



**TENDER DOCUMENT**

**Tender No: MCB/DC/01**

**For**

**“Fabrication and commissioning of shock tube for animal studies”**

**Microbiology and Cell Biology**

**Indian Institute of Science**

**Bangalore - 560012**

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# 1. Tender Notification

Tender No: MCB/DC/01

Scope of Work	<b>Fabrication and commissioning of shock tube for animal studies.</b>
Estimated Period of Work Completion	6 (Six) Months
Name of the Client	Indian Institute of Science, Bangalore
Address of the Client	The Chairman Dept. of Microbiology and Cell Biology Indian Institute of Science Bangalore - 560 012
Contact Person/Client Representative	Prof. Dipshikha Chakravorty Professor Dept. of Microbiology and Cell Biology, IISc. Phone: 080-22932842 Email: <a href="mailto:dipa@iisc.ac.in">dipa@iisc.ac.in</a>
Last date and Time for online submission (uploading) of tender	5 <sup>th</sup> July 2023, 5.00 PM
Date and Time of opening of Tender	6 <sup>th</sup> July 2023, 4.00 PM

## 2. General Conditions

The Chairman, Dept. of Microbiology and Cell Biology, Indian Institute of Science invites tenders in two bid (Technical and Financial) system from eligible bidders, for **“Fabrication and commissioning of shock tube for animal studies”**.

- 2.1 The Bidder should belong to either Class-1 or Class-2 suppliers distinguished by their “local content” as defined by recent edits to GFR. They should mention clearly which class they belong to in the cover letter. a) Class-1 supplier: Goods and services should have local content of equal to or more than 50%. b) Class-2 supplier: Goods and services should have local content of equal to or more than 20 % and less than 50%.
- 2.2 Quote should come only from Indian Original Equipment Manufacturer (OEM) or their Indian authorized distributor.
- 2.3 The quotations should be on FOR-IISc Bangalore basis in INR only.
- 2.4 Bidders offering imported products will fall under the category of non-local suppliers. They cannot claim themselves as Class-1 local suppliers/Class-2 local suppliers by claiming the services such as transportation, insurance, installation, commissioning, training, and other sales service support like AMC/CMC, etc., as local value addition.
- 2.5 Purchase preference as defined by the recent edits to GFR (within the “margin of purchase preference”) will be given to the Class-1 supplier.
- 2.6 MSMEs can seek an exemption to some qualification criteria. IISc follows GFR2017 for such details.
- 2.7 Bidders shall not be under a declaration of ineligibility for corrupt and fraudulent practices issued by the Government of India or any State Government of Union of India. (authorized signatory should provide an undertaking). Tenders from Joint ventures are not acceptable. The bidders must provide a local content declaration (refer to the attached document-GOI )
- 2.8 All Bidders shall provide the required information accurately and enough as per details in Section 4: Eligibility Criteria
- 2.9 The tenderer shall upload the valid certificate copies of PAN and GST, **failing which the tender will be rejected**. If necessary, bidder shall produce all the original documents for verification.
- 2.10 The successful Bidder shall execute an Agreement within 10 days from the date of Receipt of intimation from this office. The Tender Document will form the part and parcel of the agreement, failing which the tender will deem to be get cancelled.
- 2.11 The material of construction and design for fabrication should be approved by the client representative before execution of the work.
- 2.12 The rates quoted should reflect all taxes separately. However, bid evaluation will be done inclusive of all Taxes / Cess. / Royalty etc. The statutory levies as per Govt. guidelines will be deducted. The IISc reserves the right to accept / reject any or all the tenders without assigning any reasons.
- 2.13 Conditional tenders will not be accepted and is liable for rejection.

- 2.14 Even though the Bidders meet the eligibility criteria, they are subject to be disqualified if they have:
- Made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
  - Record of poor performance such as abandoning the works, not properly completed the contract, inordinate delays in completion, litigation history, or financial failures etc.

2.15 The Tender document can be downloaded from IISc website (<https://iisc.ac.in/all-tenders/> ). It may be noted that all subsequent notifications, changes and amendments on the project/document would be posted only on the same website. The bidders are advised to visit the IISc Portal and get familiarized with the procedure for submission of the tenders.

#### 2.16 **Content of Tender documents**

The bidders should go through the Tender Document and submit online response through IISc portal only.

#### 2.17 **Amendment of Tender documents**

Before the deadline for submission of tenders, the IISc may modify the tender documents by issuing corrigendum / addendum.

Such corrigendum/ addendum thus issued shall be part of the tender documents and shall be published online in IISc portal.

#### 2.18 **Documents comprising the Tender**

**The Technical Bid** submitted by the Bidder shall contain the documents as follows:

- a) Proof of previous experience in similar work (as per eligibility criteria)
- b) POs of confirmed orders of shock tubes of similar working conditions (nationally and internationally)
- c) Other documents citing aspects fulfilling eligibility criteria.

All prevailing duties, taxes, and other levies like CESS/Royalty payable by the contractor under the contract, or for any other cause, shall be included in the rates, prices and total Tender Price submitted by the Bidder.

#### 2.19 **Tender validity**

Tenders shall remain valid for a period not less than **180 days** after the deadline date for tender submission. A tender valid for a shorter period shall be rejected by the IISc as non-responsive.

In exceptional circumstances, prior to expiry of the original time limit, IISc may request that the Bidders may extend the period of validity for a specified additional period. The request and the Bidders' responses shall be made in writing or by email.

#### 2.20 **Format and signing of Tender**

Successful Bidder shall sign all the pages of the tender document as a token of acceptance of all the terms and conditions of the contract.

## 2.21 **Deadline for submission of the Tenders**

The Bidder shall submit a set of hard copies of all the documents in **two separate covers sealed and marked as “ Technical Bid” and Financial bid”** to IISc, on or before 5<sup>th</sup> July 2023.

All the proposals should be addressed to:

Prof. Dipshikha Chakravortty  
Dept. of Microbiology And Cell Biology  
Indian Institute of Science  
Bangalore - 560012, India

The Proposals should arrive at the Main office, Dept. of Microbiology And Cell Biology , Indian Institute of Science, Bangalore 560012, India, on or before the deadline of 5 July 2023, 5:00 pm Indian Standard Time. The parcels should be delivered between 9 am to 5 pm.

Questions regarding this tender should be addressed to Prof. Dipshikha Chakravortty at the email address [dipa@iisc.ac.in](mailto:dipa@iisc.ac.in) with the subject line “Query \_Tool name\_Bidder’s name”.

Post such submission all vendors should send an email to [dipa@iisc.ac.in](mailto:dipa@iisc.ac.in) with the subject line:

“Submitted bid\_Bidder’s name\_Tool Name” to intimate her of the submission within one day.

The IISc may extend the deadline for submission of tenders by issuing an amendment, in which case all rights and obligations of the IISc and the Bidders previously subject to the original deadline will then be subject to the new deadline.

## 2.22 **Modification and Withdrawal of Tenders**

Bidder has all the time to modify and correct till last date and time for Bid submission, as published.

The Bidder may withdraw his tender before the notified last date and time of tender submission. No Tender may be modified after the deadline for submission of tenders.

## 2.23 **Clarification of Tenders**

To assist in the examination, evaluation, the IISc may, at its discretion, ask any Bidder for clarification of his/her Tender. The request for clarification and the response shall be in writing or by e-mail along with the section number, page number and subject of clarification, but no change in the price or substance of the Tender shall be sought, offered, or permitted.

Any effort by the Bidder to influence the IISc in the Tender evaluation, or contract award decisions may result in the rejection of the Bidders’ Tender.

## 2.24 **Examination of Tenders and determination of responsiveness**

Prior to the detailed evaluation of Tenders, the IISc will determine whether each tender (a) meets the eligibility criteria, and (b) is substantially responsive to the requirements of the Tender documents.

A substantially responsive tender is one which conforms to all the terms, conditions, and specifications of the Tender documents, without material deviation or reservation. A material deviation or reservation is one (a) which affects in any substantial way the scope, quality, or performance of the Works; (b) which limits in any substantial way, inconsistent with the tender documents, the IISc's rights or the Bidder's obligations under the Contract; or (c) whose rectification would affect unfairly the competitive position of other Bidders presenting substantially responsive Tenders.

If a tender is not substantially responsive, it will be rejected by the IISc, and may not subsequently be made responsive by correction or withdrawal of the nonconforming deviation or reservation.

**2.25 Award criteria**

IISc will award the contract to the Bidder whose Tender has been determined to be substantially responsive to the tender documents and who has offered the lowest evaluated tender price. After technical evaluation the technically qualified bidders will be considered for opening of the financial bids provided that such bidder has been determined to be eligible in accordance with the provisions of this tender document and subsequent technical clarifications offered by the responsive bidders.

**2.26 Right to accept any Tender and to reject any or all Tenders**

IISc reserves the right to accept or reject any Tender, and to cancel the Tender process and reject all Tenders, at any time prior to the award of Contract, without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the IISc's action.

**2.27 Notification of award and signing of Agreement**

The Bidder whose Tender has been accepted will be notified of the award by the IISc prior to expiration of the Tender validity period by e-mail or confirmed by letter.

### 3. Technical specifications of equipment

#### Bill of Materials

<u>Sl No.</u>	<u>Equipment</u>	<u>Compliance</u>
1	<p><b><u>Shock tube</u></b> (sizing drawings will be provided by IISc)</p> <ul style="list-style-type: none"> <li>• Material of construction: SS 304</li> <li>• Total length of tube: 7 m. (1.5 m driver + 5.5 m driven)</li> <li>• Working pressure in driver section: 50 bar</li> <li>• Internal diameter: 240 - 244 mm.</li> <li>• External diameter: 270 - 273 mm.</li> <li>• Required blast wave parameters at the end of driven section: 5 bar overpressure, 10 milliseconds decay time.</li> <li>• Shock tube should be constructed in a modular fashion such that driver to driven section length ratio can be varied over a wide range of values.</li> <li>• Honing finish required for internal surface (Maximum allowable roughness of 6.3 µm - Roughness grade number N10).</li> <li>• Seamless transition from section to section.</li> <li>• Flanges of suitable class to sustain static as well as dynamic overpressures.</li> <li>• Ports for data acquisition using standard pressure or temperature sensors used in shock tubes.</li> <li>• Each module should have at least two instrumentation ports.</li> <li>• Sensors for initial pressure measurement on driver and driven sides.</li> <li>• Aluminium diaphragms to be loaded onto shock tube. Thicknesses varying from 5 - 8 mm. Total number: Minimum 100. Appropriately grooved to achieve a range of rupture pressures between 5 and 50 bar.</li> <li>• Mechanical system of suitable capacity to separate dump tank and test section for diaphragm loading if required.</li> <li>• High tensile fasteners, Viton O-rings as standard.</li> </ul> <p>Bidder should provide engineering drawings of the system based on sizing drawings given by IISc,</p>	
2	<p><b><u>Flow Expander</u></b>(sizing drawings will be provided by IISc)</p> <ul style="list-style-type: none"> <li>• Provision for flow expansion for 240 - 244 mm to 750 mm.</li> <li>• Material of construction: Mild steel with anti-rust coating</li> <li>• Length of expander in the range of 1.5 m.</li> <li>• Flanges of suitable class to sustain working pressure.</li> <li>• Stiffeners as required.</li> </ul> <p>Bidder should provide engineering drawings of the system based on sizing drawings given by IISc.</p>	



3	<p><b><u>Test section and Extender section</u></b> (sizing drawings will be provided by IISc)</p> <ul style="list-style-type: none"> <li>• Square cross section of 750 x 750 mm.</li> <li>• Material of construction: Mild steel with anti-rust coating</li> <li>• Thickness as required to withstand working pressure conditions.</li> <li>• Total length - 1.5 m</li> <li>• Animal housing unit in test section</li> </ul> <p>Bidder should provide engineering drawings of the system based on sizing drawings given by IISc.</p>	
3	<p><b><u>Support structure</u></b></p> <ul style="list-style-type: none"> <li>• Support structure designed for the overall weight of the shock tube and other accessories.</li> <li>• Material of construction: Mild steel with anti-rust coating</li> <li>• Associated foundation design capable of handling the deadweight and dynamic loading during experiment to be provided.</li> <li>• A-frame for material handling for assembly and disassembly of the shocktube and its accessory assemblies.</li> </ul> <p>Bidder should provide structural design drawings of the foundation based on the support structure design.</p>	
5	<p><b><u>Dump tank</u></b>(sizing drawings will be provided by IISc)</p> <ul style="list-style-type: none"> <li>• Thickness to be suitable for working pressure conditions.</li> <li>• Appropriate hydraulic system for separation of segments for diaphragm loading if required.</li> <li>• Suggested internal dimension of tank: 1.8 x 1.8 x 3 m (WxHxL) in total.</li> <li>• Door should be provided for personnel entry into the tank.</li> <li>• Material of construction: Mild steel with anti-rust coating</li> <li>• Provision of low-noise electrical leads and ports for vacuum system connection to be carried out of the tank without interfering with airtight sealing.</li> </ul> <p>Bidder should provide engineering drawings of the system based on sizing drawings given by IISc,</p>	
6	<p><b><u>Accessories</u></b></p> <ul style="list-style-type: none"> <li>• Control center for remote operation of shock tube.</li> <li>• Mechanical tools as required for operation of shock tube.</li> <li>• High pressure nitrogen cylinders of standard size (7 m<sup>3</sup> capacity STP, 140 bar) - 4 nos.</li> <li>• Suitable safety housing for cylinders.</li> <li>• Remote gas handling systems including regulators, actuated ball valves, high pressure hosing etc.</li> <li>• Pressure sensors and gauges as appropriate.</li> <li>• System safety checks and alarms as appropriate.</li> <li>• Dynamic pressure sensor for measurement of shock overpressure. (Qty - 4 no.s)</li> <li>• Data acquisition system (4-channel parallel measurement with 1 MHz capture rate at minimum)</li> </ul>	

## Testing and Inspection

<u>Sl No.</u>	<u>Requirement</u>	<u>Compliance</u>
1	Hydrostatic test of shock tube - 50 bar	
2	Weld bead testing - Dye-penetrant and radiographic for all weld joints.	
3	All weld joints to be cleaned with K2 paste.	
4	Raw material - All SS304 material (pipes, plates and rods) to be tested for chemical composition mechanical properties as per applicable ASTM standards.	
5	Honing of shock tube- Inside surface area of all shock tubes sections to have smooth surface (Maximum allowable roughness of 6.3 $\mu\text{m}$ - Roughness grade number N10).	
6	Ovality checks to be conducted using calibrated bore gauge (Maximum allowable ovality of 30 $\mu\text{m}$ per meter length of tube in each section)	
7	Calibration certificates of all measuring instruments used during inspection to be submitted.	

## Inspection Documents

<u>Sl No.</u>	<u>Requirement</u>	<u>Compliance</u>
1	Raw material manufacturer test certificates.	
2	Chemical and mechanical test reports for all plates, rods, pipes from NABL approved labs.	
3	UT reports for all pipes used.	
4	Dye-penetrant test reports.	
5	Radiography test reports.	
6	Hydrostatic test reports (shock tubes and dump tank).	
7	All relevant OEM certificates of accessories.	

## Installation and Training

<u>Sl No.</u>	<u>Requirement</u>	<u>Compliance</u>
1	Conduct calibration experiments on the shock tube and generate characteristic calibration curves of the shock tube.	
2	Installation of shock tube system at laboratory in Delhi NCR as prescribed by IISc.	
3	Training of scientists in the operation of the system and the associated safety precautions.	

## 4. Eligibility Criteria

### Essential Qualifications

<u>Sl No.</u>	<u>Requirement</u>	<u>Compliance</u>
1	History of design and fabrication of shock tubes of similar size (> 100 mm internal diameter) and working conditions (pressure > 50 bar) to national and international laboratories, industries, universities/academic institutions, and research centers (previous POs to be submitted).	Yes / No
2	Ability to generate manufacturing drawings from sizing data provided by IISc.	Yes / No
3	Experience with safety protocols regarding handling high pressure pneumatic systems.	Yes / No
4	Ability to calibrate the shock tube for standard working pressures and generate characteristic calibration curves for the system.	Yes / No
5	Capability to carry out installation of shock tube at the site (Delhi NCR) prescribed by IISc and demonstrate the generation of shock wave in the system.	Yes / No
6	In-house capability of providing training on the operation of facility to the end users as prescribed by IISc.	Yes / No

### Desirable Qualifications

<u>Sl No.</u>	<u>Requirement</u>	<u>Compliance</u>
1	The bidder possesses employees/consultants with demonstrated experience in research in the field of shock waves and use of shock tubes (Curriculum Vitae/Publications to be submitted)	Yes / No
2	Prior experience in the incorporation of dynamic pressure transducers, thermocouples, strain gauges etc. in shock tube experiments.	Yes / No
3	Prior experience in incorporation of high sampling rate data acquisition systems with shock tube.	Yes / No