

# **COMMITTEE ON ROAD MATERIALS'**

## **RECOMMENDED GUIDELINES**

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**ABSTRACT**

This paper contains the background for the text of the recommended guidelines of the Committee on Road Materials for Anionic Emulsified Asphalts (1995), Cationic Emulsified Asphalts (1995) and Non-ionic, Inverted Asphalt Primer (1995). Listings of all current Committee members, guidelines and working groups are also included in the appendices.

**RÉSUMÉ**

Ce rapport décrit le contexte de rédaction des recommandations du comité des matériaux routiers sur “Les émulsions de bitume cationiques (1995)”, “Les émulsions de bitume cationiques (1995)” et “Le bitume d’amorçage inversé, non ionique (1995)”. Une liste de tous les membres actuels du comité, des recommandations et des groupes de travail est également fournie dans les appendices.

## BACKGROUND

For many years, the Canadian General Standards Board (CGSB) has published specifications for asphaltic materials used in road construction and maintenance in Canada. The technical requirements for these documents were developed by a group of industry volunteers, the Committee on Road Materials.

Since 1992, due to budget restrictions, the CGSB has been unable to provide the necessary approval and publication services. This effectively stalled the activities of the Committee on Road Materials.

In 1994, the Committee on Road Materials decided to continue their work independent of the CGSB and develop industry specifications. These would act as recommended guidelines in lieu of CGSB Standards.

Rather than produce stand alone documents, it was suggested that the Committee on Road Materials publish the recommended guidelines as papers in the Canadian Technical Asphalt Association Proceedings. The following paper contains the guidelines that have recently met with Committee approval. Listings of all current Committee members, specifications and working groups are also included in the appendices.

## DISCLAIMER

*These guidelines have been developed by a committee whose membership represents users and producers of the materials discussed herein as well as general interest individuals. Reasonable care has been taken in developing the guidelines. Final responsibility for the acceptability of these guidelines as a specification or for the acceptability of the product to perform its intended purpose remains with the person using it.*

**COMMITTEE ON ROAD MATERIALS' RECOMMENDED GUIDELINE (RG-2) FOR  
ANIONIC EMULSIFIED ASPHALTS (1995)**

**1. SCOPE**

- 1.1 This guideline applies to liquid asphalt materials in the form of aqueous emulsions of the anionic type suitable for road construction and similar purposes and consisting essentially of paving asphalts dispersed in water.
- 1.2 The testing and evaluation of a product against this guideline may require the use of materials and/or equipment that could be hazardous. This document does not purport to address all the safety aspects associated with its use. Anyone using this guideline has the responsibility to consult the appropriate authorities and to establish appropriate health and safety practices in conjunction with any existing applicable regulatory requirements prior to its use.

**2. APPLICABLE PUBLICATIONS**

- 2.1 The following publications are applicable to this guideline:

- 2.1.1 Canadian General Standards Board (CGSB)

CAN/CGSB-8.2-M - Sieves, Testing, Woven Wire, Metric.

- 2.1.2 American Society for Testing and Materials (ASTM)

D 5 Test Method for Penetration of Bituminous Materials

D 113 Test Method for Ductility of Bituminous Materials

D 140 Method for Sampling Bituminous Materials

D 244 Methods of Testing Emulsified Asphalts

D 977 Specification for Emulsified Asphalts

D 2042 Test Method for Solubility of Asphalt Materials in Trichloroethylene

D 2171 Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer

- 2.2 Reference to the above publications are to the latest issues, unless otherwise specified by the authority applying this guideline. The sources for these publications are shown in the Notes section.

### 3. CLASSIFICATION

3.1 Anionic emulsified asphalts shall be supplied in the following types and grades indicated in Table 1, as specified (par. 7.1):

#### 3.1.1 Types

Rapid Setting:	Grades RS-1, RS-2
Medium Setting:	Grades MS-1, MS-2, MS-2h
Slow Setting:	Grades SS-1, SS-1h

### 4. GENERAL REQUIREMENTS

4.1 Anionic emulsified asphalt shall show no separation of asphalt within 14 d after delivery and shall be homogeneous after thorough mixing.

### 5. DETAILED REQUIREMENTS

5.1 The emulsified asphalt shall comply with the requirements given in Table 1, when a sample from which any skin has been removed is tested according to the designated methods.

5.2 **Marking** -- In addition to the requirements of any relevant Acts or Regulations, each drum of the emulsified asphalt shall be suitably labelled or stencilled to show the following information:

Name of Material  
 Type and Grade  
 Specification Reference  
 Manufacturer's Identification  
 Handling Information: KEEP FROM FREEZING  
 Drum Filling Date (Note 1)

Note 1: The drum filling date shall be included only when specifically requested (par. 7.1). This additional information should not be requested unless there is a definite need for it because its application could add to marking costs.

### 6. INSPECTION

#### 6.1 **Sampling**

6.1.1 The purchaser or designated agent shall take representative samples of not less than 4 L, according to ASTM D 140 and pay attention to the following points:

- a. Containers for emulsified asphalts shall be new wide-mouth glass jars or plastic jars or plastic-lined triple seal friction-top cans.
  - b. The containers shall be filled to within 5 to 10 mm of the top and sealed immediately after sampling.
  - c. The emulsified asphalts shall be sampled immediately upon delivery to the project site or FOB point.
  - d. Samples shall be transported to the laboratory in such a way as to minimize agitation and shall be tested for viscosity as soon as possible after sampling. Samples shall normally be tested for viscosity within 7 d. All testing shall be completed within 14 d after delivery.
- 6.1.2 The samples shall be stored in clean, airtight, sealed containers as specified in ASTM D 140, at a temperature of not less than 5°C until tested.

## 6.2 Testing

- 6.2.1 **Particle Charge Test (Quantitative)** -- Test the rapid-setting grades only for particle charge according to the procedure described in ASTM D 244, with the modification that the asphalt deposit will, for anionic emulsions, be found on the anode (positive electrode) and shall be continuous and opaque. In the event of dispute, repeat the test using freshly distilled water as the wash water for the electrodes, before evaluating the asphalt deposit.
- 6.2.2 **Oil Portion of Distillate** -- The oil portion of the distillate shall be calculated as a percentage of the emulsion:
- $$\% \text{ Oil} = \frac{\text{Total volume of oil distillate, mL}}{200 \text{ g emulsion}} \times 100$$
- Report this value as the " Oil Portion of Distillate, vol/mass, %".
- 6.2.3 **Ductility** -- Determine ductility at 25°C for 100 to 200 penetration residual asphalts and at 15°C for 200 to 300 penetration.
- 6.2.4 **Sieve Test** -- Follow ASTM D 244 except a #1000 (1000 µm) sieve screen shall be used.
- 6.2.5 **Apparent Viscosity** -- Follow ASTM D 2171 with the following mandatory guidelines:
- a. Use the Cannon-Manning viscometer only.
  - b. Select the largest size tube possible, while retaining a minimum flow time of 60 s.
  - c. Prepare the sample as outlined in Appendix A of this guideline.

## 7. NOTES

7.1 Options -- The following options must be specified in the application of this guideline:

- a. Type and grade of emulsified asphalt (par. 3.1 and Table 1).
- b. If drum filling date is required in marking (par. 5.2).

7.2 The detailed requirements for the grades of anionic emulsified asphalts in this guideline are similar although not identical to the grades in ASTM D 977. Canadian conditions require differences in the two documents, particularly the viscosity limits.

### 7.3 General Information on Anionic Emulsified Asphalts

7.3.1 The designations of rapid-setting, medium-setting and slow-setting anionic emulsified asphalts not only give an indication of the time of set but also an indication of the working limitations of each, i.e., weather conditions, character of aggregate, construction methods, etc. The rapid-setting and medium-setting emulsified asphalts are divided into two grades on the basis of viscosity. Grade 1 is more fluid and may be handled at atmospheric temperatures without heating. Grade 2 is high in viscosity and may require warming to 45 to 65°C for handling and application.

7.3.2 It should be noted that the rapid-setting (RS) grades of anionic emulsified asphalts cannot be diluted with water. Anionic emulsified asphalts cannot be mixed with cationic emulsified asphalts without breakdown of the products. Equipment in which a change is being made from cationic to anionic type emulsions, and vice versa, should be carefully cleaned in accordance with procedures recommended by the manufacturer of the emulsified asphalt.

7.3.3 Anionic emulsified asphalts described in this guideline are alkaline and are not flammable.

7.3.4 All emulsified asphalts may be damaged by freezing and should be protected from frost.

7.3.5 The main application of these emulsified asphalts according to grade are published in standard CAN/CGSB- 16.6-M, Principal Uses and Terminology for Asphalt Materials for Road Purposes.

### 7.4 Sources of Referenced Publications

7.4.1 The publications referred to in par. 2.1.1 may be obtained from the Canadian General Standards Board, Sales Unit, Ottawa, Ontario, Canada K1A 1G6. Telephone (819) 956-0426, Telefax (819) 956-5644.

7.4.2 The publications referred to in par. 2.1.2 may be obtained from ASTM, 1916 Race Street, Philadelphia, PA 19103, USA or from the Standards Council of Canada, Standards Sales Branch, 350 Sparks Street, Suite 1200, Ottawa, Ontario K1P 6N7.

Table RG-2-1: Committee on Road Materials' Recommended Guideline (RG-2) for Anionic Emulsified Asphalts (1995)

Type Grade	Rapid-Setting (RS)		Medium-Setting (MS)			Slow-Setting (SS)		Test Method							
	RS-1	RS-2	MS-1	MS-2	MS-2H	SS-1	SS-1H								
Tests on Emulsion	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Test Method						
Viscosity (SF) at 25°C,s	20	100	---	---	20	100	---	---	20	60	20	60	ASTM D 244		
Viscosity (SF) at 50°C,s *	---	---	50	300	---	---	50	---	---	---	---	---			
Residue by Distillation, % by mass	55	**	60	**	55	**	65	**	65	**	55	**	55	**	ASTM D 244
Storage Stability, 24 h, % by mass, ***	---	1.5	---	1.5	---	1.5	---	1.5	---	1.5	---	1.5	---	1.5	ASTM D 244
Oil Portion of Distillate, vol/mass %	---	---	---	---	---	---	10	---	10	---	---	---	---	---	Par. 6.2.4 & ASTM D 244
Sieve Test, % Retained on a No. 1000 Sieve, % by mass ***	---	0.1	---	0.1	---	0.1	---	0.1	---	0.1	---	0.1	---	0.1	Par. 6.2.1
Demulsibility, 35 mL 1.11 g/L CaCl <sub>2</sub> , % by mass	60	---	60	---	---	---	---	---	---	---	---	---	---	---	Par. 6.2.5
Coating Test	---	---	---	---	****	---	---	---	---	---	---	---	---	---	ASTM D 244
Cement Mixing Test, % by mass	---	---	---	---	---	---	---	---	---	2.0	---	2.0	---	2.0	ASTM D 244
Particle Charge	Negative	---	Negative	---	---	---	---	---	---	---	---	---	---	---	Par. 6.2.3
<b>Tests on Residue</b>															
Penetration at 25°C (100 g, 5 s), dmm	100	200	100	200	100	200	100	250	40	125	100	200	40	125	ASTM D 5
Ductility at 25°C and 5 cm/min, cm	60	---	60	---	60	---	60	---	60	---	60	---	60	---	Par. 6.2.2 & ASTM D 113
Solubility in Trichloroethylene, % by mass	97.5	---	97.5	---	97.5	---	97.5	---	97.5	---	97.5	---	97.5	---	ASTM D 2042
Apparent Viscosity at 60°C, Pa.s	Requirements outlined on Figure 1		---	---	---	---	---	---	---	---	---	---	---	---	Par. 6.2.6

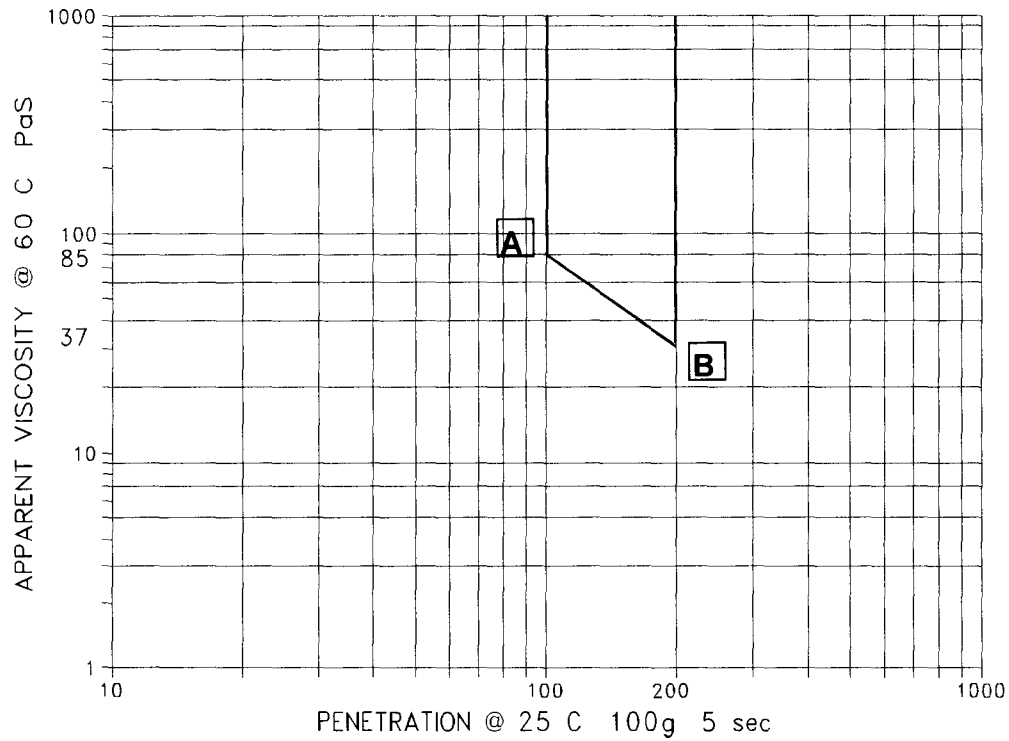
\* Emulsion sample should be heated in its original container 50±3°C in a water bath or oven prior to any mixing.

\*\* Upper limit on percent residue is governed by the viscosity limits.

\*\*\* These test requirements on representative samples are waived if successful application of the material has been achieved in the field.

\*\*\*\* Follow ASTM D 244, Section 48 and 49. The mixture of limestone and emulsified asphalt shall be capable of being mixed vigorously for 3 min, at the end of which period the stone shall be thoroughly and uniformly coated. The mixture shall then be completely immersed in tap water and the water poured off. The stone shall then not be less than 90% coated.



APPARENT VISCOSITY of EMULSION RESIDUE  
RS-1 and RS-2

**Note:** Minimum viscosity at 60°C obtained from Cannon-Manning tube shall be on or above the A,B line corresponding to its penetration value.

**Figure RG-2-1: Minimum Apparent Viscosity Requirements for Grades RS-1 and RS-2**

**APPENDIX A****SAMPLE PREPARATIONS FOR MEASUREMENT OF APPARENT VISCOSITY**

**Note:** Because of the nature of some asphalts and asphalt emulsion residues, their thermal history prior to testing may cause variations in test results, and careful sample preparation is most important for consistent test results.

- A.1.1. Immediately after completion of the distillation test, a suitable portion of the total residue should be poured into a 50 mL beaker and allowed to cool to  $180\pm 5^{\circ}\text{C}$ . This portion should then be stirred at 1 r/s for 10 s. The proper amount is then poured into the viscometer tube as in A.1.2.
- A.1.2. **Filling the Sample Tube** - The Cannon-Manning tube is preheated at  $195^{\circ}\text{C}$  in the oven for 5 min to assist in eliminating air bubbles when the sample is poured. The sample in the 50 mL beaker at  $180\pm 5^{\circ}\text{C}$  is then poured into the sample tube up to the fill mark without entrapping air. The Cannon-Manning Viscometer is returned to the  $195^{\circ}\text{C}$  oven for 10 min, then placed in the bath at  $60^{\circ}\text{C}$ , where it is held for 30 min. before testing.

**COMMITTEE OF ROAD MATERIALS' RECOMMENDED GUIDELINE (RG-4) FOR  
CATIONIC EMULSIFIED ASPHALTS (1995)**

**1. SCOPE**

- 1.1 This guideline applies to liquid asphalt materials in the form of aqueous emulsions of the cationic type, suitable for road construction and similar purposes and consisting essentially of paving asphalts dispersed in water.
- 1.2 The testing and evaluation of a product against this guideline may require the use of materials and/or equipment that could be hazardous. This document does not purport to address all the safety aspects associated with its use. Anyone using this guideline has the responsibility to consult the appropriate authorities and to establish appropriate health and safety practices in conjunction with any existing applicable regulatory requirements prior to its use.

**2. APPLICABLE PUBLICATIONS**

- 2.1 The following publications are applicable to this guideline:

2.1.1 Canadian General Standards Board (CGSB)

CAN/CGSB-8.2-M -- Sieves, Testing, Woven Wire, Metric.

2.1.2 American Society for Testing and Materials (ASTM)

D 5        Test Method for Penetration of Bituminous Materials  
D 113     Test Method for Ductility of Bituminous Materials  
D 140     Method for Sampling of Bituminous Materials  
D 244     Methods of Testing Emulsified Asphalts  
D 2042    Test Method for Solubility of Asphalt Materials in Trichloroethylene  
D 2171    Test Method for Viscosity of Asphalt by Vacuum Capillary Viscometer  
D 2397    Specification for Cationic Emulsified Asphalt.

- 2.2 Reference to the above publications are to the latest issues, unless otherwise specified by the authority applying this standard. The sources for these publications are shown in Notes section.

**3. CLASSIFICATION**

- 3.1 Cationic emulsified asphalts shall be supplied in the following five grades specified in Table 1, as specified (par. 7.1):

3.1.1 Grades

Grade CRS-1	Grade CRS-2
Grade CQS-1h	Grade CMS-2
Grade CMS-2h	

4. **GENERAL REQUIREMENTS**

- 4.1 Cationic emulsified asphalt shall show no separation of asphalt within 14 d after delivery and shall be homogeneous after thorough mixing.

5. **DETAILED REQUIREMENTS**

- 5.1 The emulsified asphalt shall comply with the requirements given in Table 1, when a sample from which any skin has been removed is tested according to the designated methods.

- 5.2 **Marking** -- In addition to the requirements of any relevant Acts or Regulations, each drum of the emulsified asphalt shall be suitably labelled or stencilled to show the following information:

Name of Material  
 Type and Grade  
 Specification Reference  
 Manufacturer's Identification  
 Handling Information: KEEP FROM FREEZING  
 Drum Filling Date (Note 1).

Note 1: The drum filling date shall be included only when specifically requested (par. 7.1). This additional information should not be requested unless there is a definite need for it, because its application could add to marking costs.

6. **INSPECTION**6.1 **Sampling**

- 6.1.1 The purchaser or designated agent shall take representative samples of not less than 4 L, according to ASTM D 140 and pay attention to the following points:

- Containers for emulsified asphalts shall be new wide-mouth glass or plastic jars or plastic-lined triple seal friction-top cans.
- The containers shall be filled to within 5 to 10 mm of the top and sealed immediately after sampling.

- c. The emulsified asphalts shall be sampled at the point of manufacture or storage or immediately upon delivery.
- d. Samples shall be transported to the laboratory in such a way as to minimize agitation. Samples should normally be tested for viscosity within 7 d. All testing shall be completed within 14 d after delivery.

6.1.2 The samples shall be stored in clean, airtight, sealed containers as specified in ASTM D 140, at a temperature of not less than 5°C until tested.

## 6.2 Testing

6.2.1 Sieve Test -- Follow ASTM D 244 except use a No. 1000 (1000 µm) sieve screen and replace sodium oleate solution (2%) with distilled water. Use distilled water in all operations, including wetting and subsequent washings of wire cloth.

6.2.2 Ductility -- Determine ductility at 25°C for 100 and 200 penetration residual asphalts, and at 15°C for 200 to 250 penetration.

6.2.3 Particle Charge Test (Qualitative) -- Test the particle charge according to the procedure described in ASTM D 244, with the modification that the asphalt deposit will, for cationic emulsions, be found on the cathode (negative electrode), and shall be continuous and opaque. In the event of dispute, repeat the test using freshly distilled water as the wash water for the electrodes, before evaluating the asphalt deposit.

6.2.4 Oil Portion of Distillate -- Calculate the oil portion of the distillate as a percentage of the emulsion:

$$\% \text{ Oil} = \frac{\text{Total volume of oil distillate, mL}}{200 \text{ g emulsion}} \times 100$$

Report this value as the "Oil Portion of Distillate, vol/mass, %".

6.2.5 Demulsibility -- Follow ASTM D 244 except dissolve 5.00 g of dioctyl sodium sulfosuccinate in 995 g of water to 0.5% solution.

6.2.6 Apparent Viscosity -- Follow ASTM D 2171 with the following mandatory guidelines:

- a. Use a Cannon-Manning viscometer only.
- b. Select the largest size tube possible, while retaining a minimum flow time of 60s through the smaller bulb.
- c. Prepare the sample as outlined in Appendix A of this guideline.

## 7. NOTES

7.1 Options -- The following options must be specified in the application of this standard:

- a. Grade of cationic emulsified asphalt (par. 3.1 and Table 1)
- b. If drum filling date is required in marking (par. 5.2).

7.2 The detailed requirements for the grades of cationic emulsified asphalts in this standard are similar although not identical to the grade in ASTM D 2397. Canadian conditions require differences in the two documents, particularly the viscosity limits and the minimum penetration value of the residue after distillation.

### 7.3 **General Information on Cationic Emulsified Asphalts**

7.3.1 The rapid-setting type of cationic emulsified asphalt is divided into two grades on the basis of difference in viscosity. The CRS-1 is more fluid and will require temperatures of 60 to 75°C for loading and spraying. The CRS-2 grade is high in viscosity and may require temperature of 60 to 80°C for loading and spraying.

7.3.2 Rapid-setting cationic emulsified asphalt should not be diluted with water. Cationic emulsified asphalts cannot be mixed with anionic emulsified asphalts without breakdown of the products. Equipment in which a change is being made from anionic to cationic type emulsions, and vice versa, should be carefully cleaned in accordance with procedures recommended by the manufacturer of the emulsified asphalt.

7.3.3 Rapid-setting cationic emulsified asphalts described in this standard are acidic and not flammable.

7.3.4 All emulsified asphalts may be damaged by freezing and should be protected from frost.

7.3.5 The main applications of these emulsified asphalts according to grade are published in standard CAN/CGSB-16.6-M, Principal Uses and Terminology for Asphalt Materials for Road Purposes.

### 7.4 **Sources of Referenced Publications**

7.4.1 The publication referred to in par. 7.3.5 may be obtained from the Canadian General Standards Board, Sales Unit, Ottawa, Canada K1A 1C6. Telephone (819) 956-0425 or 956-0426. Telefax (819) 956-5644.

7.4.2 The publications referred to in par. 2.1.2 and 7.2 may be obtained from ASTM, 1916 Race Street, Philadelphia, PA 19103, U.S.A. or from the Standards Council of Canada, Standards Sales Branch, 350 Sparks Street, Suite 1200, Ottawa, Ontario K1P 6N7.

Table RG-4-1: Committee on Road Materials' Recommended Guideline (RG-4) for Cationic Emulsified Asphalts (1995)

<u>Grade</u>	<u>CRS-1</u>		<u>CRS-2</u>		<u>CMS-2</u>		<u>CMS-2H</u>		<u>CQS-1H</u>		<u>Test Method</u>
	<u>Min.</u>	<u>Max.</u>	<u>Min.</u>	<u>Max.</u>	<u>Min.</u>	<u>Max.</u>	<u>Min.</u>	<u>Max.</u>	<u>Min.</u>	<u>Max.</u>	
<u>Tests on Emulsion</u>											
Viscosity (SF) at 25°C,s	---	---	---	---	---	---	---	---	15	100	
Viscosity (SF) at 50°C,s *	35	150	150	400	50	400	50	400	---	---	ASTM D 244
Residue by Distillation, % by mass	62	**	65	**	65	**	65	**	60	**	ASTM D 244
Storage Stability. 24 h, % by mass, ***	---	1.5	---	1.5	---	1.5	---	1.5	---	1.5	ASTM D 244
Oil Portion of Distillate, vol/mass %	---	3	---	3	---	10	---	10	---	---	Par. 6.2.4 & ASTM D 244
Sieve Test, % Retained on a No. 1000 Sieve, % by mass ****	---	0.10	---	0.10	---	0.10	---	0.10	---	0.10	Par. 6.2.1
Demulsibility, 35 mL 0.5% Dioctyl Sodium Sulfosuccinate Solution, % by mass	60	---	60	---	---	---	---	---	---	---	Par. 6.2.5
Particle Charge					Positive						Par. 6.2.3
<u>Tests on Residue</u>											
Penetration at 25°C (100 g, 5 s), dmm	100	250	100	250	100	250	40	125	40	125	ASTM D 5
Ductility at 25°C and 5 cm/min, cm	60	---	60	---	60	---	40	---	40	---	Par. 6.2.2 & ASTM D 113
Solubility in Trichloroethylene, % by mass	97.5	---	97.5	---	97.5	---	97.5	---	97.5	---	ASTM D 2042
Apparent Viscosity at 60°C, Pa.s	Requirements outlined on Figure 1				---	---	---	---	---	---	Par. 6.2.6

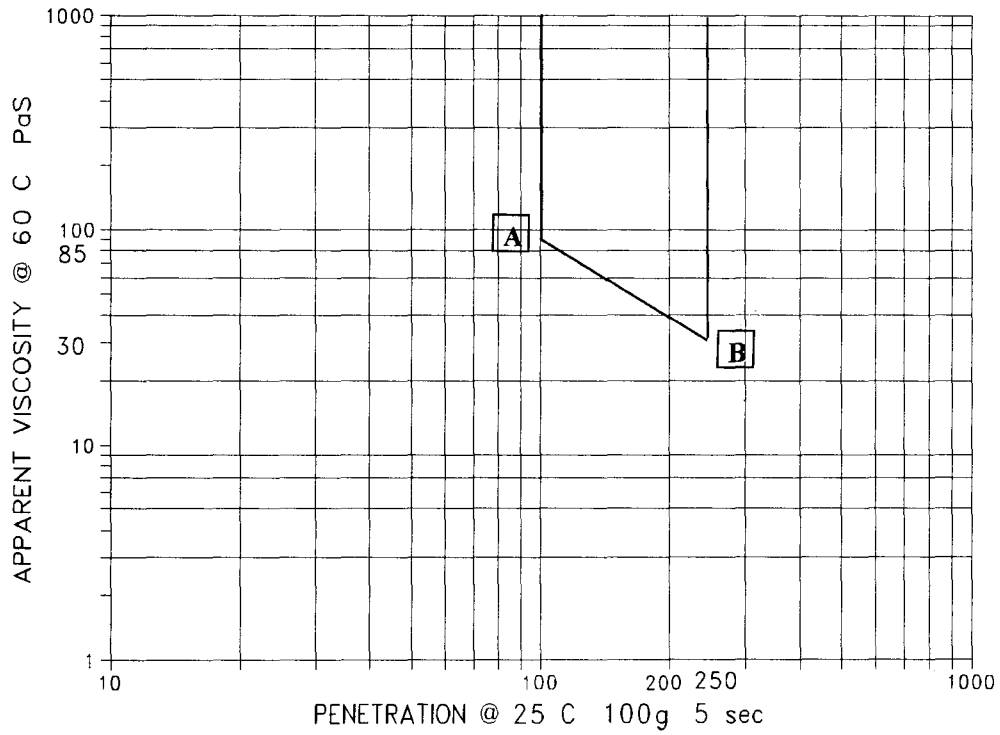
\* Emulsion sample should be heated in its original container to 50±3°C in a water bath or oven prior to any mixing.

\*\* Upper limit on percent residue is governed by the viscosity limits.

\*\*\* These test requirements on representative samples are waived if successful application of the material has been achieved in the field.

\*\*\*\* CAN/CGSB-8.2-M, Sieves, Testing, Woven Wire, Metric.

APPARENT VISCOSITY of EMULSION RESIDUE  
CRS-1 and CRS-2



**Note:** Minimum viscosity at 60°C obtained from Cannon-Manning tube shall be on or above the A,B line corresponding to its penetration value.

**Figure RG-4-1: Minimum Apparent Viscosity Requirement for Grades CRS-1 and CRS-2**



**APPENDIX A****SAMPLE PREPARATIONS FOR MEASUREMENT OF APPARENT VISCOSITY**

- Note - Because of the nature of some asphalt emulsion residues, their thermal history prior to testing may cause variations in test results. Careful sample preparation is most important for consistent test results.
- A.1.1. Immediately after completion of the distillation test, a suitable portion of the total residue should be poured into a 50 mL beaker and allowed to cool to  $180\pm 5^{\circ}\text{C}$ . This portion of the sample should then be stirred at 1 r/s for 10 s. The proper amount is then poured into the viscometer tube as in A.1.2.
- A.1.2. Filling the Sample Tube - The Cannon-Manning tube is preheated at  $195^{\circ}\text{C}$  in the oven for 5 min. to assist in eliminating air bubbles when the sample is poured. The sample in the 50 mL beaker at  $180\pm 5^{\circ}\text{C}$  is then poured into the sample tube up to the fill mark without entrapping air. The Cannon-Manning Viscometer is returned to the  $195^{\circ}\text{C}$  oven for 10 min., then placed in the bath at  $60^{\circ}\text{C}$  where it is held for 30 min. before testing.

**COMMITTEE ON ROAD MATERIALS' RECOMMENDED GUIDELINE (RG-7) FOR  
NON-IONIC, INVERTED EMULSIFIED ASPHALT PRIMER (1995)**

**1. SCOPE**

- 1.1 This standard applies to liquid asphalt material in the form of a non-ionic water-in-oil emulsion (primer) suitable for road construction. The oil portion shall be comprised essentially of paving asphalt and a petroleum solvent.
- 1.2 The testing and evaluation of a product against this standard may require the use of materials and/or equipment that could be hazardous. This document does not purport to address all the safety aspects associated with its use. Anyone using this standard has the responsibility of consulting the appropriate authorities and to establish appropriate health and safety practices in conjunction with any existing applicable regulatory requirements prior to its use.

**2. APPLICABLE PUBLICATIONS**

- 2.1 The following publications are applicable to this standard:

2.1.1 American Society for Testing and Materials (ASTM)

- D 113 Test Method for Ductility of Bituminous Materials  
D 140 Practice for Sampling Bituminous Materials  
D 244 Test Methods for Emulsified Asphalts  
D 1310 Test Method for Flash Point and Fire Point of Liquids  
by Tag Open-Cup Apparatus  
D 2042 Test Method for Solubility of Asphalt Materials in Trichloroethylene.

- 2.2 Reference to the above publications are to the latest issues, unless otherwise specified by the authority applying this standard. The sources for these publications are shown in the Notes section.

**3. CLASSIFICATION**

- 3.1 Non-ionic, inverted emulsified asphalt primer shall be designated IEP-1, as specified (par. 7.1).

**4. GENERAL REQUIREMENTS**

- 4.1 Storage stability -- shipments of primer shall show no separation of water within 14 d after delivery and shall be homogeneous after thorough mixing.

**5. DETAILED REQUIREMENTS**

5.1 The primer shall comply with the requirements given in Table 1, when a sample is tested according to the designated methods.

5.2 **Marking** -- In addition to the requirements of any relevant Acts or Regulations, each drum of the primer shall be suitably labelled or stencilled to show the following information:

Name of Material

Grade

Specification Reference

Manufacturer's Identification

Handling Information: **KEEP FROM FREEZING**

**KEEP AWAY FROM HIGH HEAT AND OPEN FLAME**

Drum Filling Date (Note 1)

NOTE 1: The drum filling date shall be included only when specifically requested (par. 7.1). This additional information should not be requested unless there is a definite need for it because its application could add to marking costs.

**6. INSPECTION****6.1 Sampling**

6.1.1 The purchaser or designated agent shall take representative samples of not less than 4 L, according to ASTM D 140 and pay attention to the following points:

- a. Containers for primer shall be wide-mouth glass or plastic jars or plastic-lined triple seal friction-top cans.
- b. The containers shall be filled to within 5 to 10 mm of the top and sealed immediately after sampling.
- c. The primer shall be sampled immediately upon delivery to the project site or FOB point.
- d. Samples shall be transported to the laboratory in such a way as to minimize agitation and they shall be tested for viscosity as soon as possible after sampling. Samples shall normally be tested for viscosity within 7 d, and all testing shall be completed within 14 d after delivery.

6.1.2 The samples shall be stored in clean, airtight, sealed containers as specified in ASTM D 140, at a temperature of not less than 5°C until tested.

## 6.2 Testing

- 6.2.1 Oil Portion of Distillate -- Since the total distillate will exceed 100 mL, follow ASTM D 244 with the following modification:

Prior to reaching 100 mL of distillate, carefully replace the first 100 mL graduated cylinder with a second one. After the distillation is complete, determine the volume of oil distillate in both cylinders and record the sum. Calculate the oil portion of the distillate as a percentage of the primer:

$$\% \text{ Oil} = \frac{\text{Total volume of oil distillate, mL}}{200 \text{ g primer}} \times 100$$

Report this value as the "Oil Portion of Distillate, vol/mass %".

- 6.2.2 Storage Stability, 24 h -- Follow ASTM D 244 except fill only one 500 mL graduated cylinder. After 24 h examine the cylinder and report if any separation is visible.
- 6.2.3 Miscibility with Water -- Follow ASTM D 244 except that the water shall be placed in a 250 mL glass beaker first. The primer shall then be added with constant stirring. At the end of the 2 h period the water shall be clear.
- 6.2.4 Particle Charge Test (Qualitative) -- Follow ASTM D 244 with the modification that the asphalt will not deposit on either the anode (positive electrode) or the cathode (Negative electrode). Equal adherence to both electrodes due to the viscous nature of material will not be considered deposition.

## 7. NOTES

- 7.1 **Options** -- The following option must be specified in the application of this standard:
- a. If the drum filling date is required in marking (par.5.2).
- 7.2 **General Information on Non-ionic, Inverted Emulsified Asphalt Primer.**
- 7.2.1 It should be noted that the primer cannot be diluted with water or mixed with anionic or cationic emulsified asphalts. Equipment in which a change is being made from cationic or anionic to this primer, and vice versa, should be carefully cleaned in accordance with procedures recommended by the manufacturer of the primer.
- 7.2.2 The primer described in this standard is considered a combustible liquid.
- 7.2.3 The primer described in this standard may be damaged by freezing and should be protected from frost.
- 7.2.4 The main applications of this primer are published in standard CAN/CGSB-16.6-M, Principal Uses and Terminology for Asphalt Materials for Road Purposes.

**7.3 Sources of Referenced Publications**

7.3.1 The publications referred to in par. 2.1.1 may be obtained from ASTM, 1916 Race Street, Philadelphia PA 19103, U.S.A. or from the Standards Council of Canada, Standards Sales Branch, 350 Sparks Street, Suite 1200, Ottawa, Ontario K1P 6N7.

7.3.2 The publication referred to in par. 7.2.4 may be obtained from the Canadian General Standards Board, Sales Unit, Ottawa, Canada K1A 1G6. Telephone (819) 956-0425 or 956-0426. Telefax (819) 956-5644.

Table RG-7-1:

**Committee on Road Materials' Recommended Guideline (RG-7) for  
Non-Ionic, Inverted Emulsified Asphalt Primer, IEP-1 (1995)**

<u>Tests on Emulsion</u>	<u>Min.</u>	<u>Max.</u>	<u>Test Method</u>
Viscosity (SF) at 50°C,s	35	150	ASTM D 244
Flash Point (Tag Open-Cup),°C	45	---	ASTM D 1310
Residue by Distillation, % by mass	40	*	ASTM D 244
Oil Portion of Distillate, vol/mass %	10	30	Par. 6.2.1
Storage Stability (24 h)	No visible separation		Par. 6.2.2
Miscibility with Water	Not miscible		Par. 6.2.3
Particle Charge	Neutral		Par. 6.2.4
<u>Test on Residue</u>			
Penetration at 25°C (100 g, 5 s), dmm	100	300	ASTM D 244
Ductility at 25°C and 5 cm/min, cm **	100	---	ASTM D 113
Solubility in Trichloroethylene, % by mass	97.5	---	ASTM D 2042

\* Upper limit on Percent Residue is governed by viscosity limits.

\*\* If the ductility at 25°C is less than 100 cm, the material will be acceptable if its ductility at 15°C is more than 100 cm.

### Appendix A

#### COMMITTEE ON ROAD MATERIALS

#### MEMBERSHIP

(Effective May 5, 1995)

##### Voting Members:

P	Borenstein, L.	Bakor Inc.
U	Campbell, N.	Newfoundland Works, Services, & Transportation
P	Davidson, J. K.	McAsphalt Industries Limited
P	Deme, I. J.	Shell Canada Products Company
P	Faber, A. J.	Husky Oil Operations Limited
G	Ferguson, J.	Consultant, Bituminous Technology
G	Gervais, F.	Consultant, UMA Engineering
U	Kavanagh, L.	Manitoba Highways & Transportation
U	Lee, G.	Nova Scotia Department of Transportation
U	MacLeod, D. R.	Public Works & Government Services Canada
U	MacLeod, D.	Saskatchewan Highways & Transportation
P	MacNeil, A.	Ashwarren International Inc.
U	Mazuch, L.	B.C. Ministry of Transportation & Highways
U	McMillan, C.	Alberta Transportation & Utilities
P	Mennie, R.	Norjohn Limited
P	Miller, L. J.	Petro-Canada Products Inc.
P	Moran, L.	Imperial Oil Limited
U	Moreux, J.-C.	Ministère des Transports du Québec
P	Morien, B. (Acting Chair)	Pounder Emulsions
U	Nicholson, P.	New Brunswick Department of Transportation
G	Sergi, H. A.	Henri A. Sergi and Associates
P	Sutandar, T.	Koch Materials Company
U	Tam, K.	Ontario Ministry of Transportation

##### Information Members:

G	Diamond, B.	Sun Paving Ltd.
P	Donachey, G. J.	Petro-Canada Products Inc.
G	Hozayen, H.	National Research Council of Canada
P	Juergens, C.	Husky Oil Operations Limited
G	Kerr, J. W. G.	Consultant, C.N. Ryzuk & Associates Ltd.
P	Lenters, J. R.	Shell Research Centre
G	Scott, J. L. M.	Consulting Engineer

G = General Interest    P = Producer    U = User

**Appendix B**

**COMMITTEE ON ROAD MATERIALS**

**RECOMMENDED GUIDELINES**

- RG-1 Cutback Asphalts
- RG-2 Anionic Emulsified Asphalts
- RG-3 Asphalt Cements
- RG-4 Cationic Emulsified Asphalts
- RG-5 High Float Emulsified Asphalts
- RG-6 Asphalt Materials - Principle Uses and Terminology
- RG-7 Non-Ionic, Inverted Emulsified Asphalt Primer
- RG-8 Polymer-Modified Asphalt Cements
- RG-9 Polymer-Modified Emulsified Asphalts

**Appendix C**

**COMMITTEE ON ROAD MATERIAL**

**CURRENT WORKING GROUPS**

- RG-1 D. MacLeod, L. Miller.
- RG-3 B. Faber, D. Macleod, A. MacNeil, L. Miller, L. Moran.
- RG-5 K. Davidson, V. Drul, J. Ferguson, D. Macleod, B. Morien, T., Sutandar.
- RG-6 H. Sergi.
- RG-7 J. Ferguson, D. Macleod, A. MacNeil, B. Morien, I. Vickaryous.
- RG-8 C. Juergens, B. Faber, K. Davidson, G. Kennepohl, C. McMillan, L. Miller, L. Moran, W. Robertson, T. Sutandar.