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REVISION OF SECTION 408
JOINT AND CRACK SEALANT

The following specification modified from CDOT's 2017 Standard Specifications for Road and Bridge Construction (CDOT Specs) is hereby incorporated into this project. References to other sections shall be as presented in the CDOT specs unless specifically noted otherwise.

DESCRIPTION

408.01 This work consists of furnishing and placing an approved hot poured joint and crack sealant in properly prepared cracks in asphalt pavements. Cracks with a width greater than 1/8 inch and less than 1 inch are to be filled with this material except for areas of large pavement failure which shall be skipped and will be patched by City of Montrose street crews.

MATERIALS

408.02 Crack seal material shall be ASTM D6990 Type II, shall conform requirements of subsection 702.04, and shall be on the CDOT approved products list.

Using a mixture of different manufacturers' brands or different types of sealant is prohibited.

CONSTRUCTION REQUIREMENTS

408.03 Immediately before applying hot poured joint and crack sealant, the cracks shall be cleaned of loose and foreign matter to a depth approximately twice the crack width. Cleaning shall be performed using a hot compressed air lance. This lance shall be used to dry and warm the adjacent asphalt immediately prior to sealing. Direct flame dryers shall not be used.

These cracks shall be filled with hot poured joint and crack sealant flush with the pavement surface. Immediately following the filling of the crack, excess sealant shall be leveled off at the wearing surface by squeegee, a shoe attached to the applicator wand, or other suitable means approved by the Engineer. The squeegeed material shall be centered on the cracks and shall not exceed 3 inches in width or 1/16th inch in depth.

The sealant material shall be heated and applied according to the manufacturer's recommendations. The equipment for heating the material shall be an indirect heating type double boiler using oil or other heat transfer medium and shall be capable of constant agitation. The heating equipment shall be capable of controlling the sealant material temperature within the manufacturer's recommended temperature range and shall be equipped with a calibrated thermometer capable of ±5 °F accuracy from 200 to 600 °F. This thermometer shall be located so the Engineer can safely check the temperature of the sealant material. Overheating of the sealant material will not be permitted.

The face of the crack shall be surface dry and the air and pavement temperatures shall both be at least 40 °F and rising at the time of sealant application.

Sealant material picked up or pulled out after being placed shall be replaced at the Contractor's expense. The Contractor shall have blotter material available on the project in the event it is required to prevent tracking or pulling. If required, blotter material shall be approved by the Engineer and placed at the Contractor's expense.

Contractor shall perform traffic control associated with crack sealing operations as described on the general note sheet of the project plans.

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Contractor shall skip over any areas within the project area that have experienced significant pavement failures. In general, these will be areas where the pavement has experienced base failure and has resulted in a large area of dense “alligator cracking” at larger than approximately 5’ by 5’. The City street crews will work with the crack sealing crew when starting up to establish typical types of areas that shall be skipped. Contractor shall spray paint corner boundaries of areas skipped and note these on a map of the project area to be provided to City street crews. The City street crews will then come patch these areas following completion of the crack seal operations.

Contractor shall sweep or blow all deleterious material from crack cleaning operations into the street (that is, do not leave debris on sidewalks or driveways). Upon completion of a street or area, contractor shall notify the City’s streets superintendent that the area has been completed and the City will come sweep/vacuum the debris from the work area.

METHOD OF MEASUREMENT

408.04 Hot poured joint and crack sealant will be measured by the ton of material used based on tickets from the material supplier.

BASIS OF PAYMENT

408.05 Payment will be made under:

Pay Item	Pay Unit
Crack Seal (ASTM D6690 Type II)	Ton

Crack seal and shall include all labor, equipment, asphalt, and materials required to complete the work, including surface prep, placement, driveway/sidewalk cleanup, blotter where necessary, and traffic control.

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REVISION OF SECTION 409
CHIP SEAL

The following specification modified from CDOT's 2017 Standard Specifications for Road and Bridge Construction (CDOT Specs) is hereby incorporated into this project. References to other sections shall be as presented in the CDOT specs unless specifically noted otherwise.

DESCRIPTION

409.01 This work consists of furnishing and applying asphalt emulsion, cover coat material and emulsified asphalt fog seal on an existing surface, in accordance with these specifications and in conformity with the lines shown on the plans or established.

MATERIALS

409.02 Asphalt Emulsion for Chip Seal. Emulsified asphalt shall be CRS-2P, shall conform to the requirements of subsection 702.02 (b), and shall be on the CDOT approved products list. Chip seal emulsified asphalt application rate shall be 0.36 to 0.42 gal/SY.

409.03 Chip Seal Aggregate. Aggregate for the chip seal shall be Type I and meet the requirements of subsection 703.05. The material will be accepted at the spreader. Chip seal aggregate application rate shall be 19 to 21 lbs/SY.

409.04 Asphalt Emulsion for Fog Seal. Emulsified asphalt shall be CSS-1h, shall conform to the requirements in subsection 702.02 (a), and shall be on the CDOT approved products list. Fog seal application rate shall be 0.08 to 0.15 gal/SY.

CONSTRUCTION REQUIREMENTS

409.05 Weather Limitations. Unless approved by the Engineer, asphalt emulsion shall not be applied on a damp surface, when either the air or pavement surface temperature is below 70 °F, or when weather conditions would prevent the proper construction of the chip seal.

409.06 Equipment. The following equipment or its equivalent shall be used:

- (1) Asphalt distributor and equipment shall be capable of uniformly distributing asphalt emulsion at even temperature and uniform pressure on variable widths of surface up to 15 feet at readily determined and controlled rates from 0.05 to 2.0 gallons per square yard. The allowable variation from any specified rate shall not exceed plus or minus 0.02 gallon per square yard. The distributor's spreading capabilities shall be computer controlled or it shall be calibrated to conform to the distributor manufacturer's procedure prior to applying the emulsified asphalt. Distributor equipment shall include a tachometer, pressure gauges, accurate volume measuring devices or a calibrated tank, and a thermometer for measuring temperatures of tank contents. Distributors shall be equipped with a power unit for the pump, and full circulation spray bars adjustable laterally and vertically. Distributors shall be equipped with an automatic heater capable of maintaining the asphalt emulsion at the manufacturer's recommended application temperature or at 140 °F, whichever is higher.
- (2) A rotary power broom with hopper and shielding to limit errant rocks and/or vacuum sweepers with a negative air pressure at the intake of at least 46 inches of negative water pressure.

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- (3) A minimum of two pneumatic tire rollers, which weigh at least 10 tons each.
- (4) One self-propelled aggregate spreader of approved design supported by at least four wheels equipped with pneumatic tires on two axles. The aggregate spreader shall be capable of applying the larger cover coat material to the surface ahead of the smaller cover coat material and shall have positive controls so the required quantity of material is deposited uniformly over the full width of the asphalt emulsion. Other types of aggregate spreaders may be used provided they accomplish equivalent results and are approved.

409.07 Preparation of Surface. The entire surface that is to receive a chip seal shall be cleaned of loose sand, dust, rock, mud, and all other debris that could prevent proper adhesion of the coating. The cleaning shall be accomplished by power broom, vacuum sweeper, scraping, blading, or other approved measures. Chip sealing operations shall not be started until the surface is approved.

409.08 Applying Asphalt Emulsion. Asphalt emulsion shall be applied by a pressure distributor in a uniform, continuous spread and within the temperature range specified. The distributor's spreading capability shall be computer controlled or calibrated to conform to the distributor manufacturer's procedure prior to applying the emulsified asphalt. If streaking occurs, the distributor operation shall be stopped immediately until the cause is determined and corrected. Streaking is alternating, narrow, longitudinal areas of excessive and then insufficient quantities of asphalt material. The quantity of asphalt material per square yard may vary from the rate shown in the Contract, as directed. A strip of building paper, at least 3 feet in width and with a length equal to that of the spray bar of the distributor plus 1 foot shall be used at the beginning of each spread. If the distributor does not have a positive cut-off, the paper shall be used at the end of each spread. The paper shall be removed and disposed of in a satisfactory manner. The distributor shall be moving forward at proper application speed at the time the spray bar is opened. Skipped areas and deficiencies shall be corrected. Junctions of spreads shall be carefully made to assure a smooth riding surface.

The length of spread of asphalt emulsion shall not be in excess of the area that trucks loaded with cover coat material can immediately cover.

The spread of asphalt emulsion shall not be more than 6 inches wider than the width covered by the cover coat material from the spreading device. Under no circumstances shall operations proceed so asphalt emulsion will be allowed to chill, set up, dry, or otherwise impair retention of the cover coat.

The distributor shall be parked so that asphalt emulsion will not drip on the surface of the traveled way.

409.09 Application of Cover Coat Material. Immediately following the application of the asphalt emulsion, cover coat material shall be spread in quantities as designated. The spreading rate may vary from the rate shown in the Contract when approved. Spreading shall be accomplished so the tires of the trucks or aggregate spreader do not contact the uncovered and newly applied asphalt emulsion. The cover coat material shall be moistened with a sufficient amount of water to reduce the dust coating of the aggregate prior to spreading. The cover coat material shall not contain free moisture as evidenced by drain down in the delivery truck bed.

Immediately after the cover coat material is spread, deficient areas shall be covered with additional material. Rolling shall begin immediately behind the spreader and shall continue until three complete coverages are obtained. Rolling shall be completed the same day the asphalt emulsion and cover coat materials are applied.

The completed roadway surface shall be lightly broomed the following morning to remove any excess material, without removing any embedded material. The Contractor shall conduct additional brooming if so directed.

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A fog seal shall be applied to the final, cleaned surface of the completed chip seal at the rate of 0.08 to 0.15 gallons per square yard of diluted emulsion. The fog seal shall have a 3:2 emulsion to water dilution rate.

METHOD OF MEASUREMENT

409.10 Chip seal will be measured and paid for as a single component including both the chip and fog seal by the actual number of square yards placed and accepted.

BASIS OF PAYMENT

409.11 Payment will be made under:

Pay Item	Pay Unit
Chip and Fog Seal (CRS-2P & Type I Cover Coat, CSS-1h Fog Seal)	Square Yard

Chip and fog seal and shall include all labor, equipment, asphalt, and materials required to complete the work, including surface prep, placement, and cleanup.