

 Indian Institute of Technology Madras

Department of Civil Engineering

Chennai-600 036

 Ref No: CIE/2014/ MIP/SPL dated 21.11.2014

To

 DUE DATE : 11.12.2014

Sir/Madam,

1. Quotations are invited **in duplicate (Two bidding covers)** for the **item/s shown as per enclosed Specifications**.
2. The quotations duly sealed and superscribed on the envelope with the enquiry reference No. & due date should be addressed to the **Head of the Department,** **and contain in 2 bid system i.e. Technical bid and Commercial bid in two separate envelopes and these two envelopes should be enclosed in a Single envelope so as to reach on or before the due date.**
3. The quotation should be valid for **(60) Sixty days from the due date and period of delivery time** required.
4. Relevant literature pertaining to the items quoted with full specifications (and drawing, if any) should be sent along with the quotations, **wherever applicable**. Samples if called for, submitted free of charge and collected back at the suppliers expenses.
5. Firms outside Chennai: Quotations should be for F.O.R. Chennai. If F.O.R. consignor station, freight charges by passenger train/lorry transport must be indicated. If Ex-godown, packing Forwarding and Freight charges must be indicated.
6. Local Firms: Quotations should be for free delivery to this Institute. If quotations are for Ex-godown, delivery charges should be indicated separately.
7. Goods should be **supplied** by **carriage paid and insured**. Goods shall not be supplied **without an official supply order**.
8. PAYMENT: The mode of payment should be mentioned**.**
9. Rate of Sales/General Taxes and percent of such other taxes legally leviable and intended to be claimed should be distinctly shown along with the price quoted. Wherever this is not done, no claim for any taxes will be admitted at any stage and any ground whatsoever. The taxes leviable should take into consideration that we are entitled to have Concessional Sales Tax applicable to Non-Government Educational Institutions run with no profit motive for which a concession. Sales Tax Certificates will be issued at the time of final settlement of the bill. The Price should be quoted without Excise Duty, Since IIT Madras is exempt from payment of Excise duty.
10. Warranty period: Explicitly Warranty period is to be given by the firms.

Yours sincerely

 For Head of the Department

**Department of Civil Engineering, IIT Madras**

**SPECIFICATIONS**

**MERCURY INTRUSION POROSIMETER**

The specifications are divided into: (i) Equipment features, (ii) Specific technical requirements, (iii) Data analysis requirements, and (iv) Safety features.

**Equipment features**

1. The porosimeter should be capable of carrying out complete pore structure analysis of pores from 960 to 0.003 microns. The analysis should comprise of total pore volume, pore volume distribution, pore surface area and its distribution, pore population through a single unit system, with Mercury filling, Low pressure analysis, and High pressure analysis integrated into that single unit.
2. The Mercury Intrusion Porosimeter should have 2 low pressure ports and 1 high pressure port.
3. The software provided for the instrument control (calibration and operation) should have user programmable time and rate for analysis along with auto speed control to automatically adjust pressurization rate in response to sample characteristics. The software should be Windows based for automatic data acquisition, tabular and graphical file management along with sufficient reference materials.
4. Step and continuous pressure increment system.
5. Automatic spillage control system, removal mechanism and refills of mercury.
6. All the accessories (necessary and optional) in the system should be quoted with details and quantity.

**Specific Technical Requirements**

1. Low pressure chamber should have a pressure range from Vacuum to 50 psi.
2. High pressure chamber should have a pressure range from atmospheric to 60000 psi.
3. Should be capable of measuring pore sizes in the range – 0.003 to 900 microns.
4. Transducer Hysteresis ± 0.05 % of the full scale.
5. High data resolution capable of monitoring minute change in intrusion volume.
6. Cylindrical sample cell of 25 mm dia and 25 mm length suitable for solid concrete pellets and soil & concrete specimens.
7. One more cell for small size samples.

**Data Analysis Requirements**

The software should provide the following capabilities:

1. Multiple data plotting routines.
2. Cumulative intrusion volume plot.
3. Log differential intrusion volume plot.
4. Incremental and differential intrusion volume plot.
5. Cumulative and incremental pore area plot.
6. Total pore intrusion volume plot.
7. Pore size average: mean, mode and median.
8. Density: Bulk and Apparent density.
9. Particle size distribution: Mayer –Stows (MS) and Smith – Stermer (SS) models, mean mode and median, interpolated data, tabular and graphic format.
10. Material compressibility
11. Pore Tortuosity
12. Pore/Throat size ratio.
13. Contact angle
14. Summary data of total pore volume, total pore area.
15. Specific surface area of the specimen.

**Safety Features**

All the safety related concerns must be stated and details of functional access provided for safety related problems should be stated in detail along with the address to following

1. System should have a manual emergency stop.
2. The system should not accept functions of over pressurizing.
3. It should prevent spillage of mercury and have proper protection and retrieval system in case of spillage.
4. Ventilation kit for safe ventilation.
5. User protection support for potential direct exposure to mercury.