Our Ref: EROL /Pur/Mech/CEM-11 12.01.2011

Subject: Tender for supply of "Digital Melt Flow Index Testing Apparatus (CEM-11)"

TO

Dear Sirs,

Tenders are invited for the supply of the above item(s) in the sealed cover duly super scribed as **"QUOTATION FOR THE SUPPLY OF Digital Melt Flow Index Testing Apparatus (CEM-11) "** complying the requirements of the enclosed **Annex-A** (The Term and conditions of supply) and **Annex-B** (The Technical Specification of the equipment) which should reach the undersigned latest by **31.01.2011** up to 17.00 h. Also ensure to submit the Technical and financial quotations/bids in **separate envelopes along with EMD as indicated in Annex A,** failing which quotation will be rejected. The tenders shall be opened in this office at 1500 hours in the next working day in the presence of such tenderers or their duly authorized representatives, who may like to attend.

Thanking you,

Yours faithfully,

S.Bhowal
Director

Encl: As above

ANNEX-A
(Terms and conditions of Supply)

1. The Tenderers are requested to give detailed tender in the forms of two bids i.e.
   Part - A Technical Bid.
   Part - B Financial Bid.

2. The Technical & **Financial** Bids should **be sealed and sent separately in sealed** envelopes & duly super-scribed (giving Equipment name, technical/financial bid, due date of opening & Ref. No. on the top of the envelope). Such Bids shall remain valid for a period of 120days from the date of opening.

3. Bidders may be required to arrange practical demonstration of equipment/model quoted by them before finalization of order.

4. The Technical Bid [Part A] should accompany complete specification, Manufacturer's name, address and following details :
   a. Expected life span of equipment and accessories.
   b. List of pre-installation facilities required for installation and commissioning of equipment and also consumables to be arranged by the Bureau,
   c. List of the Users in India especially Govt. Labs. /Institutes with complete postal address to whom the similar equipment has been supplied,
   d. Near locations in India from where after sales services shall be provided along with the name of Servicing Agent,
   e. The optional and any other essential items/accessories required for the maintenance of the equipment for the next three years.
   f. Technical Literature of the equipment along with necessary clause wise photograph/drawings, if any
   g. **Compliance statement vis-a-vis specification. including statement of deviation, if any :('Annex-111)**
   h. **Delivery Period**: The delivery of the equipment is required to be made within 30 days of receipt of order. If, it is not possible for you to affect delivery within the period, you are required to specify the date by which you can guarantee delivery of the stores.
   i. Warranty: The equipment is to be guaranteed for trouble free performance for a **minimum period** of two **years after commissioning**. The defects, if any, during the warranty period are to be rectified free of charge by arranging free replacement wherever necessary.
   j. The Tenderer is required to furnish the **Permanent** Account Number (PAN)/TAN of the firm Allotted by the Income Tax Department.

5. Each tender document sliallbe accompanied with EMD of 3% of **total cost of the equipment (excluding taxes**). The demand draft for the EMD amount shall drawn in favour of BUREAU OF INDIAN STANDARDS payable at Kolkata. Tile sealed envelope containing EMD should be super scribed "EMD" **and stapled separately with `the envelope containing the commercial Bids. No disclosure of amount of EMD in Tech. Bid should be done.**

6. Cost of **the items** should be mentioned clearly in the Fi**nancial Bid [Part-B] only. The following** details need to be included
   a. Price break-up of main equipment and accessories and consumables top bc l supplied by the party,
   b. The rates quoted should separately indicate Basic Cost, Excise Duty, sales Tax. Packing & Forwarding charges. Freight, Insurance, VAT etc. Rates quoted should specifically state Sales Tax, Excise Duty Or any other taxes/charges. In absence of any such stipulation, it will be presumed that the prices include all such charges and no claim for the same shall be entertained. Form C/D shall not be provided by BIS. In case of foreign supplier BIS shall pay Custom Duty.
   c. Rebate on the quoted price, if additional equipment is procured fotr any other BIS Lab, and
   d. The Annual Maintenance Contract charges for next three years after the expiry of warranty period.
   e. CIF (Carriage Inward & Freight), Kolkata value both by Airfreight and Ocean freight, where applicable.

7. BIS shall pay 90% of the cost after satisfactory installation & commissioning and the Balance of **10% as contract performance** security would be paid after expiry of warranty period. **In case of foreign** suppliers 100% payment shall be made by an Irrevocable better of Credit established in favour of the supplier through the Punjab National Bank, Manicktala, Kolkata, for the order value provided an unconditional Performance Bank Guarantee valid till 60 days after the warranty period from a Nationalized Bank for 10% of the order value within 15 days of placement of the order is given to us. The Agency Commission to the Indian Clearing Agent will not be paid by the Bureau. The firm has to arrange for it. BIS shall provide Custom Duty Exemption Certificate at the time of Custom Clearance as well as any applicable Custom Duty.

8. Place of Delivery:

Head, Eastern Regional Office Laboratory,
BUREAU OF INDIAN STANDARDS,
P-230. CIT Scheme-**VII M, Block-W, Kankurgacbt,**
Kolkata-700 054.

9. Quotations/bids qualified by indefinite expressions such as 'subject to immediate acceptance' etc. and incomplete quotations are liable to be summarily rejected.

10 In case of foreign quotation, the address of Principals / Manufacturers and their Banker's' details should he furnished. The supplier is required to have an import licence for the equipment quoted where applicable as per GOl guidelines

11. All goods shall be inspected by BIS preferably in the presence of supplier or his authorized representative, when the packages are opened in Labs prior to installation. The decision of BIS shall be binding. Rejected items/goods/stores shall
be removed by the supplier at his own cost and risk, within 30 days of receipt of notice for the removal of such goods, and no liability, whatsoever. on the Bureau shall be attached for the rejected/disapproved goods/items/stores.

12. INSTALLATION: **Bidder shall be responsible for installation / demonstration wherever applicable and for after sales service during the warranty and thereafter. If the supplier fails to Supply. Install and** commission the system **as per specifications mentioned in the order within the due date, the Supplier is liable to pay** liquidated **damages of one percent value of the Purchase Order awarded, per every seven days delay subject to a maximum of 10% of the total value of the order and such money will be deducted from any money due or which may become due to the supplier.**

13. The supply of spare parts is to be guaranteed at least for a period of 10 years after the supply of the equipment.

14. The Bureau reserves the right to accept or reject summarily and/or all tenders in whole or part without assigning any reason whatsoever.

15. The Date and Time of opening for Part B (Financial Bid) will he intimated only to technically acceptable/qualified tenderers at a later date.

16. In case of any dispute arising out of this agreement then DG BIS shall nominate any officer of the BIS a sole arbitrator to adjudicate upon the issue involved in the dispute and the provisions of the Arbitration Act shall be applicable

17. All question. disputes or differences arising under, out of or in connection with this Bid document shall he subject to the exclusive jurisdiction of Kolkata Court.

Bureau of Indian Standards
Eastern Regional Laboratory, Kolkata

ANNEX-B

Technical Requirements

i) The various components of the apparatus shall be as per Cl. 7.1 of IS:2530-63 and complying the requirements given in Cl.7.1.1 to 7.1.8 of IS:2530-63 for all essential parts and fitted with Jet A type fixture and a removable load of 5 kg.(Ref Cl 5.2.2 of IS 4984:1995). Please find enclosed the relevant pages of IS:2530-63 and IS 4984:1995 for ready reference.
In addition following accessories shall be supplied with the equipments-
   a. A digital timer/ Stop Watch with range 0 – 1500 seconds
   b. A sharp edged instruments for cutting the extruded strip

ii) All measuring devices shall preferably be supplied with calibration certificate from a NABL accredited laboratory.

apart at the narrow central part of the dumb-bell. Measure the thickness of the specimen at three places between the gauge marks. Use the minimum thickness for calculating the cross-sectional area of the specimen.

6.5 Procedure

6.5.1 Adjust the tensile testing machine to give a constant rate of separation of grips of 45·0 ± 5·0 cm/min. Test the load-indicating device for calibration or index error. Stretch the test specimen at the specified rate in the tensile testing machine. Record the steady load and calculate the yield stress. With increase in strain, the specimen breaks. Record the load at break for the computation of tensile strength. Any specimen which breaks outside the gauge mark shall be disregarded. A sliding marker with graduations shall be used to record the separation of the gauge marks (up to the nearest 2 mm) when the specimen breaks. The percent increase in length compared to the original gauge mark gives the percent elongation.

6.5.1.1 Record the temperature close to the tensile testing machine.

6.6 Calculation and Reporting

6.6.1 Determine the average of the six specimens tested. Record the ambient temperature of testing.

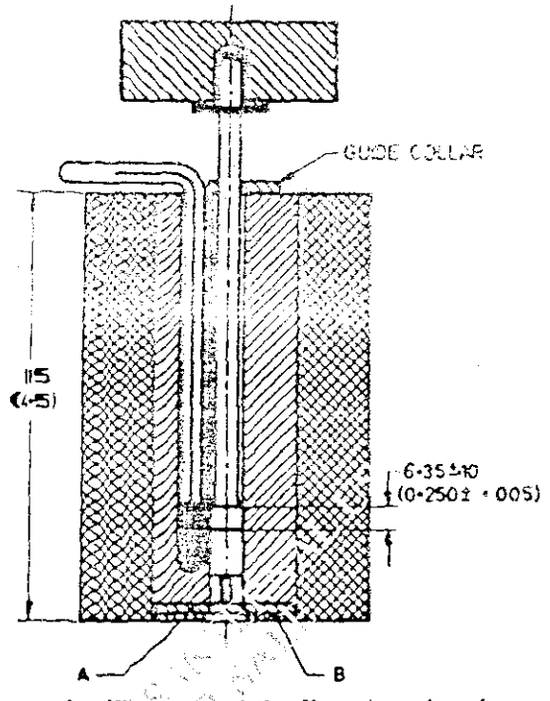
6.6.2 Report the results for tensile strength and yield stress as corrected for 27°C to the nearest kg/cm², after applying a specified temperature correction factor, where necessary.

6.6.3 No temperature correction is applied for elongation at break which is expressed to the nearest 10 percent.

7. DETERMINATION OF MELT FLOW INDEX

7.1 **Apparatus** — The apparatus is basically an extrusion plastometer. The general design is as shown in Fig. 2. Polyethlylene, which is contained in a vertical metal cylinder, is extruded through a jet by a loaded piston, under controlled temperature conditions. The essential parts of the apparatus are as given in 7.1.1 to 7.1.8.

7.1.1 *Cylinder* — The cylinder of steel (*see* Note) shall be fixed in a vertical position and suitably lagged for operation at 190°C. The cylinder shall be at least 115 mm (or 4·5 in) long. The internal diameter shall be between 9·500 mm (or 0·374 in) and 10·000 mm (or 0·394 in.), and shall meet the requirements of 7.1.2. The base of the cylinder shall be thermally insulated, if the area of the exposed metal exceeds 4 cm² (or 0·6 in²). It is recommended that the



All dimensions are in millimetres and the dimensions given in parentheses are in inches.

FIG. 1 APPARATUS FOR DETERMINING MELT FLOW INDEX

(Showing Large External Diameter Cylinder, Jet Retaining Plate A and Insulating Plate B)

insulating material used shall be polytetrafluoroethylene [thickness about 3 mm (or 0·12 in)] in order to avoid sticking of the extrudate.

NOTE — To ensure satisfactory operation of the apparatus, the cylinder and piston are made of steel of different hardness. It is convenient, for ease of maintenance and renewal, to make the cylinder of the harder steel.

7.1.2 *Piston* — A hollow piston of steel (*see* Note under 7.1.1) shall have a length which is at least as long as the cylinder. The axes of the cylinder and the piston shall coincide, and the effective length of the piston shall be 135 mm (or 5·32 in) maximum. The piston shall have a head of length 6·35 ± 0·10 mm (or 0·250 ± 0·005 in). The diameter of the head shall be less than the internal diameter of the cylinder at all points along the working length of the cylinder by 0·075 ± 0·015 mm

(or 0·003 0 – 0·000 6 in). In addition, for calculating the load (see 7.1.3), this diameter shall be known within ±0·025 mm (or ±0·001 in). The lower edge of the head shall have a radius of [illegible] mm (or [illegible] in), and the upper edge shall have its sharp edge removed. Above the head the piston shall be relieved to about 9 mm (or 0·35 in) diameter. A stud may be added at the top of the piston to support the removable load, but the piston shall be thermally insulated from this load.

7.1.3 *Removable Load on Top of the Piston* — The force P, in grams, exerted by the combined mass of the load and the piston, shall be calculated as given below:

For Jet *A*: $$P = 454 \frac{D^2}{d^4}$$

For Jet *B*: $$P = 46{\cdot}4 \frac{D^2}{d^4}$$

where

D = diameter of the piston, measured to an accuracy of ±0·025 mm (or ± 0·001 in), and

d = internal diameter of the jet, measured to an accuracy of ±0·005 mm (or ± 0·000 2 in).

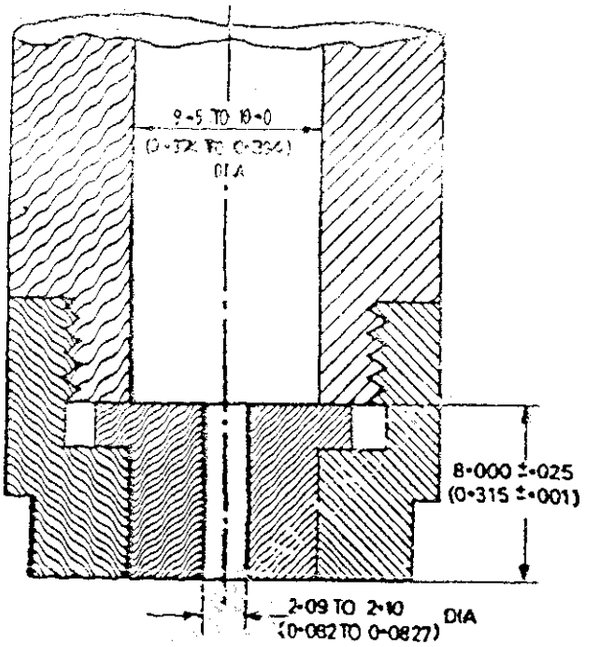
7.1.3.1 The force applied shall be calculated to an accuracy of ±10 gf.

7.1.4 *Heater* — The heater shall maintain the polyethylene in the cylinder at a temperature of 190° ± 0·5°C. An automatic temperature control is recommended.

7.1.5 *Temperature-Measuring Device* — This device shall be located as close as possible to the jet, but situated within the body of the cylinder. This measuring device shall be calibrated to permit temperature measurement to an accuracy of ±0·1°C.

7.1.6 *Jet A* — as shown in Fig. 3. It shall be 8·000 ± 0·025 mm (or 0·315 ± 0·001 in) long and shall be made of hardened steel. The mean internal diameter shall be between 2·090 mm (or 0·082 3 in) and 2·104 mm (or 0·082 7 in) and shall be uniform along its length within ±0·005 mm (or ±0·000 2 in). The jet shall not project beyond the base of the cylinder.

7.1.7 *Jet B* — It shall be 8·000 ± 0·025 mm (or 0·315 ± 0·001 in) long and shall be made of hardened steel. The mean internal diameter shall be between 1·160 mm (or 0·045 7 in) and 1·200 mm (or 0·047 2 in) and shall be uniform along its length within ± 0·005 mm (or ± 0·000 2 in). The jet shall not project beyond the base of the cylinder.



All dimensions are in millimetres and the dimensions given in parentheses are in inches.

FIG. 3 JET A (SHOWING SMALL EXTERNAL DIAMETER CYLINDER WITH AN ALTERNATIVE METHOD OF RETAINING THE JET)

7.1.8 All surfaces of the apparatus in contact with the material under test shall be highly polished.

7.2 Cleaning and Maintenance of the Apparatus

7.2.1 The apparatus shall be cleaned after each test. On no account shall abrasives or materials likely to damage the surface of the piston

NOTE — The pipes are recommended for maximum water temperature of +45°C. The pipes may also be used up to the ambient temperature of –40°C. As the creep rupture strength of the pipe varies with the change in water temperature, the maximum working pressure, therefore, should be modified by applying the pressure coefficient given in Fig. 1.

3.4 Nominal Diameter (DN)

The nominal diameter of pipes covered in this standard are:

16, 20, 25, 32, 40, 50, 63, 75, 90, 110, 125, 140, 160, 180, 200, 225, 250, 280, 315, 355, 400, 450, 500, 560, 630, 710, 800, 900 and 1 000 mm.

4 COLOUR

4.1 The colour of the pipe shall be black.

4.2 For the purpose of identification of the pipes covered in this standard, each pipe shall contain minimum three equispaced longitudinal stripes of width 3 mm (*Min*) in blue colour. These stripes shall be coextruded during pipe manufacturing and shall not be more than 0.2 mm in depth. The material of the stripes shall be of the same type of resin, as used in the base compound for the pipe.

5 MATERIAL

5.1 General

The material used for the manufacture of pipes should not constitute toxic hazard, should not support microbial growth and should not give rise to unpleasant taste or odour, cloudiness or discoloration of water. Pipe manufacturers shall obtain a certificate to this effect from the

5.2 High Density Polyethylene

High density polyethylene (HDPE) used for the manufacture of pipes shall conform to designation PEEWA-45-T-003 or PEEWA-45-T-006 or PEEWA-50-T-003 or PEEWA-50-T-006 or PEEWA-57-T-003 or PEEWA-57-T-006 of IS 7328. HDPE conforming to designation PEEWA-45-T-012 or PEEWA-50-T-012 or PEEWA-57-T-012 of IS 7328 may also be used with the exception that melt flow rating (MFR) shall be between 0.20 g/10 min to 1.10 g/10 min (both inclusive). In addition the material shall also conform to **5.6.2** of IS 7328 (*see* **A-1**).

5.2.1 The specified base density shall be between 940.0 kg/m^3 and 958.4 kg/m^3 (both inclusive) when determined at 27 °C according to procedure prescribed in Annex A of IS 7328 : 1992. The value of the density shall also not differ from the nominal value by more than 3 kg/m^3 as per **5.2.1.1** of IS 7328 : 1992.

5.2.2 The MFR of the material shall be between 0.20 g/10 min and 1.10 g/10 min (both inclusive) when tested at 190 °C with nominal load of 5 kgf as determined by method prescribed in **7** of IS 2530 : 1963. The MFR of the material shall also be within ±20 percent of the value declared by the manufacturer.

5.2.3 The resin shall be compounded with carbon black. The carbon black content in the material shall be within 2.5 ± 0.5% and the dispersion of carbon black shall be satisfactory when tested according to the procedure described in IS 2530 : 1963.

5.3 Anti-oxidant

The percentage of anti-oxidant used shall not be more than 0.3 percent by mass of finished resin. The anti-oxidant used shall be