any specified rate not to exceed 5 percent. Distributor equipment shall include tachometer, pressure gauges, volume measuring devices and a thermometer for reading temperatures of tank contents.

The aggregate spreading equipment shall be adjusted and capable of spreading aggregate at controlled amounts per square yard (square meter: 1 square meter equals 1.196 square yards) in a continuous manner.

The drag broom shall be light weight street type, mounted on a frame, designed to spread aggregate uniformly over the surface of a bituminous pavement and equipped with pull plates for towing. Towing equipment shall be pneumatic tired.

Rollers shall conform to Item No. 232S, "Rolling (Pneumatic Tire)", Light Pneumatic Tire Roller.

Rotary brooms shall be suitable for cleaning the surfaces of bituminous pavements.

Vacuum sweepers shall be suitable for removing any loose aggregate without disturbing the compacted seal coat.

316S.5 Construction Methods

Prior to commencement of this work, all erosion control, environmental protection measures and all traffic control devices shall be in place.

Seal Coats may be applied when when the surface on which the seal coat is to be placed is 60°F (16°C) or above and the air temperature is above 50°F (10°C) and rising, if the temperature is measured in the shade and away from artificial heat. Asphaltic material shall not be placed when general weather conditions are not suitable for a satisfactory seal coat or when the environment could be damaged.

A. Cracks and Holes

Cracks and holes will be patched by the Contractor prior to seal coat operations. Patching materials shall be hot mix, hot laid Asphaltic Concrete Pavement in conformance with Item 340S, “Hot Mix Asphaltic Concrete Pavement”, or other asphaltic materials as approved by the Engineer or designated representative.

B. Cleaning Existing Surfaces

Prior to placement of the seal coat, loose dirt and other objectionable material shall be removed from the existing surface. The surface will be cleaned with a rotary broom. Hand brooms will be used in areas not accessible to rotary brooms. The Engineer or designated representative must approve all streets before application of any asphalt.

C. Application of Asphaltic Material

Immediately following the preparation of the existing surface by cleaning, the asphaltic material shall be applied at the rate of 0.2 to 0.24 gallon per square yard (0.9 to 1.1 liters per square meter) as determined by the Engineer or designated representative, so that uniform distribution is obtained at all points. Skip streaks on the pavement, due to defective distributor nozzles, will be reshot with a distributor at the expense of the Contractor.

The Contractor shall calibrate the spray bar nozzles by spreading building paper as required on the surface for a sufficient distance back from the end of each application so that flow through sprays may be started and stopped on the paper and so that all sprays will operate properly over the entire length being treated. Building paper so used shall be immediately removed and loaded on a truck. At the end of each day, the

paper shall be disposed of at a permitted site approved by the Engineer or designated representative.

Application temperatures will be determined by weather conditions but the temperature of the asphaltic material to be applied shall be between 150 and 160°F (65 and 71°C) as determined by the Engineer or designated representative. When a street to be sealed is continuous through several intersections, sealed area will include all spandrels and stub-outs, unless otherwise directed by the Engineer or designated representative. Spandrels will be hand sprayed. Contractor shall not apply excessive amounts of asphaltic materials when hand spraying. Excessive materials applied shall be removed by the Contractor before spreading the aggregate.

The Contractor shall be required to seal all spandrels at the same time the adjacent streets are sealed, unless otherwise approved in writing by the Engineer or designated representative.

During all applications, the surface of adjacent structures shall be protected in such a manner as to prevent their being splattered or marred. Building paper shall be spread on all manholes, valve boxes, junction boxes, etc. to protect the surface from asphaltic materials. The asphaltic material shall not be applied until the cover aggregate is available and ready to spread with assurance of continuous operation.

No asphaltic material shall be placed which cannot be covered and rolled during operating hours established for that street as stipulated on the drawings.

D. Spreading the Aggregate

The Contractor shall employ a mechanical aggregate spreader, which applies the aggregate uniformly over the surface at the rate of 15 to 20 pounds per square yard (8 to 11 kilograms per square meter). The actual rate shall be as directed by the Engineer or designated representative.

The covering material in the quantity specified shall be spread uniformly over the bituminous material as soon after application as possible. The aggregate shall be spread in the same width of application as for the asphaltic material and spread uniformly with the aggregate spreading equipment.

Trucks spreading aggregate shall be operated backward so that bituminous material will be covered before truck wheels pass over it. The aggregate shall not be applied in such thickness to cause blanketing or stacking. Any blanketing or stacking shall be removed prior to rolling. Backspotting or sprinkling cover aggregate shall be done by hand spreading, which will be continued during the operations whenever necessary, as directed by the Engineer or designated representative.

E. Brooming and Rolling

Rolling shall be started as soon as sufficient aggregate is spread to prevent pick-up and continued until no more aggregate can be worked into the surface. The surface shall be blanket rolled. The Contractor shall manage the Work so that all rolling of all cover aggregate applied that day is accomplished prior to sundown with a minimum of four complete coverages with pneumatic rollers.

In lieu of the rolling equipment specified, the Contractor may, upon written permission from the Engineer or designated representative, operate other compaction equipment

that will produce equivalent relative compaction in the same period of time as the specified equipment.

Rollers shall be maintained in good repair and operating condition and shall be approved by the Engineer or designated representative.

The pony blading or drag brooming should start as soon as possible after the rolling has started and the surface has set sufficiently to prevent excessive marking of the seal surface. Further pony blading or drag brooming should be done as often as necessary to keep cover aggregate uniformly distributed over the street surface. At no time shall there be less than 2 pneumatic tire rollers on the job. The use of the pony blade or drag broom in connection with the rolling will be left to the opinion of the Engineer or designated representative as to which gives the desired results.

The Contractor will be responsible for maintaining all streets for 48 hours after each street has been seal coated. Maintenance will consist of brooming, rolling and adding more aggregate as directed by the Engineer or designated representative.

F. Curing of Interlayer Seal

The Contractor shall allow the interlayer seal to cure a minimum of 24 hours before applying the HMAC overlay unless otherwise approved by the Engineer or designated representative.

G. Asphaltic Material Contractor's Responsibility

The Contractor shall furnish vendor's certified test report for asphaltic material shipped for the project. The report shall be delivered to the Engineer or designated representative before permission is granted for use of the material. Any change of source shall be reported prior to delivery.

316S.6 Traffic Control Facilities

The Contractor shall schedule and conduct the seal coat operations to avoid excessive inconvenience to the public in the seal coat area.

The Contractor shall notify all abutting property owners along the street prior to initiation of the seal coat operation.

The Contractor shall have on the project site sufficient barricades, flag-persons and traffic control devices to assure a minimum of inconvenience to traffic around the construction area in conformance with the General Conditions of the Standard Contract Documents. If the Contractor's arrangements are not satisfactory to the Engineer or designated representative, the seal coat operation will not be allowed to commence.

After the seal has been applied, the Contractor shall post appropriate warning signs along these streets as directed by the Engineer or designated representative and maintain such signs for 48 hours.

316S.7 Final Cleanup

The Contractor shall vacuum sweep the completed seal coat and curb areas to remove loose aggregate as required during the first week after the traffic is allowed on the street.

316S.8 Measurement

All accepted Polymerized Asphalt Underseal Coat will be measured by one of the following methods:

A. "Polymerized Asphalt Emulsion" will be measured in gallons (liters: 1 liter equals 0.26 gallons) at the applied temperature at the point of application on the street.

B. "Aggregate" will be measured by the cubic yard (cubic meters: 1 cubic meter equals 1.31 cubic yards) in vehicles as applied on the street.

C. "Complete in Place" will be measured by the square yard (square meter: 1 square meter equals 1.196 square yards) of surface area treated, including polymerized asphalt emulsion and aggregate.

316S.9 Payment

The work performed and materials furnished as prescribed by this item and measured as provided under "Measurement" will be paid for at the unit bid prices stipulated in the bid for "Polymerized Asphalt Underseal Coat", "Polymerized Asphalt Emulsion", "Polymerized Underseal Coat, Aggregate" or "Polymerized Asphalt Underseal Coat, Complete in Place". The unit bid prices shall include full compensation for: a) furnishing, delivering and placing all materials; b) patching, brooming, compacting and rolling; c) cleaning the existing surface and gutters, covering excess asphaltic material, removal of excess aggregate and cleaning stockpiles sites; d) a 48 hour maintenance period and e) all labor, equipment, tools and incidentals necessary to complete the required work as indicated on the Drawings.

Payment will be made under one of the following:

Pay Item No. 316S-A: Polymerized Asphalt Underseal Coat, Polymerized Asphalt Emulsion — Per Gallon.

Pay Item No. 316S-B: Polymerized Asphalt Underseal Coat, Aggregate — Per Cubic Yard.

Pay Item No. 316S-C: Polymerized Asphalt Underseal Coat, Complete in Place — Per Square Yard.

End

SPECIFIC Cross Reference Materials
Specification Item No. 316S, "POLYMERIZED ASPHALT INTERLAYER SEAL"

City of Austin Standard Specifications

Designation	Description
Item No. 232S	Rolling (Pneumatic Tire)
Item No. 301S	Asphalts, Oils and Emulsions
Item No. 302S	Aggregates for Surface Treatments

Item No. 310S	Emulsified Asphalt Treatment
Item No. 312S	Seal Coat
Item No. 313S	Rubber Asphalt Joint and Crack Sealant
Item No. 340S	Hot Mix Asphaltic Concrete Pavement

Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

Designation	Description
Item No. 300	Asphalts, Oils and Emulsions
Item No. 302	Aggregates for Surface Treatments
Item No. 315	Emulsified Asphalt Seal

Texas Department of Transportation: Manual of Testing Procedures

Designation	Description
Tex-200-F	Sieve Analysis of Fine and Coarse Aggregates
Tex-410-A	Abrasion of Coarse Aggregate Using the Los Angeles Machine
Tex-502-C	Test for Penetration of Bituminous Material
Tex-503-C	Test for Ductility of Bituminous Materials
Tex-504-C	Test for Flash and Fire Points of Petroleum Materials by Cleveland Open Cup
Tex-506-C	Test for Loss on Heating of Oils and Asphaltic Compounds
Tex-507-C	Proportion of Bitumen Soluble in Trichloro-ethylene
Tex-513-C	Test for Saybolt Viscosity
Tex-519-C	Float Test for Bituminous Materials
Tex-520-C	Test for Residue of Specified Penetration
Tex-521-C	Testing Emulsified Asphalts
Tex-528-C	Test for Absolute Viscosity of Asphalt Cements
Tex-529-C	Test for Kinematic Viscosity of Asphalts

RELATED Cross Reference Materials
Specification Item No. 316S, "POLYMERIZED ASPHALT INTERLAYER SEAL"

City of Austin Standard Contract Documents

Designation	Description
00700	General Conditions
01500	Temporary Facilities
01550	Public Safety and Convenience

City of Austin Standard Specifications

Designation	Description
Item No. 315S	Milling Asphaltic Concrete Paving and Non Portland Cement Concrete Bases
Item No. 320S	Two Course Surface Treatment
Item No. 350S	Heating, Scarifying and Repaving
Item No. 801S	Construction Detours
Item No. 803S	Barricades, Signs and Traffic Handling
Item No. 870S	Work Zone Pavement Markings
Item No. 874S	Eliminating Existing Pavement Markings and Markers

Related Cross Reference Materials (Continued)
Specification Item No. 316S, "POLYMERIZED ASPHALT INTERLAYER SEAL"

Texas Department of Transportation: Standard Specifications for Construction and Maintenance of Highways, Streets, and Bridges

Designation	Description

Item No. 314	Emulsified Asphalt Treatment
Item No. 316	Surface Treatments
Item No. 345	Asphalt Stabilized Base (Plant Mixed)
Item No. 520	Weighing and Measuring Equipment

Texas Department of Transportation: Manual of Testing Procedures

Designation	Description
Tex-509-C	Spot Test of Asphaltic Materials
Tex-510-C	Determining the Effect of Heat and Air on Asphaltic Materials when Exposed in Thin Films
Tex-512-C	Test for Flash Points of Volative Flammable Materials by Tag Open-Cup Apparatus