

**METHODS OF SAMPLING AND TESTING**  
**MT 308-04**  
**TEMPERATURE-VISCOSITY CHARTS FOR USE IN DETERMINING MIXING**  
**TEMPERATURES FOR THE VARIOUS GRADES OF ASPHALT CEMENT**  
*(Montana Method)*

**1. Scope:**

- 1.1 Temperature-Viscosity data for the various grades of bituminous materials used in Montana are listed in Tables I and II.

**2. Contractor Responsibility:**

- 2.1 The contractor will furnish the Project Engineer with data on the temperature-viscosity relationship of each asphalt to be used on the project. The data must cover the recommended temperature range and viscosities at which the asphalt will be used. The Project Manager will use this data to specify the temperature at which the material will be used.

*Note - The contractor will furnish the most recent copy of the temperature-viscosity chart available at the time the material is purchased in order to ensure the greatest accuracy.*

**3. Temperature - Viscosity Data:**

- 3.1 An example temperature-viscosity chart is included to illustrate a temperature-viscosity chart used for Materials Bureau design purposes. Temperature-viscosity charts are updated periodically to monitor any changes in temperature-viscosity that may occur.

*Note - Asphalt cements (PG grade) for plant mix surfacing contracts have temperature-viscosity requirements issued by the Materials Bureau in the Mix Design memorandum, which govern the contract.*

- 3.2 An example form is included to illustrate the documentation of the values that are recommended for mix design and field operations for the contractor and by the asphalt supplier for Polymer Modified Asphalt.

**TABLE I**

**TEMPERATURE VISCOSITY DATA FOR DIFFERENT GRADES OF ASPHALT CEMENT**

**Mixing Range (150-190 Centistokes)**

**CENEX**

|          |           |
|----------|-----------|
| PG 64-22 | 310-320°F |
| PG 64-34 | 297-311°F |
| PG 70-28 | 319-335°F |

**CONTINENTAL OIL COMPANY**

|         |           |
|---------|-----------|
| 85/100  | 285-294°F |
| 120/150 | 277-285°F |
| 200/300 | 267-276°F |

**EXXON/MOBIL COMPANY**

|          |           |
|----------|-----------|
| PG 58-28 | 144-149°F |
| PG 64-22 | -----°F   |
| PG 64-28 | -----°F   |
| PG 64-34 | 150-165°F |
| PG 70-28 | 155-165°F |

**MONTANA REFINING COMPANY**

|         |           |
|---------|-----------|
| 85/100  | 290-301°F |
| 120/150 | 285-297°F |
| 200/300 | 271-280°F |

**TABLE II**

**TEMPERATURE VISCOSITY DATA FOR DIFFERENT GRADES OF LIQUID ASPHALT FROM MONTANA REFINERIES**

**Spraying Range 25-100 S.F. Sec. (50-200 Centistokes)**

**MONTANA REFINING COMPANY**

|         |           |         |           |
|---------|-----------|---------|-----------|
| MC-70   | 111-160°F | SC-70   | 110-172°F |
| MC-250  | 155-212°F | SC-250  | 160-215°F |
| MC-800  | 198-260°F | SC-800  | 192-255°F |
| MC-3000 | 225-287°F | SC-3000 | 222-285°F |

**CENEX**

|               |           |
|---------------|-----------|
| MC, & SC-70   | 105-175°F |
| MC, & SC-250  | 147-225°F |
| MC, & SC-800  | 181-256°F |
| MC, & SC-3000 | 214-290°F |

**CONTINENTAL OIL COMPANY**

|         |           |
|---------|-----------|
| MC-70   | 112-165°F |
| MC-250  | 158-215°F |
| MC-800  | 200-265°F |
| MC-3000 | 227-290°F |

**TABLE I**

**TEMPERATURE VISCOSITY DATA FOR DIFFERENT GRADES OF ASPHALT CEMENT**

**Mixing Range (150-190 Centistokes)**

**IDAHO ASPHALT**

|          |           |
|----------|-----------|
| PG 64-22 | 310-325°F |
| PG 64-28 | 310-330°F |
| PG 64-34 | 320-330°F |
| PG 70-28 | 320-340°F |

**KOCH**

|          |           |
|----------|-----------|
| PG 64-34 | 300-316°F |
|----------|-----------|

**MOOSE JAW ASPHALT**

|          |           |
|----------|-----------|
| PG 58-28 | 292-299°F |
| PG 64-34 | 325°338°F |

**MONTANA REFINING COMPANY**

|           |           |
|-----------|-----------|
| PG 58-28  | 293-304°F |
| PG 64-28  | 295-340°F |
| PG 70-28- | 275-350°F |

**TABLE II**

**TEMPERATURE VISCOSITY DATA FOR DIFFERENT GRADES OF LIQUID ASPHALT FROM MONTANA REFINERIES**

**Spraying Range 25-100 S.F. Sec. (50-200 Centistokes)**

**MONTANA REFINING COMPANY**

|         |           |         |           |
|---------|-----------|---------|-----------|
| MC-70   | 111-160°F | SC-70   | 110-172°F |
| MC-250  | 155-212°F | SC-250  | 160-215°F |
| MC-800  | 198-260°F | SC-800  | 192-255°F |
| MC-3000 | 225-287°F | SC-3000 | 222-285°F |

**CENEX**

|               |           |
|---------------|-----------|
| MC, & SC-70   | 105-175°F |
| MC, & SC-250  | 147-225°F |
| MC, & SC-800  | 181-256°F |
| MC, & SC-3000 | 214-290°F |

**CONTINENTAL OIL COMPANY**

|         |           |
|---------|-----------|
| MC-70   | 112-165°F |
| MC-250  | 158-215°F |
| MC-800  | 200-265°F |
| MC-3000 | 227-290°F |

*NOTE: Exxon Company no longer produces cutback asphalts, thus temperature viscosity data for the Exxon Company is no longer listed in Table II. In addition, Montana Refining Company no longer produces rapid cure (RC) cutback asphalts and thus no RC data for them is provided. Continental Oil no longer produces slow cure (SC) or rapid cure (RC) cutback asphalts and no data for them is provided.*

**(FOR EXAMPLE ONLY)**

As a supplier of polymer modified asphalt for a Montana Department of Transportation project, we request that you provide the following information to the Materials Bureau. A completed form is required for each variety of Polymer asphalt submitted and for each project from which polymer asphalt will be supplied.

Project  
Termini

- (1) Safety Data Sheets
- (2) Temperature-viscosity chart and/or table for viscosity from 275 degrees F. To 340 degrees F. Or to the maximum mixing temperature of the asphalt.
- (3) Mix Design Temperature Ranges
  - a. Mixing viscosity range 290°F - 310°F
  - b. Compaction Viscosity Range 230°F - 290°F
- (4) Field Temperatures (plant mix operational temperatures)  
That is the temperature maximum 310°F degrees F.  
and the temperature minimum 290°F degrees F. of plant mix as it is discharged from the plant.
  - a. Maximum temperature at which roadway compaction may be performed 290°F
  - b. Minimum temperature at which roadway compaction may be performed 230°F

Company providing modified asphalt Montana Refining Company

Individual providing information Alan Hobbs

Address P.O. Box 1243, Great Falls, MT 59403

Phone No. (406)761-4100

Completion of this form provides the documentation of the values that are recommended for mix design and field operations for the contractor and by the asphalt supplier.

Identification of modified asphalt \_\_\_\_\_

Signature \_\_\_\_\_ Date \_\_\_\_\_