



Chip Seal Best Practices

Storage – Liquid emulsion

- Emulsified asphalt will be shipped from Marathon terminals at product temperatures which are high enough to allow immediate application at the construction site with good performance.
- Caution should be used when pre-loading several hours before expected application at the construction site to ensure that the emulsified asphalt will still be hot enough for good application and performance.
- Storage of emulsion is preferred in vertical tanks vs. horizontal tanks.
- Maximum storage temperature, 185°F, should not be too high as to evaporate water and damage the emulsified asphalt specification properties.
- Do not let the emulsion freeze. This breaks the emulsion, separating the asphalt from the water.
- Do not allow the temperature of the heating surface, tubes or coils to reach, or exceed boiling. This will cause premature breakdown of the emulsion on the heating surface.
- Direct fire heating in a distributor should be kept to a minimum.
- Emulsions should not be put through excessive pumping or mixing.
- Stored emulsions should be lightly agitated.
- Do not use forced air to agitate the emulsion. It may cause the emulsion to break. Occasionally, tanks can be circulated top to bottom by using a pump, but contact your Territory Manager before attempting.
- Depending on the volume in the tank, a half hour of mixing should be sufficient.
- The mixer should have large propellers.
- RPM's of the mixer should not exceed manufacturers recommendations.
- If there is concern about separation in a distributor or tanker, contact your Territory Manager for guidance.

Type – Liquid emulsion

- Emulsion should be rapid setting or medium setting and high viscosity.
- Rapid setting emulsions are normally favored but certain weather conditions and aggregate conditions can favor medium setting. Please contact your Territory Manager for liquid recommendations.
- Always refer to your state standards for chip seal liquid specifications.
- AASHTO M140, M208 and M316 are industry recommended emulsion standards.

Type – Aggregate

- Check your state specifications.
- AASHTO MP27-16 provides guidance on aggregate gradation for chip seals.

Marathon Petroleum Company LP (MPC) Heavy Products and Petrochemicals www.MPCAsphalt.com
Northern Sales Region 28001 Citrin Drive Romulus, MI 48174 (313) 749-5787 Fax (313) 749-5821
Southern Sales Region 11001 Brower Road North Bend, OH 45052 (513) 941-4400 Fax (513) 941-4274
Western Sales Region 1250 W. Washington St, Suite 101 Tempe, AZ 85281 (602)-286-1980

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- Aggregate should be: One or two sized
Clean, <1% P200
Durable
Damp but not wet
- Larger chips will require a higher application rate.

Construction

- Preconstruction meetings should be held to review: site selection, materials, QA plans, chip seal design, application rates, test strip and any potential for adjustments to rates throughout the project and date of last equipment calibrations.
- Site selection is important as chip seals are best used when cracking is less than ¼", minimal rutting and very low severity fatigue distresses.
- A chip seal design should be conducted to determine approximate application rates for emulsion and aggregate.
- Application rates of both emulsion and cover aggregate need to be varied based on substrate type.
- CALIBRATE! Distributors need to be calibrated for overall application rate and individual nozzle flow rate.
- Aggregate spreaders should be watched for an even longitudinal flow and the spread rate should be verified once this is established.
- Nozzle should be oriented 15-30 degrees from the spray bar.
- Typical spray bar height is 12" but bar height should be adjusted to achieve even, double or triple lap coverage. Too high or too low can lead to streaking.
- Temperatures should be 55F and rising ambient and surfaces should be 65F and rising. Higher humidity can lead to longer cure times. Conditions should be little wind and no chance of rain. Pavement temperatures in excess of 140F can lead to longer traffic return time due to potential tenderness in the binder and/or a decrease in liquid viscosity reducing chip embedment.
- Roadway should be clean with a motorized broom within 30 minutes of construction.
- Application of emulsion should start and stop on paper joints.
- Chip application should begin immediately after the emulsion is sprayed.
- Look at the aggregate cover immediately to determine if adjustments need to be made. Some emulsion should be visible.
- Once the aggregate is placed, rubber tire rolling should begin immediately. You need enough rollers to cover the width of the mat. They should be staggered and complete three passes. Chip trucks should also be staggered as they approach the spreader.
- Chip embedment after initial rolling should be 50-60%.
- Traffic can be allowed onto the mat after rolling and before sweeping but must be controlled.
- Sweeping should occur within 24 hours. Actual time will be dependent on traffic type but should be completed as soon as possible. If performing the sweeping the same day, a light pre sweep is recommended to ensure no removal of embedded chips.

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Revision History

Revision #	Description of Change(s)	Author	Approver	Approval Date
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