

**STATE OF OHIO
DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL SPECIFICATION 882
CHIP SEAL WITH WARRANTY**

July 19, 2013

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882.01 General. This work consists of preparing and applying a single or double chip seal. Warrant the chip seal for two years.

882.02 Maintenance Bond. Furnish a maintenance bond for a two year period in an amount equal to 75 percent of the total amount bid for Item 882 with the performance and payment bonds specified in 103.05.

Ensure the Surety that underwrites the maintenance bond has an A.M. Best rating of "A-" or better. Include the cost of the maintenance bond in the pay item for the premium for the contract performance bond and the payment bond.

The effective date of the maintenance bond is the date the Department's Form C-85 is issued for the pavement. The Department will issue a final C-85 within 30 days after all of the pavement items, including all safety items, are completed and accepted and the pavement is open to traffic. The Department will issue a partial C-85 within 30 days after the pavement is completed and accepted, and all safety items are in place to allow the pavement to be safely open to traffic during the months from September to April. The Department will issue no more than one C-85 each calendar year except with approval of the Director.

After the final or partial Form C-85 is issued, the Department will notify the Surety. After the final Form C-85 is issued the Department will also establish all final quantities for the project and the project will be finalized using standard procedures. The maintenance bond expires two years after the issuance of Form C-85.

Maintain the liability insurance specified in 107.12, insuring against Contractor or Contractor authorized operations negligently performed during the warranty period. Ensure the insurance is in effect throughout the warranty period. Send a copy of the Certificate of Insurance to the District each year.

882.03 Warranty Items Coverage. Warranty Items and Remedial Actions are specified in 882.06. The warranty applies to all Item 882. The warranty does not apply to structural problems below the chip seal, provided the structural problem is not the fault of the Contractor.

Do not construe meeting the minimum requirements and guidelines of this specification as a warranty, expressed or implied, as to the material properties and workmanship efforts required to meet the performance criteria set forth in Table A.

882.04 Materials. Use polymer emulsified binder conforming to 702.16 Type A.

Provide cover aggregate for the chip seal Job Mix Formula (JMF) of washed limestone or dolomite meeting 703.05. Do not use an aggregate source designated with “SR” on the Aggregate Source Group list in accordance with 703.01F. Additionally the following requirements apply:

Stockpile the material to be used for the chip seal at the aggregate source.

Obtain five (5) samples from the stockpile and perform gradation testing on each sample and determine the percent passing for each sieve size listed in Table 882.04-1

1. Calculate the total range for the No. 8 (2.36 mm) sieve for all five samples. The range will not exceed 6%
2. Calculate the percent passing the No. 200 (75 µm) sieve for each sieve. No single sample value will exceed 2.0 percent.
3. Calculate the average of each sieve for all five samples. Assure the average value for each sieve is less than the value in Table 882.04-1

Submit a letter to the Engineer and District Engineer of Tests (DET) containing the Job Mix Formula (JMF) gradations and the calculations to show the cover aggregate meets requirements.

If a staging location will be used for the chip seal aggregate first move the initially tested aggregates from the aggregate source stockpile to the staging location and construct a staging stockpile. Then obtain five (5) aggregate samples from the staging location stockpile and perform gradation testing on each sample to determine the percent passing for each sieve size listed in Table 882.04-1.

Evaluate the staging location aggregate samples the same as the aggregate source samples except allow an average for the No. 200 (75 µm) sieve not greater than 1.7 percent.

Submit the Job Mix Formula (JMF) gradations from the staged stockpile and the calculations to show the cover aggregate meets requirements in letter form to the Engineer and DET.

If the chip seal aggregates fail to meet requirements, either at the aggregate source or the staging location, re-wash and/or rework the aggregate materials and retest the new stockpiles.

TABLE 882.04-1

Size	JMF Limits % Passing
1/2 inch (12.5 mm)	100
3/8 inch (9.5 mm)	85-100
No. 4 (4.75 mm)	5-25
No. 8 (2.36 mm)	0-10
No. 16 (1.18 mm)	0 - 5
No. 200 (75 µm)	1.5 max [1]
[1] Washed gradation value	

The District may obtain and test validation samples of the JMF aggregates at any time. If a single validation sample is either outside the values in TABLE 882.04-1, with the exception that the No. 200 (75 µm) value is not greater than 2.0 percent, the district will obtain five (5) samples and retest to determine if the aggregate JMF falls within the limits of TABLE 882.04-1. If the JMF verification test doesn't meet the source or staging location limits the stockpile is not acceptable.

A. Equipment. Provide equipment conforming to this section.

Use equipment for binder distribution conforming to 407.03. In addition ensure that it has a computerized rate control that automatically adjusts the binder pump to the unit ground speed and has a gauge or meter in plain view for reading gallons (liters). Use appropriate spray nozzles for the material and rate specified.

Use Type II pneumatic tire rollers conforming to 401.13, except the maximum capacity shall not apply.

Use self-propelled aggregate spreaders with a variable width aggregate hopper capable of placing from 8 to 16 feet (2.4 to 4.8 m) in any increment and a computerized rate control that automatically adjusts the aggregate output to the unit ground speed. Equip spreaders with pneumatic tires, a screen to remove oversized material, revolving cylinders, and adjustments necessary to produce a uniform distribution of particles at the specified rate.

Use power sweepers or rotary brooms in initial surface preparation and for removing loose particles. Use pickup type sweepers in areas where the aggregate shoulder does not exist. Do not sweep loose aggregate onto lawns, curbed areas, and intersections.

Furnish accurate thermometers for determining any of the applicable temperature requirements of this specification.

B. Construction.

1. Surface Preparation. Clean the pavement according to 407.05. If necessary, clean areas of the pavement with a hand broom.

Remove all existing pavement markings, except 740.02 (traffic paint), using an abrasion method conforming to 614.11,G.

For a single chip seal either remove and replace any existing raised pavement markers or protect the existing raised pavement markers from the single chip application process.

For a double chip seal application remove the raised pavement markers according to 621.08.

2. Weather Limitations. Place the chip seal when the pavement temperature is between 60 °F (16 °C) and 140 °F (60 °C). Do not schedule the performance of this work for the time period before May 1 or after September 1. Do not place chip seal if any of the following conditions exist:

- A. The atmospheric temperature is below 70 °F (21 °C).
- B. Impending weather conditions do not allow for proper curing.
- C. If temperatures are forecasted below 50 °F (10 °C) within 24 hours from the time of work.

3. Binder Application. Before applying binder, ensure that sufficient cover aggregate is available for immediate application. Adjust the binder at the target(s) rates during the test strip. Maintain the binder temperature from 150 to 185 °F (65 to 85 °C) during construction, including the start of each day. Reheat the binder at a rate of no more than 25 °F (4 °C) per hour, when the binder is allowed to cool below 150 °F (65 °C). Proper stone embedment is typically 1/2 to 2/3 of the stone chip height and can be checked by pulling out several chips by hand. Adjust and document application rates by stationing.

At the beginning and at the end of a contract section, start and stop the application on a removable protective cover (paper, metal sheets, or other suitable material) sufficiently wide enough to allow full application on the surface being treated. Make transverse and longitudinal laps in such manner to ensure that the texture of the finished surface is uniform and continuous. To prevent lapping at transverse junctions, promptly shut off the binder spray at the end of the application. Before continuing the application, place a removable protective cover a sufficient distance back from the joint on the cover aggregate so the sprayers are operating at full force when the distributor has attained the predetermined speed upon reaching the uncovered surface. Upon completion, remove all removable protective covers.

4. Cover Aggregate Application. Immediately after applying the binder, apply cover aggregate uniformly without ridges or laps at the specified rate adjusted as directed by the

Engineer to produce a minimum of excess loose particles. Spread the material in such manner that the tires of the truck or aggregate spreader at no time contact the uncovered and newly applied binder. Before rolling, correct deficiencies in the application of cover aggregate in a manner satisfactory to the Engineer. Do not over apply cover aggregate with the intent on relying on vacuum and broom sweeping to pick up all excess. Stop work if nuisance to the public amounts of aggregate occur. If work is stopped re-calibrate the aggregate spreader and re-verify the aggregate spread rate determining a new application rate and apply cover aggregate at the new rate.

After rolling, protect the surface from traffic damage during the period required for the binder to cure sufficiently and prevent dislodging of the aggregate particles by normal traffic. During this period, correct deficiencies in cover aggregate by spreading additional aggregate or by light brooming.

Apply cover aggregate at a rate necessary to provide full coverage of the binder and to avoid tracking. If the target rate is not the optimum application rate due to the gradation of the aggregate or due to existing surface conditions of the pavement, immediately establish a new rate and document the new rate by stationing.

5. Test Strip. Construct a continuous 1000-foot (300 m) long by lane width test strip. Do not waive test strips. Determine and tell the Engineer the binder application rate and aggregate application rate. Calibrate the aggregate spreader and verify the application rate with a one square yard (one square meter) piece of cardboard or other material to collect and weigh the aggregate. Do not over apply cover aggregate with the intent on relying on vacuum and broom sweeping to pick up all excess. Stop work if nuisance to the public amounts of aggregate occur. If work is stopped re-calibrate the aggregate spreader and re-verify the aggregate spread rate determining a new application rate and apply cover aggregate at the new rate. Verify the aggregate gradation during the test strip and give results to the Engineer.

The Engineer and Contractor will review the test strip the next workday for streaking, ridging, bleeding, aggregate loss or other problems. If the review shows the test strip meets the requirements of 882.04 and the application rate and quality control tests show all is in control compared to the JMF, then progress with the work. Should problems be noted, the Engineer may require another test strip.

6. Construction Operation. Establish stations at 1000-foot (300 m) intervals on the entire project before placing materials. Clearly identify and maintain the stations until project completion.

Keep the binder distributor, aggregate spreader, and rollers as close to each other as possible. Do not allow the binder distributor to be more than 150 feet (45 m) ahead of the aggregate spreader.

Perform rolling immediately after placing the aggregate, but before the binder sets up. Do not leave aggregate unrolled for more than 5 minutes. Perform a minimum of two complete roller passes over the aggregate. A single complete pass is forward and backward over the same path. For each new pass, overlap the previous pass by about one-half the width of the roller. Use a minimum of three rollers, and roll in a longitudinal direction at a speed not greater than 5 miles per hour (8 km/h). Do not operate rollers at speeds that cause pick-up or dislodging of aggregate particles.

After the binder sets, and before placing a second course for double chip seals, and within 4 hours, sweep the pavement using a power broom or pickup sweeper as needed to remove all loose aggregate. Extend sweeping 1 foot (0.3 m) beyond the edge of the pavement to help prevent migration of loose aggregate back onto the pavement. Do not re-use aggregate from a chip seal that is swept from the pavement or that is already loose off the pavement edge.

If the pavement cannot be swept within the 4-hour period due to problems associated with

the stone moisture, binder, breaking, humidity, or other unknown, the Engineer may suspend the operation until the problem is resolved or more suitable conditions are obtained to maintain the 4-hour time frame for sweeping. The Contractor is responsible for claims of damage to vehicles until the pavement and shoulders receive a final sweeping immediately before application of permanent pavement markings or a fog seal, if a fog seal is required. Protect RPM left in place for a single chip seal. Remove RPMs and replace for a double chip seal.

Wait at least 24 hours before placing the second course of a double chip seal. Ensure that the first course meets requirements and is cured, swept, and capable of withstanding construction traffic without damage. Correct damage to the underlying chip seal before placing the final chip seal.

Place the longitudinal construction joint on a lane line or as directed by the Engineer. For double chip seal, place the longitudinal construction joint for the first course 6 inches (150 mm) off the centerline and place the second course so the longitudinal joint is at the centerline.

Before opening to traffic, post the roadway with "Loose Stone" signs and a "35 mph" speed plaque mounted below the sign. Ensure that signs conform to Item 614. Place these signs at a maximum of 0.5-mile (0.8 km) intervals. Remove the signs as directed by the Engineer.

On two-lane roads or pavements where traffic is maintained on a chip seal constructed that workday, a traffic control pilot vehicle operated at no more than 25 miles per hour (40 km/h) is required in the immediate work area.

Protect all utility castings, monument boxes and other similar items using tarpaper or other approved material. Remove protection before sweeping and opening to traffic.

C. Quality Control.

1. General. Use the methods described in this section for control purposes. Identify the cause of exceeding any of the identified quality control tolerances and document in detail the corrective action necessary to bring the deficiency into compliance. Upon resuming work, take another sample and immediately test it. If the tolerances are exceeded, stop the work until corrected.

The Department can obtain samples of materials at any time. Aggregate samples can be taken from sources, on-hand stockpiles or the aggregate spreader box. Work can be stopped and materials can be rejected on the basis of poor Department test results.

2. Binder. Within one hour of start of production obtain and label a binder sample from the distribution truck and give the sample to the Engineer the same day. Provide and sample the binder in one quart plastic containers with plastic screw tops. Take more samples when requested by the Engineer. For the binder application rate, as determined by a yield check, do not exceed a tolerance of 0.02 gallons per square yard (0.09 liters per square meter) from the established application rate.

3. Coarse Aggregate. At a minimum test one sample taken from the aggregate spreader box at production start and sample and test one sample from the aggregate spreader box randomly during the day. An aggregate spreader box sample may be taken by laying a piece of suitable material under the spreader as it moves forward. Include additional testing when directed to sample and test by the Engineer. Sample and test aggregate according to AASHTO T 2, AASHTO T 248, and Supplement 1004 (AASHTO T 11 where required). Use washed gradations for determining the No. 200 (75 m) sieve. The Contractor may use additional tests. These may include dry gradations for control purposes but acceptance of on hand aggregate will be based on washed gradations only. Reject and do not use aggregate creating nuisance to the public dusting on the project.

Reject truckloads of aggregate if water is seen coming from the truck bed.

Reject aggregate that does not meet the following requirements:

No. 4 (4.75 mm) sieve from JMF	±5.0%
No. 8 (2.36 mm) sieve from JMF	±3.0%
No. 200 (75 µm) sieve from JMF	±1.0%, 2.0% upper limit
Aggregate moisture content (by dry weight)	4.0% max. for agg. Absorption > 2.0%
	3.0% max. for agg. Absorption 2.0%

4. Documentation. Provide the Engineer a daily report with the following:

- a. Control section, project number, county, route, and Engineer.
- b. Date, air temperature, pavement temperature, and humidity.
- c. Binder temperature.
- d. Beginning and ending stations.
- e. Yield checks on binder (three per day, minimum).
- f. Yield checks on aggregate (three per day, minimum).
- g. Gradation, moisture content, and station (One sample from spreader box at production start, one random sample during the day and any other samples when directed by the Engineer).
- h. Length, width, and total area.
- i. Condition of “Loose Stone” signs with “35 mph” speed plaques.
- j. Contractor representative’s signature.

Provide a bill of lading for binder and aggregate as requested or at project completion.

D. Appearance. During the application of the chip seal, inspect the chip seal for deficiencies resulting from poor workmanship, flushing, tracking from equipment, surface patterns, loss of stone, and sweeping. Inspect workmanship for untreated areas, minimum overlap on longitudinal joints, and minimum overlap on construction joints.

Verify the following for appearance:

1. Finished surface has minimal tears and binder streaking.
2. Joints appear neat and uniform without buildup, uncovered areas, or unsightly appearance.
3. Longitudinal joints have less than a 2 inch (50 mm) overlap on the adjacent passes.
4. Transverse joints have no more than 0.25 inch (6.5 mm) difference in elevation across the joint as measured with a 6 foot (2 m) straightedge.
5. Chip seal edge is neat and uniform along the roadway lane, shoulder, and curb lines.
6. Chip seal edge has no more than 2 inches (50 mm) variance in any 100 feet (30 m), along the roadway edge or shoulder.

Before the Department issues Form C-85, the Contractor and Engineer will review the completed work 15 to 25 days after placement. The extent of the following should be minimal to non-existent:

Defect	Severity
Surface Patterns	Alternate lean and heavy lines (Ridges or streaking over the surface)
Bleeding/ Flushing	Excess binder on surface, not subject to wearing off quickly
Loss of Cover Aggregate	Patches or lines of aggregate lost from surface

Perform all corrective work to the satisfaction of the Engineer.

882.05 Annual Review Process. The District will review the project informally, in late winter or early spring. If a problem is noted, a formal review by a District Review Team (DRT) will be conducted. The DRT will notify the Contractor of the scheduled review. The Contractor or

any other interested party may attend the review, for observation only. Any comments by the Contractor or other interested party will be recorded by the DRT. The DRT will select areas to review but may review the entire project. The Department will issue the results in writing to the Contractor within 15 days after completion of the review.

882.06 Remedial Actions. Perform Remedial Actions between May 1 and September 1. If an appeal process goes to Step 3, the District may revise the date for completion of the Remedial Action for the appealed item. If the Department determines that immediate repairs are necessary, due to a potential hazard to the traveling public, the Department will notify the Contractor and establish a date that all repairs are to be finished. Before performing a Remedial Action, submit a Remedial Action plan to the Engineer for approval. State in the plan when and how the Remedial Action will be performed; what material will be used; and how traffic will be controlled. Warrant Remedial Action work for the remainder of the warranty period.

Provide construction traffic control when performing any work required or allowed by this specification during the warranty period in accordance with current Department policy and the Ohio Manual of Uniform Traffic Control Devices for Streets and Highways. The Department will approve when the work is performed. Any major change in Department construction traffic control policy at the time of bid will be considered a changed condition.

Replace pavement markings or raised pavement markers (RPM) removed or damaged while performing a Remedial Action with pavement markings or RPMs equal to or better than the original products at no cost to the Department.

Supply all materials, equipment, and labor to perform the Remedial Actions at no additional cost to the Department. Perform Remedial Actions with material meeting the requirements of 882.04. Certify the component materials and designed mix meets the requirements of 882.04.

The Department will perform emergency work, repairing pavement distresses which are hazardous to the traveling public. If the emergency work is extensive, the Department may authorize the Contractor to perform the repairs. The District Construction Administrator (DCA) will determine if the distress is or is not the responsibility of the Contractor. If the DCA determines the distress is the responsibility of the Contractor, the cost, including construction traffic control, of emergency work performed by the Department will be charged to the Contractor. If the DCA determines the distress is not the responsibility of the Contractor, the Department will pay for Contractor performed repairs according to 109.05. The Contractor is not responsible for pavement damage beyond the Contractor's control (i.e., car fire, oil spill, etc.). The DCA's determination may be appealed in accordance with 882.07.

TABLE A

The beginning point of a 100 yd (100 m) segment starts at the beginning of any individual distress type. For loss of aggregate, the beginning point of a 100 yd (100 m) segment will exclude locations where vehicles turn from or onto other state highways.		
Defect	Severity	Allowable Extent
Surface Patterns	Severe - light and heavy lines over the pavement surface	40% of segment length affected, continuous or localized
Bleeding / Flushing	Moderate - excess binder on surface (loss of stone/tire contact) not subject to wearing off quickly	5% of segment length affected continuously or total of 20% localized problems
Loss of Aggregate	Moderate - patches of aggregate loss	10% of segment length affected continuously or total of 20% localized problems

882.07 Appeal Process. Findings of the DRT may be appealed. Submit any appeal to the DCE, in writing, within 15 days after receipt of the written results of the DRT.

The DCA will evaluate appeals. The evaluation will include reviewing the disputed area in the field and consulting with the Office of Construction Administration. The evaluation may also include reviewing test data, obtaining samples, or interviewing Department (District or Central Office) or Contractor employees. The DCA's determination will be issued in writing to the Contractor within 45 days after the DCA receives the appeal.

If in disagreement with the DCA's determination, appeal the determination using Step 3 of the Dispute Resolution and Administrative Claim Process.

If the appeal is denied and the September 1 work restriction has passed, perform the Remedial Actions the following season. If this extends beyond the warranty period, provide an additional maintenance bond according to 882.02 of sufficient duration to encompass the time necessary to complete all Remedial Actions. If the District determines repairs are necessary before the next season, make repairs acceptable to the District and perform final repairs the following season.

882.08 Method of Measurement. The Department will measure Chip Seal with Warranty by the number of square yards (square meters), completed and accepted in place. The Department will determine the width by measuring the actual width of the chip seal. The Department will determine the length along the centerline of each roadway or ramp.

The Department will measure the number of raised pavement markers removed if a Double Chip Seal is specified.

882.09 Basis of Payment. The cost of removal of all existing pavement markings according to 882.04 is incidental to this item.

The cost of protection of RPM's on a single chip seal is incidental to this item.

The cost of any removal or protection of existing raised pavement markers according to 882.04 is incidental to this item.

The Department will pay for removal of existing raised pavement markers on a Double Chip Seal application according to Item 621 Raised Pavement Markers Removed.

The Department will not pay for materials, equipment or labor required to perform Remedial Actions. The Department will pay for accepted quantities at the contract prices as follows:

Item	Unit	Description
882	Square yard (square meter)	Single Chip Seal with two year Warranty
882	Square yard (square meter)	Double Chip Seal with two year Warranty

Designer Note:

This note is for all chip seal projects where a warranty is desired and there are no special aggregate size requirements.

There are no pay item changes except for a double chip seal; RPM's must be removed and replaced.