

# GEM SEAL™

## HEAVY DUTY PAVEMENT SEALER DETAILED APPLICATION SPECIFICATIONS

### 1. Scope:

This recommended practice covers the application of mineral-colloid-stabilized emulsified coal tar pavement sealer. This application serves as weather protection, beautification of surface, and aliphatic-solvent (petroleum distillates such as gas, oil and diesel) resistant seal for asphaltic concrete pavements of airport ramps, taxiways and fueling aprons, parking lots, and driveways.

### 2. References:

- 2.1. Federal Specification R-P-355e; Pitch, Coal Tar Emulsion (Coating for Bituminous Pavements)
- 2.2. ASTM Specification D-3320; Standard Specification for Emulsified Coal Tar Pitch (Mineral Colloid Type)
- 2.3. ASTM Specification D-490; Standard Specification for Road Tar
- 2.4. ASTM Specification D-3423; Standard Practice for Application of Emulsified Coal Tar Pitch
- 2.5. ASTM Specification D-2939; Standard Methods of Testing Emulsified Bitumens Used as Protective Coatings
- 2.6. ASTM Specification D-4866; Performance Standard for Coal Tar Pitch Emulsion Pavement Sealer Foundations Containing Mineral Aggregates and Optional Polymeric Admixtures

### 3. Materials:

- 3.1. Emulsified coal tar pavement sealer, Gem Seal™, will conform to the following requirements:
  - 3.1.1. Federal Specification RP-355e. Non volatiles (solids) shall be 51% ±1%.
  - 3.1.2. The refined tar prior to emulsification shall conform to ASTM D-490, grade RT-12. The refined tar shall be derived from high temperature coke oven tar. Oil and water gas tars shall not be used even though they might comply with ASTM D-490, grade RT-12.
  - 3.1.3. The emulsion shall be produced using a colloid mill to insure homogeneity and appropriate size of the particles in suspension.
  - 3.1.4. The contractor and/or his supplier will provide a certification with each bulk emulsion delivery indicating compliance with the above requirements. Further, the certificate will indicate the non-volatiles (solids) content and ash content of that particular transport lot as determined by results of tests performed on material loaded. Such certifications shall be subject to verification by testing samples of the emulsion received for use on the project. Costs of verification testing should be borne by the Project Administrators.

- 3.2. Dilution water shall be potable and free of excessive minerals and contaminants. Water will be provided by the Project Administrator and available within a reasonable distance from the job site.

- 3.3. Sand will be washed and graded silica sand, or crushed, washed, and graded slag, free of all contaminants, and conforming to the following gradation:

Sieve Size	% Passing
#8	100
#16	95 - 100
#30	60 - 93
#50	10 - 40
#100	0 - 10
#200	0 - 2

Note: Gradations outside these ranges may be used provided past history shows evidence of a durable surface.

- 3.4. Latex additive compounds shall be Gem Seal **ULTRA** or **GS-10** Latex and conform to the following general specifications\*:

Product:	<b>ULTRA</b>	<b>GS-10</b>
Chemical name:	Nitrile Rubber	Neoprene Rubber
Solids content:	40% minimum	40% minimum
Particle size:	0.1 - 0.5 microns	0.1 - 0.5 microns
Viscosity, cps:	100 maximum	75 minimum
Specific gravity:	1.01	1.08 , 1.23 on residue

*Note: Ultra and GS-10 latex shall not be mixed together.*

**4. Equipment:** All tools and equipment necessary to perform the contract in accordance with the specified terms and conditions, such as brushes, hand squeegees, pumps and hose equipment, storage tanks, mixing tanks, water distributors, power sweepers, blowers, barricades and applicator equipment shall be provided as required by the contractor. All methods employed in performing the work and all equipment necessary for executing any part of the work shall be subject to approval by the Project Administrator before work is started, and when found unsatisfactory will be corrected. All equipment will be in good working condition.

- 4.1. Spray equipment used on the job shall have mechanical mixing devices incorporated in their construction to assure homogeneous mixing of the emulsion and required additives. The pumping system must be adequate to apply a uniform coating at the specified rates of application. Equipment requiring pressurization of the mixing tank for distribution will not be used.

4.2. Motorized squeegee application equipment used on the job will have two or more devices such as squeegees and/or drag broom assemblies to assure even distribution of the tar emulsion system. Mechanical mixing devices will be incorporated into the construction of the applicator to assure homogeneous mixing of the emulsion and required additives.

4.3. Mixing or agitating equipment may be either portable powered or a tank-type power mixer. In any case, mixers shall be of sufficient capacity to assure homogeneous mixing of the emulsion and required additives and to maintain complete suspension of mineral aggregate until the emulsion system is applied to the pavement. All storage tanks or drop tankers shall be equipped with mechanical agitators sufficient to keep the coal tar emulsion homogenous during storage.

## 5. Preparation of Surfaces:

5.1. Allow new asphalt to cure. Cure time varies with type of asphalt, aggregate, weather conditions, and construction procedures. Hot mix asphalt will usually cure in 30 - 90 days. Cold mix pavements should have at least 90 days to cure. Required cure time should be determined by the Project Administrator, and a written order to proceed will be furnished to the contractor.

5.2. Wide cracks, extensive alligator cracking patterns, soft or sunken spots indicate that the pavement and/or base should be repaired or replaced. Extensive patching shall be allowed to cure prior to sealcoating in accordance with 5.1.

5.3. Thoroughly inspect the pavement for minor cracks and other imperfections. Ignore hairline cracks. Cracks of approximately 1/4 - 3/4 inch wide should be cleared of debris and filled with a Gem Seal approved crack sealant in accordance with manufacturer's specification. (OPTIONAL)

5.4. Remove oil and grease spots that have not permanently damaged or softened the pavement by scrubbing with a detergent and flushing with water until a water-break-free surface is obtained. Oil and grease spots with deeper penetration will be treated by burning with hand held propane torch, and then coating the spot with an approved oil spot primer such as Tar-Prime. If the oil spot is so severe as to cause permanent deterioration of the pavement, or if the pavement has failed due to other causes, the pavement shall be removed to the full depth of the damage and replaced with new asphalt pavement in accordance with paragraph 5.1.

5.5. Old traffic control lines may be blackened with black epoxy or black acrylic coatings. Excessive build up of lines should be abraded before any prime coats of asphalt or tar emulsion are applied. (OPTIONAL)

5.6. Highly oxidized or weathered surfaces shall be primed. Prime with SS-1, SS-1h, CSS-1, CSS-1h asphalt emulsions or with Gem Seal Tar Prime coal tar emulsion. Asphalt emulsions shall be diluted one part asphalt emulsion to 5 parts potable water and uniformly applied to the pavement at a rate of 0.10 ± 0.02 gallon per square yard. Tar Prime shall be diluted one part Tar Prime to two parts water and applied at a rate of 0.07 - 0.10 gallons per square yard. The prime shall be allowed to cure for 24 hours before applying pavement sealer. (OPTIONAL)

5.7. Immediately before application of sealer, clean the surface of all loose dust, dirt, leaves, and any other foreign materials by sweeping, blowing, flushing with water, or any combination of the three.

## 6. Mix Design and Application Rates:

6.1.

Use	Coats	Gem Seal Gallon	Water Gallon	Sand ** 100 lbs	ULTRA or <b>GS-10</b> Latex Gallon	Application Mix Gal/Sq. Yd
Low	1st	100	30-50	3-5	0-4	0.10 - 0.15
Traffic	2nd	100	25-45	0-4	0-4	0.08 - 0.12
Moderate	1st	100	40-60	3-5	2-5	0.10 - 0.15
Traffic	2nd	100	40-60	0-4	2-5	0.08 - 0.12
High	1st*	100	30-60	3-5	2-5	0.10 - 0.15
Traffic	2nd	100	30-60	3-5	2-5	0.10 - 0.15
	3rd	100	25-55	0-4	2-5	0.08 - 0.12

\*1st Coat is applied to entrances, exits, traffic lanes and turning radii.

\*\* Sand should be added to the final coat when skid resistance is needed.

- NOTE:**
1. These water dilution ratios are volumetric and are based on receiving Gem Seal Coal Tar Emulsion with a solids content of 50 to 52 percent.
  2. Approximately 20 pounds of sand displaces 1 gallon of liquid.

**WARNING:** Sealcoats, when improperly applied and/or under certain environmental conditions, may become slippery. As with any paint-like coating, repeated applications reduce texture. Skid resistance can be improved with additions of 3 to 5 pounds of sand per gallon. CAUTION MUST BE EXERCISED, particularly when skid resistance is a major safety factor.

6.2. Latex additives: The latex additive will be added at the specified rate as indicated in the job mix formula  $\pm 0.25\%$ . Undiluted latex will first be diluted with an equal volume of water and added slowly to the emulsion after mix water and prior to the addition of any sand. Latex will be added while the mixer is in operation to assure uniform dispersion and no coagulation of the latex. Diluent water added to the latex will be considered part of the mix water required in paragraph 6.1.

6.3. Sand will be slowly added after the mix water and any required latex additives have been dispersed into the tar emulsion. Again, the mixer will be in operation during the addition of the sand to assure uniform dispersion and to prevent overloading of the mixing device. Additional amounts of water may be added, if necessary, should the tar emulsion system become too thick to be uniformly applied. Additional water will be added only after the Project Administrator has been notified, and additions will not exceed those amounts expressly stipulated by the Project Administrator.

6.4. Slow mixing shall be continuous from the time all materials are placed into the mixer until the pavement sealer mix is applied by the application equipment. During the entire mixing process, no breaking, segregating, or hardening of the emulsion, and no balling or lumping of the aggregate shall be permitted.

6.5. The coating shall be applied uniformly over the entire pavement surface and free of voids and pinholes. When pavement temperatures are in excess of 120°F, fog spraying of pavement with clean water is recommended to achieve better bond and even spreading of material. Fog spray shall dampen pavement without leaving puddles. (OPTIONAL)

6.6. Subsequent coats will be applied only after the previous coat is dried, preferably 24 hours later, but no less than 4 hours under ideal conditions. Ideal conditions are temperatures in excess of 70°F, sunshine, and less than 60% relative humidity. Marginal conditions can require curing times greater than 24 hours. Subsequent coats should be applied at right angles to the previous coat, if possible.

6.7. Sealer will not be applied unless the temperature is a minimum 50°F and rising and pavement temperature is 60°F and rising. Work will be completed so that there is a minimum of two hours of direct sunlight remaining after completing the day's work. Sealer will not be applied under rainy or wet conditions such as an overcast sky with high humidity. UNDER NO CIRCUMSTANCES will work be performed under cold and/or wet conditions, nor will tar emulsion be used that has been subjected to freezing weather.

## 7. Incidentals:

7.1. The contractor and Project Administrator will coordinate their activities with each other to insure the availability of the work area so as not to delay the execution of the project, to maintain traffic flow, and to minimize activities that might be detrimental to the work in progress such as automatic sprinkler systems, other customer or construction traffic, etc.

7.2. The contractor will notify the Project Administrator of pavement areas that he feels have so deteriorated or have other outside factors such as poor drainage, improper construction, etc., that will render the application of a seal coat ineffective.

7.3. Striping will be done with a latex or acrylic paint approved by the manufacturer. No striping will commence until the seal coat to be striped has cured for at least 24 hours.

7.4. The contractor shall submit with his proposal at least three references of previously completed projects, proof of workers compensation and liability insurance coverage, and all local business licenses and permits as required by local authorities.

7.5. The contractor will provide a performance and payment bond to the Project Administrator - OR- waivers of lien from suppliers will be provided with each invoice for payment. (OPTIONAL)

**8. Job Site Location and Scope of the Project:** See Exhibit "A". (To be drawn and attached by property owner, or manager, or architect/engineer).

**9. Basis of Payment:** These prices shall be full compensation for furnishing materials, preparation, mixing, and applying materials in compliance with this specification, and for all the tools, equipment, labor, and incidentals necessary to complete this project.

The proposal shall indicate by line item:

1. The approximate square yards and cost of patching to be performed.
2. The approximate lineal feet and cost of crack sealing to be performed.
3. The approximate square yards and cost of the sealcoating to be performed.
4. The approximate lineal feet and cost of the traffic striping to be performed. -OR- A lump sum cost when performed in accordance with painting diagrams provided by the Project Administrator.
5. Total cost of project. (State and local taxes shall be identified by type and amount.)

## 10. WARNINGS and Miscellaneous Notes:

10.1. Skid Resistance: Sealcoats, when improperly applied and/or under certain environmental conditions, may become slippery. As with any paint-like coating, repeated applications reduce texture. Skid resistance can be improved with additions of 4 to 6 pounds of sand per gallon. CAUTION MUST BE EXERCISED, particularly when skid resistance is a major safety factor. Gem Seal does not recommend sealcoating asphalt pavements with the following characteristics; main thoroughfares, runways, steep inclines, poor drainage, and vehicles traveling at speeds in excess of 25 mph that are subject to rapid stops or hydroplaning. Gem Seal recommends applying coal tar emulsion to asphalt pavement surfaces only.

10.2. Container Warning: Containers, regardless of being empty, half full, or full of product, may retain a residue of liquid and/or vapor and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, OR OTHER SOURCES OF IGNITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Do not attempt to clean since residue is difficult to remove. "Empty" drums should be completely drained, properly bunged, and promptly returned to a drum reconditioner. Empty pails should have a hole punched in the pail bottom to prevent drowning of small children. All other containers should be disposed in an environmentally safe manner and in accordance with governmental regulations. For work on tanks refer to OSHA regulations, ANSI Z49.1, and other governmental and industrial references pertaining to cleaning, repairing, welding, or other contemplated operations.

\*\*Container refers to any vessel, can, drum, tanker, distributor tank, etc., that may be used for handling and/or storing any of the products covered by this guideline specification or any product of unknown origin.

10.3. Health and Environmental: Gem Seal is not considered a hazardous waste and meets all current Federal requirements for industrial waste. **AS AN APPLICATOR** you should be familiar with all potential hazards prior to entering the workplace. Toxicity Characterization Leaching Procedure information and Material Safety Data Sheets will be provided upon request. In case of accidental spill, contain with absorbent material, allow to dry, and dispose of according to local, state and federal regulations. Precautions should be taken to prevent surface runoff and Gem Seal from entering storm drainage system or ponds.

10.4. Maintenance of coating can prolong its life and attractive appearance. Sand, gravel and other debris should be removed as they accumulate. Oil drippings, antifreeze, etc. can be scrubbed with mild detergents and flushed with clean water.

10.5. Technical assistance available upon request.

10.6. Do not allow to freeze.

## LIMITED WARRANTY

Gem Seal coal tar emulsion (Federal Grade) is warranted to meet or exceed all requirements of Federal Spec RP-355e. Gem Seal will provide detailed specifications and certifications upon request.

The manufacturer warrants these materials to be merchantable quality, when stored, used, and applied in accordance with these specifications. While the manufacturer recommends uses for these materials based on tests believed reliable, the manufacturer in no way guarantees particular methods of use, applications, or performance under certain conditions. The manufacturer does not warrant these products to be suitable for any use or method of application other than the general purpose and method of application as indicated in these specifications. Liability under this warranty is limited to the replacement of the product proven defective or to the purchase price, at the manufacturer's option, upon return of the unused portion. This warranty is made in lieu of all other expressed or implied warranties and excludes liability for consequential damages. In the event of a claim under this warranty, written notice of the complaint must be given to the manufacturer.

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**GEM SEAL,™**