

UTAH DEPARTMENT OF TRANSPORTATION

TECHNICAL BULLETIN MT-05.06

April 8, 2005



Asphalt



Asphalt is made up of about 95% aggregate (sand, gravel, crushed stone) and 5% binder. The binder is made of asphalt cement and is used to bind the aggregate together. It is used to form a strong, durable surface for roads and highways. In chip-seal applications, the binder must be applied in a specific sequence.

Asphalt cement is produced by heating a mixture of asphalt and petroleum solvents such as kerosene, or diesel, or fuel oil. The asphalt cement is then blended so that it remains suspended in water. The process of emulsification involves the addition of asphalt cement, water, emulsifying agents, and other chemicals to create an asphalt emulsion.

TERMINOLOGY

Asphalt emulsions are used in a variety of applications, including as tack coats, fog and chip seals, and as surface treatments. UDOT uses the following grades for those applications: SS-1, SS-RS-2, CRS-2A, B, LMCRS-2, HFMS-2, HFMS-2P, HFMS-2SP, and HFMS-2S.

The characteristics of asphalt emulsions are designated as Slow-Setting (SS), Rapid-Setting (RS). Setting is also influenced by the electrical charge imparted by the use of specialized emulsifiers and other chemicals. A "C" designates a cationic emulsion; for example, a CSS-1 is differentiated from an Anionic emulsion by a "C". The viscosity is designated by a "1" or "2"; for example, a CMS-2 is more viscous than a CMS-1. The grade of base asphalt is designated by an "h"; for example, the asphalt grade is designated by an "h". For example, the asphalt grade is designated by an "h". For example, the asphalt grade is designated by an "h". For example, the asphalt grade is designated by an "h".

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REQUIREMENTS

Asphalt emulsions used for chip-seals are not diluted whereas emulsions used for tack coats, fog seals, and surface treatments are diluted. The percentage of asphalt residue in the emulsion varies by application. For example, emulsions used for chip-seals are not diluted whereas emulsions used for tack coats, fog seals, and surface treatments are diluted.

fog seals, or flush coats are diluted by adding additional water prior to use. Non-compatible water will adversely affect performance and/or cause premature breaking. Consequently, request the supplier to provide this service.

USE AND RECOMMENDED APPLICATION RATES

TACK COAT:

Use SS-1, SS-1h, CSS-1, CSS-1h, diluted 2:1, at a starting rate of 0.10 gallons per square yard (gsy) for new pavements or 0.15 gsy for milled pavements. For practical estimating purposes, use a specific gravity of 1.01 @ 77 °F.

FLUSH COAT:

Use SS-1, SS-1h, CSS-1, CSS-1h, or HFMS-2P, diluted 2:1 on chip-sealed pavements, at a starting rate of 0.12 gsy. For practical estimating purposes use a specific gravity of 1.01 @ 77 °F.

CHIP SEAL COAT:

Use CRS-2A, CRS-2B, CRS-2P, LMCRS-2, HFMS-2P, HFRS-2P, un-diluted, at starting rates of 0.35 gsy for non-milled pavement surfaces, or 0.45 gsy for milled surfaces. For practical estimating purposes, use a specific gravity of 1.02 @ 77 °F.

COLD IN PLACE PAVEMENT RECYCLING:

Use CMS-2, HFMS-2, or HFMS-2SP, un-diluted, at a starting percent of the recycled mix of 1% or lower.

GENERAL PRECAUTIONS

- Do not allow the emulsion to be heated above 185 °F. (evaporation issues-serviceability)
- Do not allow the emulsion to freeze (breaking issues)
- Do not use forced air to agitate the emulsion (breaking issues)
- Do not mix different grades of emulsified asphalt (breaking issues)
- **Do avoid breathing fumes, vapors, or mists**
- **Do obtain a copy of the supplier's material safety data sheet (MSDS). Read the MSDS carefully and follow it.**

FURTHER INFORMATION

UDOT Standard Specification 02745, Bituminous Materials,

<http://www.udot.utah.gov/index.php/m=c/tid=1100>

Asphalt Emulsion Manual Series No. 19, "A Basic Emulsion Manual"

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