

Item C921 – Asphalt Pavement Rejuvenator

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C921.1 Description. This work shall consist of furnishing all labor, material, and equipment necessary to perform all operations for the application of an asphalt rejuvenating agent to asphaltic concrete surface courses. The rejuvenation of surface courses shall be by spray application of a cationic rejuvenating agent composed of petroleum oils and resins emulsified with water. All work shall be in accordance with the specifications, the applicable drawings, and subject to the terms and conditions of this contract.

C921.2 Materials. The asphalt rejuvenating agent shall be an emulsion composed of a petroleum resin oil base uniformly emulsified with water. Each bidder must submit with his bid a certified statement from the asphalt rejuvenator manufacturer showing that the asphalt rejuvenating emulsion conforms to the required physical and chemical requirements shown below.

Table 2.0-1 Tests on Emulsions

Test	ASTM	AASHTO	Minimum	Maximum
Viscosity @ 25°C, SFS	D-244	T-59	15	40
Residue, % W ¹	D-244 (Mod.)	T-59 (Mod.)	60	65
Miscibility Test ²	D-244 (Mod.)	T-59 (Mod.)	No Coagulation	---
Sieve Test, % W ³	D-244 (Mod.)	T-59 (Mod.)	---	0.1
Particle Charge Test	D-244	T-59	Positive	---
Percent Light Transmittance ⁴	GB	GB	---	30

Table 2.0-2 Test on Residue from Distillation

Test	ASTM	AASHTO	Minimum	Maximum
Flash Point, COC, °C	D-92	T-48	196	---
Viscosity @ 60°C, cSt	D-445	---	100	200
Asphaltenes, % w	D-2006-70	---	---	1.00
Maltene Dist. Ratio	D-2006-70	---	0.3	0.6
(PC+A ₁ ⁵)/(S+A ₂)				
PC/S Ratio ⁵	D-2006-70	---	0.5	---
Saturated Hydrocarbons, S ⁵	D-2006-70	---	21	28

¹ ASTM D-244 Modified Evaporation Test for percent of residue is made by heating 50 gram sample to 149 C (300° F) until foaming ceases, then cool immediately and calculate results.

² Test procedure identical with ASTM D-244-60 except that .02 Normal Calcium Chloride solution shall be used in place of distilled water.

³ Test procedure identical with ASTM D-244 except that distilled water shall be used in place of two percent sodium oleate solution.

⁴ Test procedure is attached.

⁵ Chemical composition by ASTM Method D-2006-70:

PC = Polar Compounds, A₁ = First Acidaffins
A₂ = Second Acidaffins, S = Saturated Hydrocarbons

C921.3 Performance. The rejuvenating agent shall have a record of at least five years of satisfactory service as an asphalt rejuvenating agent and in-depth sealer. Satisfactory service shall be based on the capability of the material to decrease the viscosity and increase the penetration value of the asphalt binder as follows. The viscosity shall be reduced by a minimum of 45 percent and the penetration value shall be increased by a minimum of 25 percent. Testing shall be performed on extracted asphalt cement from a pavement to a depth of three eighths inch (3/8"). In addition, the pavement shall be in-depth sealed to the intrusion of air and water.

The bidder must submit with his bid the manufacturer's certification that the material proposed for use is in compliance with the specified requirements. The bidder must submit with his bid previous use documentation and test data conclusively demonstrating that; the rejuvenating agent has been used successfully for a period of five years by government agencies such as cities, counties, etc.; and that the asphalt rejuvenating agent has been proven to perform, as heretofore required, through field testing by government agencies as to the required change in the asphalt binder viscosity and penetration number. Testing data shall be submitted indicating such product performance on a sufficient number of projects, each being tested for a minimum period of three years to insure reasonable longevity of the treatment, as well as produce consistency. RECLAMITE®, manufactured by Golden Bear Oil Corporation, is a product of known quality and accepted performance.

C921.4 Product Standards and Alternates. The product "Reclamite"® for the asphalt rejuvenating agent as manufactured by Witco Corporation or an approved equal is the standard for these specifications. The prices quoted on the bid sheet bid shall be for this standard. Should a bidder wish to submit a bid for alternates to the standard, said prices shall be entered on the bid sheet as the "alternate bid" for each item. In the event that the bidder submits no bid for the standard, only the "alternate bids" should be completed.

Bidders may offer an alternate for the standard specified in the specifications provided the bidder adheres to the following and submits same with the bid.

- a. List the proposed alternate on the bid sheet form giving the product name and price.
- b. Furnish complete specifications and descriptive literature for the alternate as well as a one-gallon sample of the material proposed for use. Such descriptive and detailed information shall be complete and at least equal in detail to the City's requirements for the standard item for which the alternate is offered.
- c. Submit a current Material Safety Data Sheet for the alternate materials.

The alternate will be given consideration by the City. The contractor may furnish only those alternate items included in his proposal and approved by the City prior to award of a contract.

If no alternate is indicated on the bid sheet, the contractor shall furnish the standard (brand) specified in the attached specifications.

Should the alternate offered be found unacceptable by the City based on the data submitted with the bid and no bid is entered on the bid sheet for the standard, then said bid will be considered non-responsive.

C921.5 Temperature/Weather Limitations. The temperature of the asphalt rejuvenating emulsion, at the time of application shall be as recommended by the manufacturer. The asphalt rejuvenating agent shall be applied only when the existing surface to be treated is thoroughly dry and when it is not threatening rain. The asphalt rejuvenating agent shall not be applied when the ambient temperature is below 40° F.

C921.6 Applicator Experience. The asphalt rejuvenating agent shall be applied by an experienced applicator of such material. The bidder shall have a minimum of three years experience in applying the product proposed for use. He must submit with his bid a list of five projects on which he applied said rejuvenator. He shall indicate the project dates, number of square yards treated in each and the name and phone number of the government official in charge of each project.

A project superintendent knowledgeable and experienced in application of the asphalt

rejuvenating agent must be in control of each day's work. The bidder shall submit a written experience outline of the project superintendent.

C921.7 Handling of Asphalt Rejuvenating Agent. Contents in tank cars or storage tanks shall be circulated at least forty-five minutes before withdrawing any material for application. When loading the distributor, the asphalt rejuvenating agent concentrate shall be loaded first and then the required amount of water shall be added. The water shall be added into the distributor with enough force to cause agitation and thorough mixing of the two materials. To prevent foaming, the discharge end of the water hose or pipe shall be kept below the surface of the material in the distributor which shall be used as a spreader. The distributor truck will be cleaned of all of its asphalt materials, and washed out to the extent that no discoloration of the emulsion may be perceptible. Cleanliness of the spreading equipment shall be subject to the approval and satisfaction of the Engineer.

C921.8 Application Equipment. The distributor for spreading the emulsion shall be self-propelled, and shall have pneumatic tires. The distributor shall be designed and equipped to distribute the asphalt rejuvenating agent uniformly on variable widths of surface at readily determined and controlled rates from 0.05 to 0.5 gallons per square yard of surface, and with an allowable variation from any specified rate not to exceed five (5) percent of the specified rate.

Distributor equipment shall include full circulation spray bars, pump tachometer, volume measuring device and a hand hose attachment suitable for application of the emulsion manually to cover areas inaccessible to the distributor. The distributor shall be equipped to circulate and agitate the emulsion within the tank. A check of distributor equipment as well as application rate accuracy and uniformity of distribution shall be made when directed by the engineer.

The truck used for sanding shall be equipped with a spreader that allows the sand to be uniformly distributed onto the pavement. The spreader shall be able to apply 1/2 pound to 3 pounds of sand per square yard in a single pass. The spreader shall be adjustable so as not to broadcast sand onto driveways or tree lawns. The sand to be used shall be free flowing, without any leaves, dirt, stones, etc. Any wet sand shall be rejected from the job site. Any equipment which is not maintained in full working order, or is proven inadequate to obtain the results prescribed, shall be repaired or replaced at the direction of the Engineer.

C921.9 Application of Asphalt Rejuvenating Agent. The asphalt rejuvenating agent shall be applied by a distributor truck at the temperature recommended by the manufacturer and at the pressure required for the proper distribution. The emulsion shall be so applied that uniform distribution is obtained at all points of the areas to be treated. Distribution shall be commenced with a running start to insure full rate of spread over the entire area to be treated. Areas inadvertently missed shall receive additional treatment as may be required by hand sprayer application.

Application of asphalt rejuvenating agent shall be on one-half width of the pavement

at a time. When the second half of the surface is treated, the distributor nozzle nearest the center of the road shall overlap the previous application by at least one-half the width of the nozzle spray. In any event the centerline construction joint of the pavement shall be treated in both application passes of the distributor truck.

Before spreading, the asphalt rejuvenating agent shall be blended with water at the rate of two (2) parts rejuvenating agent to one (1) part water, by volume or as specified by the manufacturer. The combined mixture of asphalt rejuvenating agent and water shall be spread at the rate of 0.05 to 0.10 gallons per square yard, or as approved by the Engineer following field testing.

Where more than one application is to be made, succeeding applications shall be made as soon as penetration of the preceding application has been completed and approval is granted for additional applications by the Engineer.

Grades or super elevations of surfaces that may cause excessive runoff, in the opinion of the Engineer, shall have the required amounts applied in two or more applications as directed. After the street has been treated, the area within one foot of the curb line on both sides of the road shall receive an additional treatment of the asphalt rejuvenating emulsion. Said treatment shall be uniformly applied by a method acceptable to the Engineer.

After the rejuvenating emulsion has penetrated, a coating of dry sand shall be applied to the surface in sufficient amount to protect the traveling public as required by the Engineer.

The contractor shall furnish a quality inspection report showing the source, manufacturer, and the date shipped, for each load of asphalt rejuvenating agent. When directed by the Engineer, the contractor shall take representative samples of material for testing.

C921.10 Street Sweeping. The contractor shall be responsible for sweeping and cleaning of the streets prior to, and after treatment.

Prior to treatment, the street will be cleaned of all standing water, dirt, leaves, foreign materials, etc. This work shall be accomplished by hand brooming, power blowing or other approved methods. If in the opinion of the Engineer the hand cleaning is not sufficient then a self-propelled street sweeper shall be used.

All sand used during the treatment must be removed not later than forty-eight (48) hours after treatment of the street. This shall be accomplished by a combination of hand and mechanical sweeping. All turnouts, cul-de-sacs, etc. must be cleaned of any material to the satisfaction of the Engineer. Street sweeping will be included in the price bid per square yard for asphalt rejuvenating agent.

If, after sand is swept and in the opinion of the Engineer a hazardous condition exists on the roadway, the contractor must apply additional sand and sweep same no later than

twenty-four (24) hours following reapplication.

No additional compensation will be allowed for reapplications and removal of sand.

C921.11 Resident Notification. The contractor shall distribute by hand, a typed notice to all residences and businesses on the street to be treated. The notice will be delivered no more than twenty-four (24) hours prior to the treatment of the road. The notice will have a local phone number that residents may call to ask questions. The notice shall be of the door hanger type which secures to the door handle of each dwelling. Unsecured notices will not be allowed. The contractor shall also place the notice on the windshield of any parked cars on the street. Hand distribution of this notice will be considered incidental to the contract.

C921.12 Traffic Control. The contractor shall schedule his operations and carry out the work in a manner to cause the least disturbance and/or interference with the normal flow of traffic over the areas to be treated. Treated portions of the pavement surfaces shall be kept closed and free from traffic until penetration, in the opinion of the Engineer, has become complete and the area is suitable for traffic.

When, in the opinion of the Engineer, traffic must be maintained at all times on a particular street, then the contractor shall apply an asphalt rejuvenating agent to one lane at a time. Traffic shall be maintained in the untreated lane until the traffic may be switched to the completed lane.

The contractor shall be responsible for all traffic control and signing required to permit safe travel. The contractor shall notify the Police and Fire departments as to the streets that are to be treated each day through the Engineering Department.

If, in the opinion of the Engineer, proper signing is not being used, the contractor shall stop all operations until safe signing and barricading is achieved.

C921.13 Method of Measurement. Asphalt rejuvenating agent will be measured by the square yard as provided for in the contract documents.

C921.14 Basis of Payment. The price bid for this item shall include all labor, equipment, and material incidental to the placement of the material according to these specifications.

Payment will be made at the unit price bid:

Item	Unit	Description
C921	Square Yard	Asphalt Pavement Rejuvenator