

ITEM 18403.9996 M - DYNAMIC SHEAR RHEOMETER

DESCRIPTION

The Dynamic Shear Rheometer (DSR) is used for specification purposes to measure the complex modulus and phase angle of asphalt binder at intermediate to upper pavement service temperatures at a frequency of 10 radians per second. In addition to measuring the modulus and phase angle at a single frequency, the DSR may also be used over a range of frequencies to determine the time dependency of the asphalt binder.

MATERIALS

DYNAMIC SHEAR RHEOMETER

The Dynamic Shear Rheometer (DSR) supplied will meet the following requirements:

- A. Standards:** The DSR shall conform to the specifications set forth by the Federal Highway Administration for the “pooled fund” purchase of this item. The DSR shall be able to perform all testing as described in AASHTO Provisional Standards MP1, TP5, and PP6. The DSR shall be capable of performing the test for linearity of asphalt binder which is being added to standard TP-5. The DSR shall also be capable of manual adjustment of the gap.
- B. Equipment:** The DSR shall be supplied as a “**specification or test grade**”, NOT a research grade instrument.
- C. Operating Frequency:** The DSR shall operate in a frequency range from 1×10^{-3} to 20 Hz. (max. 100 rad./sec.) with unique selectable delay periods for each frequency in rad./sec. The DSR shall perform oscillatory testing and analysis over a frequency range specified using plate geometry.
- D. Strain Resolution:** The DSR shall be supplied with a strain resolution to 5×10^{-5} radians.
- E. Plates:** The DSR shall be supplied with plates that are removable and/or disposable ranging in diameter from 6 mm to 40 mm. Two sets of 8 mm and 25 mm base and top plates to be supplied.
- F. Environmental Control Chamber:** The DSR shall be supplied with an environmental control chamber that completely encloses the test sample and has its own temperature control system which will maintain the test temperature to $\pm 0.1^\circ \text{C}$. The temperature gradient through the test sample shall not be greater than 0.1°C .
- G. Temperature Control Unit:** The DSR shall be supplied with a temperature control unit with temperature range of $+5^\circ \text{C}$ to $+100^\circ \text{C}$.
- H. Programmable Temperature Control Card:** The DSR shall be supplied with a programmable temperature control card for isothermal, step change, and gradient ramps in all modes of operation.

ITEM 18403.9996 M - DYNAMIC SHEAR RHEOMETER

I. Computer (minimum requirements):

- 1. Processor:** The processor shall be a Pentium 166 Mhz computer with 16 M RAM, 1 M Video RAM, 6 expansion slots, 1 GB hard disk and 1.44 MB floppy drive.
- 2. Monitor:** The monitor shall be a 15" SVGA Color monitor.
- 3. Printer:** LJ6MP 600 x 600 DPI Laser Jet Printer or equivalent with cable.
- 4. Software:** The software shall control the DSR and perform and store all calculations as described in the AASHTO Provisional standards referenced above. Software shall be able to program the equipment to perform frequency sweeps in rad./sec. from 0.1 to 100 rad./sec., strain sweeps from 0 to 200%, temperature sweeps and step changes over the full temperature range and generate tables and graphs of rheological properties such as G^* , G' , G'' , $\tan \delta$, $G^* / \sin \delta$, and $G^* \times \sin \delta$ over the full frequency range specified. The software must be able to output data to an ASCII file for incorporation into other software.

J. Power Requirements: The DSR shall operate on standard 115 volts AC, 50/60 Hz.

K. Molds: The DSR shall be supplied with three (3) extra sets of silicone rubber molds.

L. Manuals: Clear and simple operating and instruction manuals supplied for the DSR and operational software.

M. Installation: The DSR shall include on-site installation and training.

N. Warranty: The warranty will cover parts and labor for a period of two years.

DYNAMIC SHEAR RHEOMETER POTENTIAL VENDOR LISTING

Bohlin Instruments, Inc
2540 Route 130
Cranbury, NJ 08512

TA Instruments, Inc
22 Justin Drive
Danville, NH 03819

Gilson Company
P.O. Box 677
Worthington, Ohio 43085

ATS Rheosystem
195 Chesterfield-Jacobstown Road
Wrightstown, NJ 08562

Rheometric Scientific
1 Possumtown Road
Piscataway, NJ 08854

HAAKE
53 West Century Road
Paramus, NJ 07652

Physica USA
400 Randal Way, B-207
Spring, TX 77388-8908

ITEM 18403.9996 M - DYNAMIC SHEAR RHEOMETER

CONSTRUCTION DETAILS

Within sixty-days of the award of the bid the Dynamic Shear Rheometer shall be delivered to the New York State Department of Transportation - Materials Bureau, Building 7, Room 206, State Office Campus, 1220 Washington Ave, Albany, New York, 12232. Within thirty days of delivery the Dynamic Shear Rheometer shall be installed and in-house training completed.

METHOD OF MEASUREMENT

Payment will be made at the lump sum price bid for this Item.

BASIS OF PAYMENT

The price bid for this Item shall include the cost of the Dynamic Shear Rheometer, three (3) extra sets of silicone rubber molds, and all other miscellaneous materials, equipment, and labor to complete the requirements of this Item.

Progress payments will be made as follows:

1. 50% of the lump sum price will be paid after the DSR is delivered to the address shown in the Construction details.
2. 50% of the lump sum will be paid after the DSR is installed and the in-house training completed in accordance with Materials Section M. Installation.

Payment will be made under:

<u>ITEM NO.</u>	<u>ITEM</u>	<u>PAY UNIT</u>
18403.9996M	Dynamic Shear Rheometer	Lump Sum