

Cationic Asphalt Emulsions

CRS-1 · CRS-2 · CMS-2 · CMS-2h · CSS-1 · CSS-1h · CQS-1h

In accordance with AASHTO M 208 / ASTM D2397 — Standard Specification for Cationic Emulsified Asphalt

1. Description

Asphalt emulsions are homogeneous dispersions of fine asphalt cement droplets suspended in water, stabilised by the action of chemical emulsifiers and by electrochemical surface reactions. Emulsification overcomes the insolubility of asphalt in water and removes the need to heat it to achieve the fluidity required for application, which reduces energy consumption, vapour emission and the risk of burns on site.

Cationic emulsions carry a positive surface charge, which makes them particularly compatible with negatively charged aggregates — siliceous, granitic and quartzitic, predominant in the Andean region and the Caribbean — and gives them better adhesion and lower susceptibility to water action than anionic emulsions. For this reason they are the predominant choice in road paving.

The nomenclature of asphalt emulsions has three elements. The leading letter "C" identifies cationic, positively charged emulsions; its absence indicates an anionic, negatively charged emulsion. Next comes the setting rate: RS (rapid setting), MS (medium setting), SS (slow setting) and QS (quick setting, controlled break for seal treatments). The final number relates to viscosity — a "2" is more viscous than a "1" — and the suffix "h" indicates a harder asphalt residue (penetration 40–90 instead of 100–250). The prefix "HF" designates high-float emulsions, which form a thicker film.

2. Applications

- Tack coats between asphalt layers (SS, CSS, CSS-1h).
- Prime coats over granular bases (diluted CSS-1h, priming emulsions).
- Single and double surface treatments and sand seals (RS, CRS).
- Slurry seals and cold micro-surfacing (SS, CSS, CQS).
- Cold dense-graded and cold open-graded mixes (MS, CMS).
- Cold in-place and in-plant recycling, stabilised bases and soils (SS, CSS).
- Fog seals and curing seals.

3. Specifications

Property	Method	CRS-1	CRS-2	CMS-2	CMS-2h	CSS-1	CSS-1h	CQS-1h
Saybolt Furol viscosity at 25 °C (s)	T 59	—	—	—	—	20–100	20–100	20–100
Saybolt Furol viscosity at 50 °C (s)	T 59	20–100	100–400	50–450	50–450	—	—	—
Storage stability, 24 h (%), max.	T 59	1	1	1	1	1	1	1
Demulsibility (%)	T 59	40 min.	40 min.	—	—	—	—	—
Particle charge test	T 59	Positive	Positive	Positive	Positive	Positive	Positive	Positive
Sieve test, retained on No. 20 (850 µm) (%), max.	T 59	0.10	0.10	0.10	0.10	0.10	0.10	0.10
Cement mixing test (%), max.	T 59	—	—	—	—	2.0	2.0	—
Coating, dry aggregate	T 59	—	—	Good	Good	—	—	—
Coating, after water spraying	T 59	—	—	Fair	Fair	—	—	—
Coating, wet aggregate	T 59	—	—	Fair	Fair	—	—	—
Oil distillate, % by volume of emulsion, max.	T 59	3	3	12	12	—	—	—
Residue by distillation (%), min.	T 59	60	65	65	65	57	57	57
Tests on the distillation residue								
Penetration at 25 °C, 100 g, 5 s (0.1 mm)	T 49	100–250	100–250	100–250	40–90	100–250	40–90	40–90
Ductility at 25 °C, 5 cm/min (cm), min.	T 51	40	40	40	40	40	40	40
Solubility in trichloroethylene (%), min.	T 44	97.5	97.5	97.5	97.5	97.5	97.5	97.5

Unless otherwise indicated, viscosity, penetration and demulsibility values are ranges or minima, and stability, sieve, cement-mixing and oil-distillate values are maxima. Equivalent ASTM methods: D244/D6997 (distillation), D6930 (stability and settlement), D6936 (demulsibility), D7402 (particle charge), D6933 (sieve), D5,

D113 and D2042 on the residue. Notes: (i) in addition to 24-hour stability, some agencies require 5-day settlement (typically 5 % max), generally applied only to the CMS grades; (ii) US state specifications apply documented deviations: North Dakota sets CMS-2 oil distillate at 5–15 % rather than 12 % max; Iowa restricts CRS-2 to 1 % max; Montana requires 62 % residue on CQS-1h, measured by evaporation, and adds an ash limit. Please state the governing specification when requesting a quotation.

4. Storage and transport

Asphalt emulsions must be stored above 5 °C, to prevent breaking by freezing of the water phase, and below 85 °C, to prevent boiling. During heating the product must be recirculated to avoid local overheating that would cause premature breaking. Bulk storage shall be in clean tanks, preferably vertical, to avoid product contamination and minimise the area in contact with air. The tank must have an agitation and/or recirculation system that guarantees complete homogeneity during storage. Where storage for extended periods is required, the product must be recirculated at least once every five days. Avoid contact with pressurised water, with emulsions of the opposite charge and with cement or lime residues in tanks and equipment.

5. Packaging and logistics

In bulk in tank trucks from 9 to 35 t · 20 t isotanks and flexitanks for export · 200 kg steel drums · 1,000 L IBCs · 1,000 kg lined big bags. HS code: 2715.00 (bituminous mixtures based on petroleum bitumen).

6. Quality control

Every batch shipped is accompanied by a laboratory-issued quality certificate reporting the tests required by the applicable standard, with traceable batch identification. Additional testing or independent third-party inspection (SGS, Bureau Veritas, Intertek, Cotecna) at origin or destination can be arranged at the customer's request.

Consult the product Safety Data Sheet (SDS) before handling.

The information in this data sheet is offered in good faith, based on PRO-ROAD®'s technical knowledge of its products and on the requirements of the standards cited. It does not constitute a sales specification or a warranty of results. The customer is responsible for verifying the suitability of the product for its intended use, for its correct handling and for its application in accordance with project specifications. Values guaranteed per batch are certified in the corresponding quality certificate.

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