

**FULL DEPTH PAVEMENT RECLAMATION
(CALCIUM CHLORIDE) AND
STONE SEAL (NEW WORK)
SPECIFICATIONS**

1. DEFINITIONS

The term Director [Superintendent, etc.] shall mean the Director of Public Works of the awarding authority.

The term Designee shall mean an employee of awarding authority, designated by the Director.

The term Contractor shall mean a professional company contracted by the awarding authority to perform work under this agreement.

2. DESCRIPTION

Work under this contract shall consist of the Contractor furnishing equipment and materials to pulverize the in-place asphalt pavement and underlying material, spray liquid calcium chloride on the pulverized mass, mix and/or blend the material, spread and compact the resultant mixture to the lines and grades shown on the plans or established by the Director or his/her Designee, cap the finished base with an application of calcium chloride, and apply three applications of stone and two applications of liquid asphalt on properly prepared streets. Bid quantities are approximate only; payment shall be for actual square meters reclaimed and actual quantities applied to streets. Streets to be stone sealed shall be selected by the Contractor and the Director or his/her Designee.

3. MATERIALS

a. Liquid Calcium Chloride

The calcium chloride solution shall be provided by the manufacturer as a true solution and shall not be reconstituted from flake calcium chloride. The calcium shall meet the following material specifications (see ASTM Designation D98; AASHTO-M144).

Calcium Chloride	35% +/- 1%
Alkali Chloride as NaCl	2% max.
Magnesium as MgCl	0.1%

Typical (in lbs. per gallon)

Calcium Chloride	5.050
Sodium Chloride	0.200
Magnesium Chloride	0.004
Calcium Chloride	0.004
Water	<u>6.002</u>
	11.26

b. Reclaimed Base

All pulverized material shall pass the 76.2 mm, (3-inch sieve). The processed sub-base shall meet the following gradation:

REQUIRED RECLAIMED BASE GRADATION

<u>SIEVE SIZE</u>	<u>% PASSING</u>
76.2 mm, (3")	98 – 100
38.1 mm, (1 – ½")	70 – 100

*Gradation may vary due to local aggregate conditions.

c. Liquid Asphalt

Liquid asphalt grades shall be: CRS-2 (3% Latex), CMS-2 (3% Latex), RS-2 (3% Latex), HFMS-2 (3% Latex) or MC-3000 conforming to AASHTO specifications M208, M140 or M82.

d. Latex Additive

The latex additive shall be Ultrapave 70 (Anionic) or Ultrapave 1156 (Cationic) or equivalent conforming to the following specifications. It is required that the latex be co-milled at the bulk emulsion facility, to ensure complete and balanced blending. The emulsion manufacturing plant must be open to inspection by the awarding authority.

	<u>Anionic</u>	<u>Cationic</u>
Monomer Ratio (Butadiene/Styrene)	(76 +/- 2/24 +/- 2)	(76 +/- 2/24 +/- 2)
Solids, min %	67	59
Solids, min lbs./gal.	5.2	4.8
Coagulum (80 mesh screen) max	0.1%	0.1%
pH of Latex	9.5 – 10.5	4.0 – 5.5
Brookfield Visc. (Model RVT, #3 spindle @20 RPM)	800 – 2000	5000 max
Mechanical Stability	Excellent	Excellent

e. Stone

Stone shall be crushed quarry stone, free from dust, soft stone or other contaminants, with a minimum of 70% of the stones have a fractured face. All stone shall satisfy a 35% maximum for the L.A. Abrasion Test and a 35% maximum for the Flakiness Index Test.

REQUIRED STONE GRADATION

12.5 mm, (1/2" STONE)		9.5 mm, (3/8" STONE)	
SIEVE SIZE	% PASSING	SIEVE SIZE	% PASSING
15.8 mm, (5/8")	100	12.5 mm, (1/2")	100
12.5 mm, (1/2")	85 – 100	9.5 mm, (3/8")	85 – 100
9.5 mm, (3/8")	15 – 45	6.3 mm, (1/4")	10 – 60
4.75 mm, (#4)	0 – 10	4.75 mm, (#4)	0 – 25
2.36 mm, (#8)	0 – 2	2.36 mm, (#8)	0 - 5

Maximum passing 0.075 mm, (#200), sieve shall not exceed 2.0%, wet washed, for all sized aggregates used in surface treatments.

4. MATERIAL QUANTITIES

The quantity of asphalt emulsion to be used on the double application shall be in the range of 4.5 to 6.8 liters per square meter, (1 to 1.5 gallons per square yard), or the quantity of MC-3000 to be used on the double application shall be in the range of 3.6 to 4.5 liters per square meter, (0.80 to 1.0 gallons per square yard). Cover aggregate shall be spread in the range of 32.6 to 43.4 kilograms per square meter, (60 to 80 pounds per square yard). The Contractor will use lab tests to design specific material quantities to meet existing field conditions. Variations in material quantities will be made without adjustment to contract unit price. The Contractor must maintain a laboratory open to the inspection of the awarding agency.

5. EQUIPMENT

The equipment used by the Contractor shall include, but not be limited to, one or more of the following:

a. Reclaimer

Reclamation will be by means of a traveling rotary reclaimer or equivalent machine capable of cutting through existing asphalt at depths up to 30.5 centimeters, (12 inches), with one pass. The machine shall be self-propelled and equipped with an adjustable grading blade thus leaving its path generally smooth for traffic. Equipment such as road planners or cold milling machines which are designed to mill or shred the existing bituminous concrete rather than to crush or fracture it, are not considered capable of achieving specification gradation. The required and necessary action of the reclaimer will increase the percentages of fine aggregate. This machine is not intended for use on sub-bases with large boulders or ledge. Existing bituminous concrete and gravel base must be pulverized and mixed so as to form a homogeneous mass of uniformly processed base material which will bond together when compacted.

b. Pressure Distributor

The distributor for calcium shall be capable of applying liquid calcium chloride in accurately measured quantities at any rate between 0.5 to 9.1 liters per square

meter, (0.1 to 2.0 gallons per square yard), of roadway surface, at any length of spray bar up to 6.1 meters, (20 feet). The distributor shall be capable of maintaining a uniform rate of distribution of material regardless of change in grade, width or direction of the road. The distributor shall be equipped with a Digital Volumetric Accumulator capable of measuring liters applied and distance traveled. The volume and measuring device shall be equipped with a power unit for the pump so that application is by pressure, not gravity. The spray nozzles and pressure system shall provide a sufficient and uniform fan-shaped spray of material throughout the entire length of the spray bar at all times while operating, and shall be adjustable laterally and vertically. The spray shall completely cover the roadway surface receiving the treatment.

c. Asphalt Distributor

The asphalt distributor shall contain suitable mechanical circulating and heating mechanisms to provide a uniform approved temperature of the entire mass of material. The distributor shall be equipped with a radar type sensor used to measure ground speed, and feed a Digital Volumetric Accumulator capable of measuring liters applied and distance traveled. It shall be capable of applying asphalt material in accurately measured quantities at any rate between 0.5 to 9.1 liters per square meter, (0.1 to 2.0 gallons per square yard), of roadway surface, at any length of spray bar up to 4.9 meters, (16 feet). The distributor shall be capable of maintaining a uniform rate of distribution of asphalt material regardless of change in grade, width or direction of the road. It shall be equipped with an electronic control for setting asphalt pump discharge rate and on/off switching of spray for nozzles in .3 meter, (one foot), increments which shall be located in the truck cab. The spray nozzles and pressure system shall provide a sufficient and uniform fan-shaped spray of asphalt material throughout the entire length of the spray bar at all times while operating. The spray shall completely cover the roadway surface receiving the treatment.

d. Aggregate Spreader

The aggregate spreader shall be hydrostatically driven and self-propelled. It may be equipped with a hydraulically controlled variable adjustable head that is capable of spreading stone in widths from 1.4 to 5.4 meters, (4.5 to 18 feet). The spreader shall be mounted on pneumatic tires, and shall apply the stone on the road surface in a manner that ensures that the tires do not contact the road surface until after the stone has been applied. The unit shall be equipped with an electronic radar type sensor used to measure ground speed and will automatically adjust the stone application rate depending on width of application and the speed of chip spreader. It shall have the ability to apply stone on any grade from 0 - 6%. The spreader shall be equipped with an integral hopper with a minimum capacity of 4.5 metric tons, (5 tons), of stone which shall be filled by trucks in a manner which ensures that the truck tires never come in contact with the asphalt-treated road surfaces until the stone has been properly applied. To maintain constant stone application, a self-locking truck hitch will permit towing of aggregate trucks without stopping the chip spreader. It will be capable of maintaining positive engagement over irregular terrain.

e. Rollers

At least one steel wheeled roller shall be used on each treated surface immediately after the stone has been applied. Each roller shall have a compacting width of not less than 1.5 meters, (5 feet). Each roller shall have a gross weight of not less than 7.2 metric tons, (8 tons), and contact pressure adjustable from 1400 to 2000 kPa, (200 to 300 psi).

f. Trucks

Rear discharge conveyor-fed trucks in sufficient number and size must be used to deliver stone to the spreader.

g. Grader

A motor grader shall be used for shaping and finishing the surface of the reclaimed base, in accordance with the lines, grades and typical cross sections shown on the plans or established by the Director of his/her Designee.

6. CONSTRUCTION METHODS

Full Depth Reclamation

a. Streets to be Reclaimed

The Contractor and the Director shall mutually determine the streets which shall receive reclamation. Measurements of streets to be reclaimed shall be made by the Contractor and the Director of his/her Designee. The Contractor shall prepare a cost estimate for each street prior to beginning work. Lines and grades shall be furnished by the awarding authority to all bidders at the time of job negotiation.

b. Surface Preparation

Surface preparation, which may include cleaning and grubbing; removal of visible cobbles; drainage; adjusting of street irons-valve covers, manhole covers, drop inlet gratings, catch basins; signs, mail boxes and guard rail resetting; etc., will be the responsibility of the awarding authority and will be completed before the contractor moves onto the job.

c. Pulverization Process

The existing road pavement shall be pulverized and mixed with equal amounts of gravel base existing in the roadway foundation. The pulverization shall blend the asphalt and base material into a homogeneous mass, utilizing the asphalt acquired from the existing pavement as a stabilizer to bond material together when compacted. After the first pulverization, two (2) applications of calcium chloride totaling 3.40 liters per square meter, (.9 gallons per square yard), shall be applied. The aggregate mass shall then be pulverized again to ensure proper asphalt, gravel, and calcium chloride blending to the desired depth. Following base compaction, shaping and fine grading, then recompaction, a final capping of .3785 liters per square meter, (.10 gallon per square yard), of calcium chloride shall be applied.

d. Rolling

Initial rolling shall be done immediately following the second reclaimer pass, and again following fine grading.

e. Grading

Sub-grade changes may be necessary to meet proposed grade lines and cross sections. In areas where the proposed roadway grade to above the present grade, additional material will be provided by the awarding authority on the site, incorporated during regrading and compaction of the pulverized material, then brought to line and grade. Any excavation of sub-base material shall be placed in windrows or stockpiled so as not to impede the work of the Contractor, for later removal by municipal forces. After the material has been thoroughly worked by the reclaimer, the mass will be shaped and fine graded.

f. Traffic Control

Traffic control, including police details, warning lights, barricades, and warning signs, is the sole responsibility of the awarding authority. Unless otherwise specified, the roadway shall be kept open to traffic at all times, with traffic discontinued on the lane being reclaimed. Controlled traffic may be permitted as soon as the base has been rolled.

Stone Seal New Work

a. Streets To Be Treated

The Contractor and the Director shall mutually determine the streets which shall receive stone seal treatment. Measurements of streets to be treated shall be made by the Contractor and the Director or his/her Designee, and the Contractor shall prepare a cost estimate for each street prior to beginning work.

b. Surface Preparation

Surface preparation, which may include pothole patching, truing and leveling, adjusting of street irons (valve covers, manhole covers, drop inlet gratings), etc., will be the responsibility of the awarding authority and will be completed before the contractor moves onto the job.

Immediately prior to the application of asphalt materials, Highway Department personnel shall remove small branches and other debris, and use a mechanical street sweeper to clean any loose material from the pavement surface.

The Highway Department shall protect manhole covers, drop inlets, catch basins, curbs, and any other structures within the shoulder areas against the application of the surface treatment materials.

c. Weather Limitations

Work will not be done unless the road surface is dry. No work shall be done during rain or foggy periods. No work shall be done if the ambient temperature is below 10°C, (50°F).

d. Spreading Asphalt And Stone

Prior to application of asphalt material on any street, sufficient quantities of materials to cover the entire street at the specified rates shall be on the site and ready for application. The awarding authority shall be responsible for providing the Contractor with an aggregate storage area near the job site. The asphalt material shall not be applied more than 90 meters, (300 feet), in advance of the self-propelled aggregate spreader. **AT NO TIME SHALL ANY ASPHALT MATERIAL BE ON ANY ROAD SURFACE FOR MORE THAN FIFTEEN MINUTES BEFORE IT IS COVERED WITH TREATED STONE.**

e. Rolling

Initial rolling shall be done immediately following the application of stone. Rollers shall be operated at a speed that will not displace aggregate to the treated surface.

f. Traffic Control

Traffic control is the sole responsibility of the awarding authority. Unless otherwise specified, the roadway shall be kept open to traffic at all times, with traffic discontinued on the lane being surface treated. Controlled traffic may be permitted as soon as the final layer is applied and rolled. A recommended maximum speed of 30 km/h, (20 mph), should be maintained for a period of two (2) hours.

g. Surplus Aggregate

Surplus aggregate shall be swept off of the road surfaces by the Highway Department, and shall be the property of the awarding authority. Sweeping will be done after stone seal has properly cured, and care will be taken not to dislodge imbedded aggregate or damage the surface.

7. PERFORMANCE

The awarding authority will not award this contract unless the Contractor furnished satisfactory evidence of his/her ability and experience to perform this work, and that he/she has sufficient capital and equipment to enable him/her to prosecute the work successfully and to complete it within the time named in the contract. The Contractor shall not sublet any portion of this contract, and will own all equipment used to complete such contract. As part of the bid, the Contractor must submit a list of six similar and successfully completed jobs, whose relevance to the proposed job shall be deemed by the awarding authority. The name, address, and telephone number of a contact person involved with each of these projects must be included so they can be investigated prior to the award of the contract. It will be the responsibility of each bidder to visit the job site with the Highway Superintendent. The Board of Selectmen can reject any bid of a contractor who has not visited the work site.

8. METHOD OF PAYMENT

Payment for work under this agreement shall be made at the contract unit price per square meter times the number of square meters, measured by the Contractor and the Director or his/her designee, of road surface treated. Price per square meter shall be for complete in place quantities. Upon completion of work, and acceptance by the Director, the Contractor shall submit a payment request to the Director. Payment shall be net thirty (30) days.

9. GUARANTEE

Any material or workmanship found to be defective for up to one (1) year from the date of acceptance by the Director shall be replaced by the Contractor at no cost to the awarding authority. Upon notification of defective material or workmanship, the Contractor shall immediately replace such defective areas.

BID FORM

BID ITEM: RECLAIMING ASPHALT PAVEMENT USING A ROTARY RECLAIMER WITH LIQUID CALCIUM CHLORIDE, FINE GRADING, VIBRATORY COMPACTION, AND A NEW WORK STONE SEAL SURFACE.

Price per Square Yard. \$ _____

Bidder: _____

Phone: _____

Address: _____

Fax: _____

Signature: _____

Printed Name & Title: _____

Date: _____

REFERENCE LIST
FULL DEPTH PAVEMENT RECLAMATION
(CALCIUM CHLORIDE) AND STONE SEAL (NEW WORK)

Please list six similar projects that have been completed.

Owner:
Address:
City,State,Zip:
Contact:
Phone:
Contract Amount:

Owner:
Address:
City,State,Zip:
Contact:
Phone:
Contract Amount:

Owner:
Address:
City,State,Zip:
Contact:
Phone:
Contract Amount:

Owner:
Address:
City,State,Zip:
Contact:
Phone:
Contract Amount:

Owner:
Address:
City,State,Zip:
Contact:
Phone:
Contract Amount:

Owner:
Address:
City,State,Zip:
Contact:
Phone:
Contract Amount: