

## Description

Bitumen emulsion is a binding material, consisting of water and bitumen. Emulsion is a disperse system, with particles of bitumen dispersed in water. The main task is to keep bitumen micro particles from coalescing, which maintains physicochemical properties of the emulsion and its quality. This stability is achieved with special emulsifiers.

Bitumen emulsions are transportable, easily stored materials. They are kept in the storage warehouses in cylindrical containers at plus temperatures for up to several months, without losing their properties. Bitumen emulsions can be divided into three classes of which the first two, in volume terms, is by far the most important:

- Anionic emulsions;
- Cationic emulsions;
- Nonionic emulsions;

## Characteristics

### Bitumen Anionic Emulsions

|  | Standard   | RS-1             | RS-2             | SS-1             | SS-1H            |
|--|------------|------------------|------------------|------------------|------------------|
|  |            | RANGE<br>Min/Max | RANGE<br>Min/Max | RANGE<br>Min/Max | RANGE<br>Min/Max |
| Viscosity SSF, 25°C(s)                                       | ASTM D244  | 20/100           | 20/100           | 20/100           | 20/100           |
| Viscosity SSF, 50°C(s)                                       | ASTM D244  | -/-              | -/-              | -/-              | -/-              |
| Storage stability, 24h (%)                                   | ASTM D6930 | -/1              | -/1              | -/1              | -/1              |
| Demulsibility, 35ml, 0.8% dioctyl sodium sulfosuccinate, (%) | ASTM D6936 | 60/-             | 60/-             | -/               |                  |
| Cement mixing (%)  |            | -/-              | -/-              | -/2              | -/2              |
| Particle charge test   | ASTM D244  | Minus            | Minus            |                  |                  |
| Sieve (%)  | ASTM D6933 | -/0.1            | -/0.1            | -/0.1            | -/0.1            |
| Residue by distillation (%)                                  | ASTM D244  | 55/-             | 63/-             | 57/-             | 57/-             |
| Residue penetration, 25°C                                    | ASTM D5    | 100/200          | 100/200          | 100/200          | 40/90            |
| Solubility in Trichloroethylene, (%)                         | ASTM D2042 | 97.5/-           | 97.5/-           | 97.5/-           | 97.5/-           |
| Residue ductility, 25°C, 5cm/min (cm)                        | ASTM D113  | 40/-             | 40/-             | 40/-             | 40/-             |

## Bitumen Cationic Emulsions

|  | Standard   | CRS-1            | CRS-2            | CSS-1            | CSS-1H           |
|--|------------|------------------|------------------|------------------|------------------|
|  |            | RANGE<br>Min/Max | RANGE<br>Min/Max | RANGE<br>Min/Max | RANGE<br>Min/Max |
| Viscosity SSF, 25°C(s)                                       | ASTM D244  | 20/100           | 100/400          | 20/100           | 20/100           |
| Storage stability, 24h (%)                                   | ASTM D6930 | -/1              | -/1              | -/1              | -/1              |
| Demulsibility, 35ml, 0.8% dioctyl sodium sulfosuccinate, (%) | ASTM D6936 | 40/-             | 40/-             | -/-              | -/-              |
| Cement mixing test, (%)                                      | ASTM D6935 | -/-              | -/-              | -/2.0            | -/2.0            |
| <b>Coating ability and water resistance</b>                  |            |                  |                  |                  |                  |
| Particle charge test   | ASTM D244  | Positive         | Positive         | Positive         | Positive         |
| Sieve test, (%)  | ASTM D6933 | -/0.1            | -/0.1            | -/0.1            | -/0.1            |
| <b>Distillation Test</b>                                     |            |                  |                  |                  |                  |
| Oil distillate, by volume of emulsion, (%)                   | ASTM D6997 | -/3              | -/3              | -/-              | -/-              |
| Residue, (%)   | ASTM D244  | 60/-             | 65/-             | 57/-             | 57/-             |
| <b>Test on residue from Distillation Test</b>                |            |                  |                  |                  |                  |
| Penetration, 25°C(77°F), 100g, 5s                            | ASTM D5    | 100/250          | 100/250          | 100/250          | 40/90            |
| Ductility, 25°C(77°F), 5cm/min, cm                           | ASTM D113  | 40/-             | 40/-             | 40/-             | 40/-             |
| Solubility in Trichloroethylene, (%)                         | ASTM D2042 | 97.5/-           | 97.5/-           | 97.5/-           | 97.5/-           |

## Bitumen TACK COAT K Cationic Emulsions

**Tack coat K1-40** cationic bitumen emulsion is an emulsified asphalt containing minimum 40% bitumen and 60% water. It is a low viscosity emulsion used mainly for tack coating.

**Tack coat K1-60** cationic bitumen emulsion is an emulsified asphalt containing minimum 57 % bitumen. It is a medium viscosity emulsion used mainly for tack coating in normal overlay and patching work. Tack Coat K1- 60 bitumen emulsion can also be used in grouting.

**Tack coat K1-70** cationic bitumen emulsion containing minimum 67% Bitumen, is commonly used for Tack-Coating. It is a medium viscosity emulsion used mainly for tack coating in normal overlay and patching work. Tack Coat K1- 60 bitumen emulsion can also be used in grouting.

**Application:** Cationic bitumen emulsion can be used at ambient temperature at the spray rate of 0.25 to 0.70 litre per square meter (0.05 to 0.15 gallon per square yard).

|  | Standard      | TACK COAT<br>K1-40 | TACK COAT<br>K1-60 | TACK COAT<br>K1-70                   |                                      |
|--|---------------|--------------------|--------------------|--------------------------------------|--------------------------------------|
|  |               | RANGE<br>Min/Max   | RANGE<br>Min/Max   | RANGE<br>Min/Max                     |                                      |
| Viscosity, 25°C(s)   | ASTM D244     | -/25               | 20/70              | -/-                                  |                                      |
| 1 Day Settlement (% difference)  | ASTM D244     | -/-                | /-1                | -/-                                  |                                      |
| Sieve test, (%)  | ASTM D244     | -/0.1              | -/0.1              | -/-                                  |                                      |
| Particle charge test   | ASTM D244     | Positive           | Positive           | -/-                                  |                                      |
| Residue from Distillation, (%)   | ASTM D244     | 38/-               | 60/-               | -/-                                  |                                      |
| Test on Residue from Distillation<br>Penetration on residue,<br>25°C(77°F), 100g, 5s (0.1mm) | ASTM D5       | 60/200             | 60/200             | -/-                                  |                                      |
| Solubility in Trichloroethylene,<br>(%)  | ASTM D2042    | -/-                | -/-                | -/-                                  |                                      |
| Binder Content   | BS EN 1428    | -/-                | -/-                | 67-71%                               |                                      |
| Efflux Time (4mm at 40°C)  | BS EN 1286    | -/-                | -/-                | 10-45s                               |                                      |
| Breaking Value   | BS EN 13075-1 | -/-                | -/-                | 50-100                               |                                      |
| Adhesivity   | BS EN 13614   | -/-                | -/-                | >75%                                 |                                      |
| <i>Typical Binder Rheology to PR EN 14770(SHW Clause 928)</i>                                |               |                    |                    | <i>After recovery to BS EN 13074</i> | <i>After recovery to BS EN 14769</i> |

EMULSION

|  |            |     |     |                                      |                                      |
|--|------------|-----|-----|--------------------------------------|--------------------------------------|
| Penetration, 25°C, 100g, 5s                                    | BS EN 1426 | -/- | -/- | 210dmm                               | 60dmm                                |
| Penetration, 5°C, 200g, 60s                                    | BS EN 1426 | -/- | -/- | 130dmm                               | 50dmm                                |
| Softening Point  | BS EN 1426 | -/- | -/- | 36°C                                 | 49°C                                 |
| High Equi-stiffness Temperature                                | T2kpa      | -/- | -/- | 47°C                                 | 58°C                                 |
| Low Equi-stiffness Temperature                                 | T2kpa      | -/- | -/- | -5°C                                 | 7°C                                  |
| Complex stiffness Modulus at 5°C                               | G*(5°C)    | -/- | -/- | 6.73x10 <sup>5</sup> Pa              | 2.58x10 <sup>6</sup> Pa              |
| Complex stiffness Modulus at 25°C                              | G*(pen)    | -/- | -/- | 5.00x10 <sup>4</sup> Pa              | 2.61x10 <sup>6</sup> Pa              |
| Complex stiffness Modulus at 60°C                              | G*(60°C)   | -/- | -/- | 3.53x10 <sup>2</sup> Pa              | 1.67x10 <sup>3</sup> Pa              |
| Phase Angle at 5°C   | δ(low)     | -/- | -/- | 71.0°                                | 57.5°                                |
| Phase Angle at 60°C  | δ (high)   | -/- | -/- | 88.7°                                | 84.3°                                |
| <b>Typical Binder Cohesion to BS EN 13588 (SHW Clause 939)</b> |            |     |     | <b>After recovery to BS EN 13074</b> | <b>After recovery to BS EN 14769</b> |
| Maximum Cohesion   | Cm         | -/- | -/- | 0.70 Jcm <sup>2</sup>                | 0.80 Jcm <sup>2</sup>                |
| Temperature of Maximum Cohesion                                | Cm         | -/- | -/- | 35°                                  | 45°                                  |
| Temperature Range for  | Tm         | -/- | -/- | 15°                                  | 15°                                  |
| Cohesion Value >0.5 Jcm <sup>2</sup>                           | -          | -/- | -/- | 15°                                  | 15°                                  |

EMULSION