SPS-602

ebNotice Inviting Quotation (E-Procurement mode)
कोटेशन को आमंत्रित करने की सूचना (इ-प्रोक्योर्मेंट मोड)

INDIAN INSTITUTE OF TECHNOLOGY DELHI
भारतीय प्रौद्योगिकी संस्थान दिल्ली
HAUZ KHAS, NEW DELHI-110016
हौज ख़ास, नई दिल्ली -110016

Dated/ दिनांक **: 11/04/2025**

Open Tender Notice No. / खुला प्रस्ताव निविदा सूचना नंबर: IITD/BCVL(SP-4974)/2025

Indian Institute of Technology Delhi is in the process of purchasing following item(s) as per details as given as under.
इंडियन इंस्टीट्यूट ऑफ टेक्नोलॉजी दिल्ली निम्नलिखित मदों की खरीद की प्रक्रिया में है।

Details of the item आइटम का विवरण	**Biaxial Shake Table Facility**
Earnest Money Deposit to be submitted बयाना जमा करने के लिए जमा राशि	**NIL.** However, bidders are required to submit 'Bid Security Undertaking' in lieu of EMD (Annexure-IX)
Warranty वारंटी अवधि	**2 Years/2** साल
Performance security निष्पादन सुरक्षा	**5% of Contract value as per MoF OM No. F.1/2/2023-PPD dated 3-4-2023** *(Percentage to be decided by purchaser)*
Delivery Schedule	*14-16 weeks* Pl. refer Terms & Conditions No.12
Mandatory Minimum Local Content	*1) 50% for Class 1 Supplier* *2) 20% for Class II Supplier*
Margin of Purchase Preference for Local Content	*20% (Pl. refer to the DPIIT Order mentioned at T&C No.45)*

Tender Documents may be downloaded from Central Public Procurement Portal http://eprocure.gov.in/eprocure/app . Aspiring Bidders who have not enrolled / registered in e-procurement should enroll / register before participating through the website http://eprocure.gov.in/eprocure/app . The portal enrolment is free of cost. Bidders are advised to go through instructions provided at 'Instructions for online Bid Submission'.
निविदा दस्तावेज केन्द्रीय सार्वजनिक खरीद पोर्टल http://eprocure.gov.in/eprocure/app से डाउनलोड हो सकते हैं ई-प्रोक्योरमेंट में पंजीकृत नहीं होने वाले इच्छुक बोलीदाताओं को वेबसाइट http://eprocure.gov.in/eprocure/app के माध्यम से भाग लेने से पहले पंजीकरण करना चाहिए। पोर्टल नामांकन मुफ्त है बोलीदाताओं को सलाह दी जाती है कि 'ऑनलाइन बोली के लिए निर्देश' पर दिए गए निर्देशों के माध्यम से जाने की सलाह दी जाए।

Tenderers can access tender documents on the website (For searching in the NIC site, kindly go to Tender Search option and type 'IIT'. Thereafter, Click on "GO" button to view all IIT Delhi tenders). Select the appropriate tender and fill them with all relevant information and submit the completed tender document online on the website http://eprocure.gov.in/eprocure/app as per the schedule given in the next page.
निविदाकर्ता वेबसाइट पर निविदा दस्तावेज का उपयोग कर सकते हैं (एनआईसी साइट में खोज के लिए, कृपया निविदा खोज विकल्प और 'आईआईटी' टाइप करें। उसके बाद, सभी आईआईटी दिल्ली निविदाओं को देखने के लिए "गो" बटन पर क्लिक करें) उपयुक्त निविदा का चयन करें और उन्हें सभी प्रासंगिक सूचनाओं से भरें और वेबसाइट पर http://eprocure.gov.in/eprocure/app पर पूरा निविदा दस्तावेज ऑनलाइन जमा करें। अगले पृष्ठ में दिए गए कार्यक्रम के अनुसार

No manual bids will be accepted. All quotation (both Technical and Financial should be submitted in the E-procurement portal).
कोई मैन्युअल बोली स्वीकार नहीं की जाएगी। सभी कोटेशन (तकनीकी और वित्तीय दोनों को ई-प्रोक्योरमेंट पोर्टल में जमा करना चाहिए)

SCHEDULE

Name of Organization	Indian Institute of Technology Delhi
Tender Type (Open/Limited/EOI/Auction/Single/Global)	Open
Tender Category (Services/Goods/works)	Goods
Type/Form of Contract (Work/Supply/ Auction/ Service/ Buy/ Empanelment/ Sell)	Supply
Product Category (Civil Works/Electrical Works/Fleet Management/ Computer Systems)	Other
Source of Fund (Institute/Project)	Project Code RP04661 (Equipment)
Currency	**Indian Rupee (INR)**
Date of Issue/Publishing	11/04/2025 (17:00 Hrs)
Document Download/Sale Start Date	11/04/2025 (17:00 Hrs)
Document Download/Sale End Date	09/05/2025 (15:00 Hrs)
Date for Pre-Bid Conference	---
Venue of Pre-Bid Conference	---
Last Date and Time for Uploading of Bids	09/05/2025 (15:00 Hrs)
Date and Time of Opening of Technical Bids	10/05/2025 (15:00 Hrs)
Tender Fee (If any)	Rs.__NIL_____/- (For Tender Fee) (To be paid through RTGS/NEFT. IIT Delhi Bank details are as under: Name of the Bank A/C : IITD Revenue Account SBI A/C No. : 10773572622 Name of the Bank : State Bank of India, IIT Delhi, Hauz Khas, New Delhi-110016 IFSC Code : SBIN0001077 MICR Code : 110002156 Swift No. : SBININBB547 (This is mandatory that UTR Number is provided in the on-line quotation/bid. (Kindly refer to the UTR Column of the Declaration Sheet at Annexure-II)
No. of Covers (1/2/3/4)	02
Bid Validity days (180/120/90/60/30)	90 days (From last date of opening of tender)
Address for Communication	Block4, Civil Engineering Department, IIT Delhi
Contact No.	011-2659-1680
Fax No.	--
Email Address	debayanb@civil.iitd.ac.in

Chairman Purchase Committee
(Buyer Member)

Instructions for Online Bid Submission/ ऑनलाइन बोली (बिड) के लिए निर्देश:

As per the directives of Department of Expenditure, this tender document has been published on the Central Public Procurement Portal (URL:http://eprocure.gov.in/eprocure/app). The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal.

व्यय विभाग के निर्देशों के अनुसार, यह निविदा दस्तावेज केंद्रीय सार्वजनिक प्रापण पोर्टल (यूआरएल: http://eprocure.gov.in/eprocure/app) पर प्रकाशित किया गया है। बोलीदाताओं को मान्य डिजिटल हस्ताक्षर प्रमाण पत्र का उपयोग करते हुए सीपीपी पोर्टल पर इलेक्ट्रॉनिक रूप से अपनी बोलियों की सॉफ्ट प्रतियां जमा करना आवश्यक है। सीपीपी पोर्टल पर पंजीकरण करने के लिए निविदाकर्ताओं की सहायता करने के लिए नीचे दिए गए निर्देशों का मतलब है, सीपीपी पोर्टल पर आवश्यकताओं के अनुसार अपनी बोलियां तैयार करें और अपनी बोलियां ऑनलाइन जमा करें।

More information useful for submitting online bids on the CPP Portal may be obtained at:

अधिक जानकारी सीपीपी पोर्टल पर ऑनलाइन बोलियां जमा करने के लिए उपयोगी हो सकती है:

http://eprocure.gov.in/eprocure/app

REGISTRATION

1) Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL:http://eprocure.gov.in/eprocure/app) by clicking on the link "Click here to Enroll". Enrolment on the CPP Portal is free of charge.

   बोलीदाताओं को "नामांकन के लिए यहां क्लिक करें" लिंक पर क्लिक करके सेंट्रल पब्लिक प्रोक्युरमेंट पोर्टल (यूआरएल: http://eprocure.gov.in/eprocure/app) के ई-प्रोक्योरमेंट मॉड्यूल पर भर्ती करना आवश्यक है। सीपीपी पोर्टल पर नामांकन नि: शुल्क है

2) As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.

   नामांकन प्रक्रिया के भाग के रूप में, बोलीदाताओं को अपने खाते के लिए एक अद्वितीय उपयोगकर्ता नाम चुनना होगा और एक पासवर्ड प्रदान करना होगा।

3) Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.

   बोलीदाताओं को सलाह दी जाती है कि पंजीकरण प्रक्रिया के भाग के रूप में अपना वैध ईमेल पता और मोबाइल नंबर पंजीकृत करें। इन का उपयोग सीपीपी पोर्टल से किसी भी संचार के लिए किया जाएगा।

4) Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / TCS / nCode / eMudhra etc.), with their profile.

   नामांकन पर, बोलीदाताओं को सीसीए इंडिया द्वारा मान्यता प्राप्त किसी प्रमाणन प्राधिकरण द्वारा जारी किए गए अपने मान्य डिजिटल हस्ताक्षर प्रमाण पत्र (कक्षा द्वितीय या कक्षा III प्रमाण पत्र के साथ महत्वपूर्ण उपयोग पर हस्ताक्षर करने) की आवश्यकता होगी (जैसे सिफी / टीसीएस / एनकोड / ई-मुद्रा आदि) , उनके प्रोफाइल के साथ

5) Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSCs to others which may lead to misuse.

   केवल एक मान्य डीएससी एक बोलीदाता द्वारा पंजीकृत होना चाहिए। कृपया ध्यान दें कि निविदाकर्ता यह सुनिश्चित करने के लिए ज़िम्मेदार हैं कि वे अपने डीएससी को दूसरों को उधार नहीं देते हैं जिससे दुरुपयोग हो सकता है।

6) Bidder then logs in to the site through the secured log-in by entering their user ID / password and the password of the DSC / eToken.

बोलीदाता फिर अपने यूजर आईडी / पासवर्ड और डीएससी / ईटीकेन के पासवर्ड को दर्ज करके सुरक्षित लॉग-इन के माध्यम से साइट पर लॉग ऑन करता है।

SEARCHING FOR TENDER DOCUMENTS/ निविदा दस्तावेजों के लिए खोजना

1) There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, organization name, location, date, value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as organization name, form of contract, location, date, other keywords etc. to search for a tender published on the CPP Portal.

सीपीपी पोर्टल में निर्मित विभिन्न खोज विकल्प हैं, ताकि बोलीदाताओं को कई मापदंडों से सक्रिय निविदाएं खोज सकें। इन मापदंडों में निविदा आईडी, संगठन का नाम, स्थान, तिथि, मूल्य आदि शामिल हो सकते हैं। निविदाओं के लिए उन्नत खोज का एक विकल्प भी है, जिसमें बोलीदाता कई नामों को जोड़ सकते हैं जैसे संगठन का नाम, अनुबंध का स्थान, स्थान, सीपीपी पोर्टल पर प्रकाशित निविदा की खोज के लिए तारीख, अन्य कीवर्ड आदि।

2) Once the bidders have selected the tenders they are interested in, they may download the required documents / tender schedules. These tenders can be moved to the respective 'My Tenders' folder. This would enable the CPP Portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.

बोलीदाताओं ने एक बार निविदाएं चुनी हैं जिसमें वे रुचि रखते हैं, उसका वे आवश्यक दस्तावेज / निविदा कार्यक्रम डाउनलोड कर सकते हैं। ये निविदाएं 'मेरी निविदाओं' फ़ोल्डर में ले जाई जा सकती हैं। इससे सीपीपी पोर्टल को बोलीदाताओं को एसएमएस / ई-मेल के माध्यम से सूचित किया जा सकता है, यदि निविदा दस्तावेज में कोई शुद्धि जारी कि गई है।

3) The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

बोलीदाता को प्रत्येक निविदा को निर्दिष्ट अद्वितीय निविदा आईडी का नोट बनाना चाहिए, अगर वे हेल्पडेस्क से कोई स्पष्टीकरण / सहायता प्राप्त करना चाहते हैं।

PREPARATION OF BIDS / बोली (बिड) की तैयारी

1) Bidder should take into account any corrigendum published on the tender document before submitting their bids.

बोलीदाता को अपनी बोलियां जमा करने से पहले निविदा दस्तावेज पर प्रकाशित किसी भी शुद्धि को ध्यान में रखना चाहिए।

2) Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents - including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.

कृपया बोली के भाग के रूप में जमा किए जाने वाले दस्तावेजों को समझने के लिए निविदा विज्ञापन और निविदा दस्तावेज ध्यान से देखें। कृपया उन अंकों की संख्या पर ध्यान दें जिन में बोली दस्तावेज जमा करना है, दस्तावेजों की संख्या - जिसमें प्रत्येक दस्तावेज के नाम और सामग्री शामिल हैं, जिन्हें प्रस्तुत करने की आवश्यकता है। इनमें से कोई भी विचलन बोली को अस्वीकार कर सकता है।

3) Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF / XLS / RAR / DWF formats. Bid documents may be scanned with 100 dpi with black and white option.

बोलीदाता, अग्रिम में, निविदा दस्तावेज / अनुसूची में बताए अनुसार प्रस्तुत करने के लिए बोली दस्तावेज तैयार करना चाहिए और आम तौर पर, वे पीडीएफ / एक्सएलएस / आरएआर / डीडब्ल्यूएफ स्वरूपों में हो सकते हैं। बोली दस्तावेजों को 100 डीपीआई के साथ काले और सफेद विकल्प स्कैन किया जा सकता है।

4) To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use "My Space" area available to them to upload such documents. These documents may be directly submitted from the "My Space" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

   मानक दस्तावेजों के एक ही सेट को अपलोड करने के लिए आवश्यक समय और प्रयास से बचने के लिए जो प्रत्येक बोली के भाग के रूप में जमा करने के लिए आवश्यक हैं, ऐसे मानक दस्तावेज अपलोड करने का प्रावधान (जैसे पैन कार्ड कॉपी, वार्षिक रिपोर्ट, लेखा परीक्षक प्रमाण पत्र आदि)) बोलीदाताओं को प्रदान किया गया है। ऐसे दस्तावेजों को अपलोड करने के लिए बोलीकर्ता उनके लिए उपलब्ध "मेरा स्पेस" क्षेत्र का उपयोग कर सकते हैं। बोली जमा करते समय ये दस्तावेज़ सीधे "मेरा स्पेस" क्षेत्र से जमा किए जा सकते हैं, और उन्हें बार-बार अपलोड करने की ज़रूरत नहीं है इससे बोली जमा प्रक्रिया के लिए आवश्यक समय में कमी आएगी।

SUBMISSION OF BIDS/ बोली (बिड) का जमा करना

1) Bidder should log into the site well in advance for bid submission so that he/she upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.

   बोलीदाता को बोली प्रस्तुति के लिए अच्छी तरह से साइट पर लॉग इन करना चाहिए ताकि वह समय पर बोली अपलोड कर सके या फिर बोली प्रस्तुत करने के समय से पहले। अन्य मुद्दों के कारण किसी भी देरी के लिए बोलीदाता जिम्मेदार होगा।

2) The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.

   बोलीदाता को निविदा दस्तावेज में दर्शाए अनुसार एक-एक करके आवश्यक बोली दस्तावेजों को डिजिटल हस्ताक्षर और अपलोड करना होगा।

3) Bidder has to select the payment option as "on-line" to pay the tender fee as applicable and enter details of the instrument. Whenever, Tender fees is sought, bidders need to pay the tender fee separately on-line through RTGS (Refer to Schedule, Page No.2).

   बोलीदाता को निविदा शुल्क / ईएमडी को भुगतान के लिए "ऑन लाइन" के रूप में भुगतान विकल्प चुनना होगा और उपकरण का विवरण दर्ज करना होगा। जब भी, ईएमडी / निविदा शुल्क की मांग की जाती है, बोलीदाताओं को टेंडर शुल्क और ईएमडी अलग-अलग आरटीजीएस के माध्यम से ऑन लाइन पर भुगतान करने की आवश्यकता होती है (अनुसूची, पेज नं .2 देखें)।

4) A standard BoQ format has been provided with the tender document to be filled by all the bidders. Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. Bidders are required to download the BoQ file, open it and complete the white colored (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BoQ file is found to be modified by the bidder, the bid will be rejected.

   एक मानक BoQ प्रारूप को सभी बोलीदाताओं द्वारा भरने के लिए निविदा दस्तावेज प्रदान किया गया है। बोलीदाताओं को इस बात का ध्यान रखना चाहिए कि उन्हें आवश्यक प्रारूप में अपनी वित्तीय बोली जमा करनी चाहिए और कोई अन्य प्रारूप स्वीकार्य नहीं है। बोलीकर्ताओं को BoQ फाइल को डाउनलोड करने, इसे खोलने और अपने संबंधित वित्तीय उद्धरण और अन्य विवरण (जैसे बोलीदाता का नाम) के साथ सफेद रंगीन (असुरक्षित) कोशिकाओं को पूरा करना आवश्यक है। कोई भी अन्य कक्ष नहीं बदला जाना चाहिए। एक बार विवरण पूरा हो जाने पर, बोलीदाता को इसे सहेजना होगा और इसे ऑनलाइन जमा करना होगा, बिना फ़ाइल नाम बदलना। यदि BOQ फ़ाइल को बोलीदाता द्वारा संशोधित किया गया है, तो बोली को खारिज कर दिया जाएगा।

5) The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.

   सर्वर का समय (जो बोलीदाताओं के डैशबोर्ड पर प्रदर्शित होता है) बोलीदाताओं द्वारा बोलियों को खोलने के लिए समय सीमा को संदर्भित करने के लिए मानक समय के रूप में माना जाएगा। बोलीदाताओं को खोलना आदि। बोलीदाताओं को बोली प्रस्तुत करने के दौरान इस समय का पालन करना चाहिए।

6) All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128 bit encryption technology. Data storage encryption of sensitive fields is done.

   बोलीदाताओं द्वारा प्रस्तुत सभी दस्तावेज पीकेआई एन्क्रिप्शन तकनीकों का उपयोग करके एन्क्रिप्ट किया जाएगा जिससे डेटा की गोपनीयता सुनिश्चित हो सके। दर्ज किए गए डेटा को अनधिकृत व्यक्तियों द्वारा बोली खोलने के समय तक नहीं देखा जा सकता है। बोलियों की गोपनीयता को सुरक्षित सॉकेट लेयर 128 बिट एन्क्रिप्शन तकनीक का उपयोग कर रखा जाता है। संवेदनशील क्षेत्रों का डेटा संग्रहण एन्क्रिप्शन किया जाता है।

7) The uploaded tender documents become readable only after the tender opening by the authorized bid openers.

   अपलोड किए गए निविदा दस्तावेज केवल अधिकृत बोलीदाता द्वारा निविदा खोलने के बाद ही पठनीय हो सकते हैं।

8) Upon the successful and timely submission of bids, the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.

   बोलियों के सफल और समय पर जमा होने पर, पोर्टल एक सफल बोली प्रस्तुत करने का संदेश देगा और एक बोली सारांश बोली संख्या के साथ प्रदर्शित किया जाएगा। और अन्य सभी प्रासंगिक विवरणों के साथ बोली प्रस्तुत करने की तारीख और समय।

9) Kindly add scanned PDF of all relevant documents in a single PDF file of compliance sheet.

   कृपया अनुपालन पत्रक की एक पीडीएफ फाइल में सभी प्रासंगिक दस्तावेजों के स्कैन किए गए पीडीएफ़ को जोड़ दें।

ASSISTANCE TO BIDDERS / बोलीदाताओं को सहायता

1) Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.

   निविदा दस्तावेज से संबंधित कोई भी प्रश्न और इसमें निहित नियमों और शर्तों को निविदा आमंत्रण प्राधिकरण को निविदा के लिए या निविदा में वर्णित प्रासंगिक संपर्क व्यक्ति से संबोधित किया जाना चाहिए।

2) Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk. The contact number for the helpdesk is 1800 233 7315.

   ऑनलाइन बोली प्रस्तुत करने या सामान्य में सीपीपी पोर्टल से संबंधित प्रश्नों की प्रक्रिया से संबंधित कोई भी प्रश्न 24x7 सीपीपी पोर्टल हैल्पडेस्क पर निर्देशित किया जा सकता है। हेल्पडेस्क के लिए संपर्क संख्या 1800 233 7315 है

General Instructions to the Bidders / बोलीदाताओं के लिए सामान्य निर्देश

1) The tenders will be received online through portal http://eprocure.gov.in/eprocure/app . In the Technical Bids, the bidders are required to upload all the documents in .pdf format.
   निविदाएं पोर्टल http://eprocure.gov.in/eprocure/app के माध्यम से ऑनलाइन प्राप्त होंगी तकनीकी बोलियों में, बोलीदाताओं को सभी दस्तावेजों को। पीडीएफ प्रारूप में अपलोड करना होगा।

2) Possession of a Valid Class II/III Digital Signature Certificate (DSC) in the form of smart card/e-token in the company's name is a prerequisite for registration and participating in the bid submission activities through https://eprocure.gov.in/eprocure/app. Digital Signature Certificates can be obtained from the authorized certifying agencies, details of which are available in the web site https://eprocure.gov.in/eprocure/app under the link "Information about DSC".
कंपनी के नाम में स्मार्ट कार्ड / ई-टोकन के रूप में मान्य क्लास II / III डिजिटल हस्ताक्षर प्रमाण पत्र (डीएससी) के पंजीकरण के लिए एक शर्त है और https://eprocure.gov.in/eprocure/ के माध्यम से बोली प्रस्तुत करने की गतिविधियों में भाग ले सकते है। डिजिटल हस्ताक्षर प्रमाण पत्र अधिकृत प्रमाणित एजेंसियों से प्राप्त की जा सकती है, जिनमें से जानकारी "डीएससी के बारे में सूचना" लिंक के तहत वेब साइट https://eprocure.gov.in/eprocure/app पर उपलब्ध है।

3) Tenderer are advised to follow the instructions provided in the 'Instructions to the Tenderer for the e-submission of the bids online through the Central Public Procurement Portal for e Procurement at https://eprocure.gov.in/eprocure/app.
निविदाकर्ता को सलाह दी जाती है कि वे निविदाकार को निर्देश दिए गए हों ताकि ई-प्रोक्योरमेंट के लिए सेंट्रल पब्लिक प्रोकॉर्ममेंट पोर्टल के जरिए https://eprocure.gov.in/eprocure/app पर ऑनलाइन निविदाएं जमा कर सकें।

Department of Civil Engineering
Indian Institute of Technology
Hauz Khas, New Delhi-110 016

NOTICE INVITING QUOTATIONS

Subject : Purchase of "Biaxial Shake Table Facility"

Invitation for Tender Offers

Indian Institute of Technology Delhi invites online Bids (Technical bid and Commercial bid) from eligible and experienced OEM (Original Equipment Manufacturer) OR OEM Authorized Dealer for **supply, installation & integration of Biaxial Shake Table Facility** with (warranty period as stated at page #1 of this tender) on site comprehensive warranty from the date of receipt of the material as per terms & conditions specified in the tender document, which is available on CPP Portal http://eprocure.gov.in/eprocure/app

TECHNICAL SPECIFICATION:

Sl. No.	Technical Specifications
01	✓ **MANDATORY ITEMS:** ✓ **Seismic Table** ✓ The shake table shall include a bearing-mounted horizontally sliding simultaneously in two orthogonal directions table with base plates under the bearings for attachment to a suitable floor. The table shall also include accelerometers and cabling and dynamic, fatigue rated actuators. ✓ The table may be purchased as a single axis system with bearing only for the single axis. The table shall also be upgradeable to a biaxial system where installation of the additional bearings and actuators can be performed after the initial installation of the single axis system. ✓ Shake table shall be of a welded steel, box type construction with internal webs to add stiffness and minimize weight. ✓ Shake table should be of stable with minimum weight. ✓ The shake table shall be designed for dynamic testing and have a pay load capacity of 10000 kg (approx.). The overturning moment capacity is 30 ton-force meters. The yaw moment capacity is 10 ton-force meters approximately. ✓ The weight and height of the shake table shall be approximately 6500 kg and 800 mm, respectively. ✓ The base plate shall include mounting holes with spacing intervals of 500 mm (approx.). It should also include leveling screws and access holes for grouting the table to the floor.

- ✓ The two accelerometers shall be rigidly mounted to the side of the shake table for measurement in the two horizontal directions. They should also have protective covers.
- ✓ No. maximum accelerometer = 2; Minimum capacity of each accelerometer = ±8 g.
- ✓ Maximum specimen weight = 10 metric tons; Maximum table acceleration with maximum specimen mass = 1g @ rated load; Minimum table acceleration without specimen = 2g; Maximum table velocity = 1 m/s @ rated load; Testing frequency = 0 - 50 Hz.
- ✓ The shake table shall provide horizontal specimen mounting surface of 3000 mm by 3000 mm including equally spaced M24 threaded holes.

- ✓ Linear guide bearing assembly must have protective bellows.

- ✓ **Servo-Controlled Hydraulic Actuators (2 Nos.)**

- ✓ The actuators shall have non-metallic bearings that are capable of withstanding continuous off-center loads.
- ✓ Double-ended, double-acting, fatigue-rated for combined balanced dynamic performance.
- ✓ Minimum force capacity: 200 kN; Minimum stroke: 500 mm.
- ✓ Load measurement through differential pressure transducer.
- ✓ The actuators shall each have 3.8 liter close-coupled accumulators for both pressure and return.
- ✓ The actuators shall have hydraulic cushions built into both end caps for system protection and safety against piston rod over-travel.
- ✓ The actuators shall have internally mounted LVDT type displacement transducers for measuring actuator displacements. Total LVDT stroke shall be identical to the total actuator stroke i.e. 500 mm.
- ✓ The actuators shall use swivel assemblies to attach to both the shake table and the reacting structures. The swivel angle of the swivels shall be -75 degrees and +90 degrees. The tilt angle of the swivels shall be +/-14 degrees.
- ✓ Shake table performance to be measured as below performance parameters:

Payload	Frequency	Double Ampl. (mm)	Velocity (mm/s)	Acceleration (g)
0	1 Hz	200	1250	Approx.1
	5 Hz	20	800	Approx.2.1
	10 Hz	6	400	Approx.2.1
	20 Hz	1.5	200	Approx.2.1
10T	1 Hz	200	1250	Approx.1
	5 Hz	10	300	Approx.1
	10 Hz	2	150	Approx.1
	20 Hz	0.6	80	Approx.1

- ✓ Performance curve of system shall be submitted
- ✓ Actuator swivels shall include an adjustment mechanism to control the backlash in the spherical bearing joint.
- ✓ Servo valve mount position on actuators – axial; Servo valve type – 3 stage; Flow rate of servo valve at 50 Hz = 630 LPM.

- ✓ The three-stage servo valve must have spool control managed by an internal LVDT or other displacement transducer.
- ✓ Load measurement through differential pressure transducer at rated temp range 15-35° C:
  Static rated pressure: 5000 psi approximately
  Fatigue rated pressure: 3000 psi approximately
  Output at static rated pressure: 20 mV approximately
  Nonlinearity: 0.002
  Repeatability: 0.1% full scale
- ✓ The swivel should be of fatigue rated load bearing capacity of minimum: 300 kN
- ✓ Clamping bolt in swivel should be of rated minimum torque: 750 N-m

3) Hydraulic Power Unit (01 No)

- ✓ The system shall include a minimum flow of 500 LPM of a hydraulic power unit to operate each axis independently at the maximum performance level.
- ✓ The HPU should be modular designed and equipped with high pressure variable volume pump and motor assembly submerged in hydraulic oil reservoir. Pump-motors must operate at an efficiency level of at least 85%.
- ✓ Number of pumps required – maximum 5 numbers
- ✓ Flow rate of pump-motor assembly = 100-125 LPM.
- ✓ Future addition/upgrade of pumps to have total maximum flow rate of system without adding another power unit chassis = 600 LPM.
- ✓ The power unit shall operate at minimum pressure = 21 MPa.
- ✓ The power unit shall include minimum filtration of 3 micron.
- ✓ The hydraulic power unit shall have a free field sound level of less than–75 dB(A). Documentary evidence of the sound should be provided.
- ✓ HPU motor efficiency class should meet or exceed the standard mentioned or equivalent: IEC 60034-30-1.
- ✓ Hydraulic Hose Conforms with industry standards: SAE J517, SAE J343.
- ✓ Hydraulic Hose Conforms with industry test & procedures standard: SAE 100R
- ✓ Hydraulic Hose Conforms with industry contamination control standards: ISO 11171
- ✓ Hydraulic Hose should have oil resistant labels with Part number, date of manufacture, diameter and working pressure.
- ✓ Minimum required Hose Set from Distribution Manifold to HPU: 25 ft
- ✓ Minimum required Hose Set from Distribution Manifold Channel to Service Manifold Station: 10 ft
- ✓ Minimum required Hose Set; Actuator to Service Manifold Station 2 no's: 15 ft
- ✓ **Hydraulic Service Manifold (two Stations):**

- ✓ The service manifold accumulator to minimize pressure ripple.
- ✓ The service manifolds shall include 19-liter pressure and 7-liter return line accumulators to minimize pressure ripple.
- ✓ To minimize pressure, drop in the system, the hydraulic service manifolds shall have a flow rating of not less than 900 lpm.
- ✓ Manifold slow proportional turn on capability adjustable range: 2-21 MPa

- ✓ The hydraulic service manifolds shall provide local ON/ LOW/HIGH/OFF control to isolate the pump pressure from the actuator. Fast emergency unload for system depressurization.
- ✓ The hydraulic service manifolds shall include minimum filtration of 10 micron.
- ✓ The hydraulic service manifolds should be compliant with safety standards or equivalent to: EN 13121, EN 13849-1, and EN ISO 4413.

4) Controller, PC, Software

- ✓ The servo hydraulic test system shall be controlled by a desktop computer workstation which is integrated into the controls system and provides the main operator's software interface. The operating system of the PC should be preemptive, multi-tasking, and multi-threaded.
- ✓ Servo hydraulic closed loop control shall be provided by the use of a digital controller, which provides complete control of the servo-loop, data acquisition, and function generation.
- ✓ The system should have the capability to be programmed by the operator using a standard library of procedure calls designed specifically for real-time control of the system.
- ✓ The system shall have the capability for fully automated seismic simulation testing with the addition of a software applications program.
- ✓ The software which controls the system should run under the latest Windows Operating System.
- ✓ The system software will provide each user a customized desktop that includes screen position memory and saved settings for the controller.

4.1) Closed Loop Controller

- ✓ A digital controller shall be provided which provides for closed loop control of the systems.
- ✓ The digital controller shall be able to be field upgraded to include more control channels and/or more powerful controller processor in the same chassis.
- ✓ The controller shall have the capability to allow for any transducer, whether conditioned by the controller or not, to be selected for control. Control modes will include load control, displacement control, acceleration control, velocity control or calculated channel control.
- ✓ The conditioners shall be fully integrated into the control system and possess the capability for computer control of ranging, transducer zero, transducer excitation, and linearization. All of the conditioners will be available for use as control channels.
- ✓ Chassis should be compact to occupy a tabletop.
- ✓ The controller shall have the capability to assign actions for detectors. The actions shall include ramp to, stop at level, digital output, off, indicate, hydraulics off, and valve clamp. These actions shall be set up by the user in the system software. Once set up, the actions can be saved and recalled.
- ✓ Minimum 3 nos. of I/O channels shall be available for control of peripheral devices.
- ✓ An emergency stop will be provided external to the controller.
- ✓ The closed loop controller shall include the following high-level fixed control techniques:
  The controller shall be capable of control of three state variables (displacement, velocity, acceleration) to generate high fidelity command waveforms. This is required

for the broad spectrum of frequencies in seismic time history files. Method for reference generation, error generation and application of signal output to be explained. Schematic of internal algorithm to be provided.

- ✓ Minimum Number of hydraulic stations upgradability of the controller - future upgradation in same controller: 4 Nos
- ✓ Minimum required number of configured hydraulic stations for present seismic table, actuators: 2 Nos
- ✓ Minimum number of channels upgradability of the controller - future upgradation in same controller: 8 Nos
- ✓ Minimum required number of configured channels for present seismic table, actuators: 2 Nos
- ✓ Minimum number of Auxiliary Data Inputs - future upgradation in same controller: 32 Nos
- ✓ Number of Digital I/O channels for future upgradation in same controller: 16 Nos

4.2) Transducer Signal Conditioners, Digital Universal Conditioners (DUC)

- ✓ For conditioning of acceleration, load, LVDT, or strain gage DUC signal conditioners shall be provided. Each DUC channel shall be available for test control if desired with mode switching between any channel available during a test.
- ✓ The signal conditioners should have computer-controlled ranging to allow for fully automated testing. Full range conditioning will be employed.
- ✓ Each signal conditioner should have computer control of linearization for accurate, automated calibration of transducer.
- ✓ The signal conditioners should have computer control of transducer zeroing to allow for fully automated testing.
- ✓ The signal conditioners shall have computer control of transducer excitation to allow for fully automated testing.
- ✓ The signal conditioners shall have computer control of signal filters cut off frequency on and off.
- ✓ Each conditioner shall have the capability to detect excitation loss and have computer control of limit detection for operator and system safety.
- ✓ The signal conditioners will support eight (8) wire bridge conditioning cabling to improve accuracy of the signal with long cable. The cabling shall also be compatible with 4 to 8 wire transducer bridges.
- ✓ The DUC will supply excitation voltages from 0 to 20V DC with current loads up to 100 mA. The excitation signal noise will be less than 0.25 mv peak to peak at frequencies from 10 to 500 Hz.
- ✓ DUC supply excitation voltage range: 0-20V DC
- ✓ DUC supply excitation current loads = 100 mA approximately
- ✓ DUC supply excitation noise should be less than peak to peak: 0.25 mV
- ✓ Frequency range: 10 - 500 Hz
- ✓ D/A converter resolution = 16 bit

4.3) Valve Driver

- ✓ For each axis of control, a valve driver shall be provided.
- ✓ A valve driver shall support two- and three-stage servo valves.

- ✓ The D/A output to the servo valve driver minimum resolution of 16 bit.
- ✓ The maximum current output of the valve driver = 100 milliamps.
- ✓ Amplitude and frequency shall be computer controlled.
- ✓ Maximum frequency = 500 Hz.
- ✓ Amplitude: up to 50% peak output.
- ✓ To ensure accurate valve balance, each individual valve driver shall have the valve balance computer controlled. Valve balance up to ± full scale will be possible.

4.4) Function Generator

- ✓ Function generation shall be fully integrated into the system control software and electronics with the capability to stop and start tests in an automated mode through a computer.
- ✓ The function generator shall be capable of generating cyclic, random, earthquake files and external control (digital or analog) for both axes simultaneously or independently.
- ✓ The system should be capable of generating and controlling from wave shapes which are defined by specific applications programs.
- ✓ The wave forms frequency range: 0.001 to 500 Hz.
- ✓ The function generator will include mean, amplitude, and frequency adjustment for square, triangle, sine, sine dwell and sine sweep. Mean and amplitude controls for ensuring that the system operates to the desired mean and amplitude will be included.
- ✓ The function generator will include band-limited and shaped random signals with adjustable RMS levels. Shapes shall include flat, $(1/f)^2$, (1/f), f, $(f)^2$.

4.5) Data Recorder

- ✓ The data record shall capture all control and feedback signals used to operate the seismic simulator.
- ✓ Analog to Digital converter minimum resolution = 16 bit.
- ✓ The data acquisition rate shall be minimum on all channels = 2 kHz.

4.6) Control Software

- ✓ The main user interface for the system shall be through a personal computer and utilize a mouse driven, windowed user interface. This is a requirement for fully automated testing and to minimize the chances for operator error.
- ✓ The setting of all machine parameters and machine status information will be available through windows on the workstation screen that can be changed to icons when not required.
- ✓ The control software should allow user-defined detector actions such as indicate, hydraulics off, system interlock, or actions such as hold in a specified control mode, or ramp to a specified end level upon activating a detector.
- ✓ The control software will allow data from the system transducers to be collected and stored to disk during any test.
- ✓ The control software shall allow detection of digital inputs to the test system controller and allow digital output signals to be output from one of the control system digital output channels.

- ✓ Control software should be capable of stabilization of differential oil pressure through control loop signal updates. The required signal shall be calculated and programed to dampen the oil column compliances that change with the movement of heavy masses at high frequencies.
- ✓ The control software shall include the following adaptive control techniques:
- ✓ Control software should have compensation technique that can adapt to changing system dynamics. Amplitude and phase irregularities should be corrected in real-time by adaptation at every point of the wave of fixed and wave frequency, not just the peaks. Input signal must be scaled by the inverse of the amplitude error and shifted by the negative of the phase error. Schematic of internal algorithm to be provided.

- ✓ Software shall be capable to reduce or cancel spurious harmonics based on the science of active noise cancellation. Software shall be capable of combining this functionality with amplitude-phase correction. Schematic of internal algorithm to be provided.

- ✓ Software shall be capable to improve input-output frequency response of the control system. FRF (frequency response function) of the system is to be measured using a digital filter and command must be scaled by an inverse of this function to help the overall frequency response approach unity. Automatic adjustments must be made based on system/specimen response. Schematic of internal algorithm is to be provided.
- ✓ Software should be capable of handling a desired file (unchanging) and drive file (modified) to allow online iterations on an individual sample-by-sample basis till the control system response is a perfect replica of the original desired command.

4.7) Programming Environment

- ✓ The operator shall have the capability to program the system using a library of real time procedure calls.
- ✓ The library of procedure calls shall include a set to control function generator processes. The function generator processes to be controlled include: definition of wave shape, frequency, random signals and earthquake files.
- ✓ The library of routines shall include a set which controls the functions of the analog readout output and digital I/O channels.

4.8) Personal Computer

- ✓ A Personal Computer of the latest model shall be included for use with the control system. The PC shall be as follows (minimum configuration):
  Uninterruptible Power Supply for the Controller and PC (Please provide the details for the same in technical bid)

4.9) System Capabilities

- ✓ Must be able to represent forward and inverse models to allow for general specimen model definitions such as mass, center-of-gravity, and damping ratios. Modelling will help understand issues prior to running the test.

- ✓ Must have capability to upgrade in the future to perform hybrid simulations, which will allow structure sub-components to be tested in conjunction with full component simulations. System should have capability upgrade to combine physical testing and computer modeling for a more efficient and affordable way to examine how structural systems respond to realistic dynamic or seismic loading. It should allow modeling the complete structure while physically testing only a portion with the seismic table.

4.10) System Services

4.10.1) System Installation

- ✓ Bidders must provide grout material and include services to grout seismic simulator test system base plate and actuator mounting fixtures. Bidder must level the baseplate within a tolerance of 0.2mm per meter. All bearing rails must be parallel in the vertal direction within +/- 0.05mm. A laser measurement system is needed to assure that all bearing rails are parallel.
- ✓ Responding bidders shall include system startup and checkout of the test system at the buyer's facility. This installation will also include on-site training on the use and operation of the system.
- ✓ Bearing Rails level within 0.2mm per meter. Bearing Rails parallel in vertical direction within 0.05mm.
- ✓ Bidders to provide buyers with technical support in the design and fabrication of an appropriate isolation mass for the shake table. Design and fabrication is the responsibility of the buyers.

4.10.2) System Documentation

- ✓ A complete set of operation and maintenance manuals shall be provided with the system.
- ✓ Design Review.
- ✓ Bidders to include at least one on-site design review.

B) REMARKS

- ✓ Supplier’s engineer shall provide installation support and check-out service.
- ✓ Structural RC details, noise barriers, guard rails should be provided with detailed specifications and calculations.
- ✓ Site preparation guidance to be provided from the vendor
- ✓ On-line system manuals on the CD.
- ✓ The bidder must note that requirements in the above specifications are intended to be descriptive only and not restrictive. The bids offered under other specifications will be considered, provided that the bid clearly states the offered commodities are substantially superior to those requirements in the above specification. (By descriptive literature, illustrations, etc.)
- ✓ POs of same/similar items should be provided along-with the technical bids
- ✓ POs of previous supplies for same or higher configuration systems. Minimum of 5 numbers either in India or globally.
- ✓ Bidder should have a sound bank balance, annual report for the last five years to be provided.

	✓ The supplier must be ISO 9000 series certificated. Suppliers whose products or services do not adhere to the **specified quality standards** (e.g., ISO certifications, safety standards, or industry-specific standards) will be disqualified ✓ Service Support: The Vendor shall define the service support plan in India and shall utilize either factory direct service or through factory trained service personnel located in India with a minimum of five service engineers on staff for servo-hydraulic application. A commitment to the local community shall be evidenced by the existence of this service support for at least 10 years. ✓ 1 year minimum and 3 years maximum system warranty after acceptance ✓ Spares and consumables to be quoted ✓ POs of same/similar items should be provided to any of the govt. institutions like IITs along-with the technical bid ✓ Any supplier who fails to submit all the required documents (e.g., certifications, proof of previous work, financial statements) will be disqualified. ✓ Performance Security will be 5% of the basic value of the item. ✓ The bidder must have an average annual turnover of at least INR 5-7 crores in the last ✓ two financial years. ✓ Past performance of the vendor should be 70% and a **completion report** (detailing milestones achieved, outcomes, and customer satisfaction) may be required to meet the 70% past performance criteria. ✓ Vendors may be required to submit **performance certificates** from previous clients or government departments to demonstrate successful contract completion. ✓ **First Demonstration**: The first demonstration might occur **at the time of delivery**, installation, or setup of the equipment or service. The technician would show that the system is installed properly and operating as expected. ✓ **Second Demonstration**: The second demonstration could take place after a period of use (e.g., after a few weeks or months) to verify that the equipment or system continues to function correctly. It may also be part of a **training session** for end-users or the technical team. ✓ **Payment Terms:** 100% payment will be released after the satisfactory installation and 10% payment will be released after four (04) months of successful operation of the equipment.

A complete set of tender documents* may be Download by prospective bidder free of cost from the website http://eprocure.gov.in/eprocure/app. Bidder has to make payment of requisite fees (i.e. Tender fees, if any online through RTGS/NEFT only.

Terms & Conditions Details

Sl. No.	Specification
1.	**Due date**: The tender has to be submitted on-line before the due date. The offers received after the due date and time will not be considered. No manual bids will be considered.
2.	**Preparation of Bids**: The offer/bid should be submitted in two bid systems i.e. Technical bid and Financial bid. The Technical bid should consist of all technical details along with commercial terms and conditions. Financial bid should indicate item wise price for the items mentioned in the technical bid in the given format i.e BoQ_XXXX. The Technical bid and the financial bid should be submitted Online. ***Note: -Comparison of prices will be done ONLY on the bids submitted for the Main Equipment and anything asked as 'Optional' in the specs is not to be included for overall comparison.***
3.	**EMD (if applicable)**: The tenderer should submit an EMD amount through RTGS/NEFT. The Technical Bid without EMD would be considered as UNRESPONSIVE and will not be accepted. The EMD will be refunded without any interest to the unsuccessful bidders after the award of contract. Refer to Schedule (at page 1 of this document) for its actual place of submission.
4.	**Refund of EMD**: The EMD will be returned to unsuccessful Tenderer only after the Tenders are finalized. In case of successful Tenderer, it will be retained till the successful and complete installation of the equipment.
5.	**Opening of the tender**: The online bid will be opened by a committee duly constituted for this purpose. Online bids (complete in all respect) received along with EMD (if any) will be opened as mentioned at "Annexure: Schedule" in presence of bidders representative if available. Only one representative will be allowed to participate in the tender opening. Bid received without EMD (if present) will be rejected straight way. The technical bid will be opened online first and it will be examined by a technical committee (as per specification and requirement). The financial offer/bid will be opened only for the offer/bid which technically meets all requirements as per the specification, and will be opened in the presence of the vendor's representatives subsequently for further evaluation. The bidders if interested may participate on the tender opening Date and Time. The bidder should produce authorization letter from their company to participate in the tender opening.
6.	**Acceptance/ Rejection of bids:** The Committee reserves the right to reject any or all offers without assigning any reason.
7.	**Pre-qualification criteria:** (i) Bidders should be the manufacturer / authorized dealer. Letter of Authorization from original equipment manufacturer (OEM) on the same and specific to the tender should be enclosed. (ii) An undertaking from the OEM is required stating that they would facilitate the bidder on a regular basis with technology/product updates and extend support for the warranty as well. (Ref. Annexure-II) (iii) OEM should be internationally reputed Branded Company. (iv) Non-compliance of tender terms, non-submission of required documents, lack of clarity of the specifications, contradiction between bidder specification and supporting documents etc. may lead to rejection of the bid. (v) In the tender, either the Indian agent on behalf of the Principal/OEM or Principal/OEM itself can bid but both cannot bid simultaneously for the same item/product in the same tender. (vi) If an agent submits bid on behalf of the Principal/OEM, the same agent shall not submit a bid on behalf of another Principal/OEM in the same tender for the same item/product.
8.	**Performance Security**: Performance Security may be furnished in the form of Insurance Surety Bonds, Account Payee Demand Draft, Fixed Deposit Receipt from a Commercial bank, Bank Guarantee (including e-Bank Guarantee) from a Commercial bank or online payment in an acceptable form safeguarding the purchaser's interest in all respects within 21 days from the date of receipt of

	the purchase order and should be kept valid for a period of 60 days beyond the date of completion of warranty period.
9.	**Force Majeure:** The Supplier shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, it's delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure. • For purposes of this Clause, "Force Majeure" means an event beyond the control of the Supplier and not involving the Supplier's fault or negligence and not foreseeable. Such events may include, but are not limited to, acts of the Purchaser either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes. • If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.
10.	**Risk Purchase Clause**: In event of failure of supply of the item/equipment within the stipulated delivery schedule, the purchaser has all the right to purchase the item/equipment from the other source on the total risk of the supplier under risk purchase clause.
11.	**Packing Instructions**: Each package will be marked on three sides with proper paint/indelible ink, the following: i.Item Nomenclature ii.Order/Contract No. iii.Supplier's Name and Address iv.Consignee details v.Packing list reference number
12.	**Delivery and Documents:** Delivery of the goods should be made within a maximum of 12 to 16 weeks *(for goods ready for shipment)* & Maximum *(To be filled by Purchaser)* weeks *(For special/ to be fabricated goods) from the date of the Purchase Order*. Within 24 hours of shipment, the supplier shall notify the purchaser and the insurance company by email the full details of the shipment including contract number, railway receipt number/ AAP etc. and date, description of goods, quantity, name of the consignee, invoice etc. The supplier shall mail the following documents to the purchaser with a copy to the insurance company: 1. 4 Copies of the Supplier invoice showing contract number, goods' description, quantity 2. unit price, total amount; 3. Insurance Certificate if applicable; 4. Manufacturer's/Supplier's warranty certificate; 5. Inspection Certificate issued by the nominated inspection agency, if any 6. Supplier's factory inspection report; and 7. Certificate of Origin (if possible by the beneficiary); 8. Two copies of the packing list identifying the contents of each package. 9. The above documents should be received by the Purchaser before arrival of the Goods (except where the Goods have been delivered directly to the Consignee with all documents) and, if not received, the Supplier will be responsible for any consequent expenses.
13.	**Delayed delivery:** If the delivery is not made within the due date for any reason, the Committee will have the right to impose penalty 1% per week and the maximum deduction is 10% of the contract value / price.
14.	**Prices**: The price should be quoted in net per unit (after breakup) and must include all packing and delivery charges. Price quoted should be in Indian Rupees, free delivery at IIT Delhi Campus at site (DDP/FOR).

	Further, depending on the nature of the goods, there may be cost elements towards installation and commissioning, operator's training, and so on. Normally, it may be included in the equipment cost but if it is quoted separately, the same will be added in the item price for the determination of ranking of the bidders. The offer/bid should be exclusive of taxes and duties, which will be paid by the purchaser as applicable. However, the percentage of taxes & duties shall be clearly indicated. Necessary certificate will be issued on demand. The Buyer/PFC will have the right to award contracts to different Bidders for being lowest in particular items. For ranking of offers, price of complete scope of supply as detailed in technical specifications, the procuring authority/Purchaser may decide as follows for comparison of price bid - (i) All items of the bid which are mandatorily required to meet the tendered specifications of the item/system (ii) If a bidder has put certain items/modules which are required to meet the tendered specifications in the 'optional' part of the bid, then such optional items shall also be included for the purpose of price comparison (iii) On the other hand, if a bidder has inadvertently included any item/module in its main price bid which is not required as per tender specifications, then the price of such item/module shall be excluded from the price comparison provided that the price for the said item/module is clearly reflected separately in the bid (iv) Anything asked as 'optional' in our specs is not to be included for overall comparison **Non-conformities between Figures and words:** Sometimes, non-conformities/errors are also observed in responsive tenders between the quoted prices in figures and in words. This situation normally does not arise in case of e-Procurement. This should be taken care of in the manner indicated below: (i) If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price will prevail and the total price will be corrected. (ii) If there is an error in a total corresponding to the addition or subtraction of sub-totals, the sub-totals shall prevail and the total shall be corrected; (iii) If there is a discrepancy between words and figures, the amount in words will prevail for calculation of price.
15.	**Notices:** For the purpose of all notices, the following shall be the address of the Purchaser and Supplier. **Purchaser: Debayan Bhattacharya** , Deptt of Civil Engg. Indian Institute of Technology Hauz Khas, New Delhi - 110016. **Supplier:** (To be filled in by the supplier) **(Supplier should submit its supplies information as per Annexure-II).**

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16.	**Progress of Supply**: Wherever applicable, supplier shall regularly intimate progress of supply, in writing, to the Purchaser as under: 1. Quantity offered for inspection and date; 2. Quantity accepted/rejected by inspecting agency and date; 3. Quantity dispatched/delivered to consignees and date; 4. Quantity where incidental services have been satisfactorily completed with date; 5. Quantity where rectification/repair/replacement effected/completed on receipt of any communication from consignee/Purchaser with date; 6. Date of completion of entire Contract including incidental services, if any; and **7.** Date of receipt of entire payments under the Contract (In case of stage-wise inspection, details required may also be specified).
17.	**Inspection and Tests:** Inspection and tests prior to shipment of Goods and at final acceptance are as follows: • After the goods are manufactured and assembled, inspection and testing of the goods shall be carried out at the supplier's plant by the supplier, prior to shipment to check whether the goods are in conformity with the technical specifications attached to the purchase order. Manufacturer's test certificate with data sheet shall be issued to this effect and submitted along with the delivery documents. The purchaser shall be present at the supplier's premises during such inspection and testing if need is felt. The location where the inspection is required to be conducted should be clearly indicated. The supplier shall inform the purchaser about the site preparation, if any, needed for installation of the goods at the purchaser's site at the time of submission of order acceptance. • The acceptance test will be conducted by the Purchaser, their consultant or other such person nominated by the Purchaser at its option after the equipment is installed at purchaser's site in the presence of supplier's representatives. The acceptance will involve trouble free operation and ascertaining conformity with the ordered specifications and quality. There shall not be any additional charges for carrying out acceptance test. No malfunction, partial or complete failure of any part of the equipment is expected to occur. The Supplier shall maintain necessary log in respect of the result of the test to establish to the entire satisfaction of the Purchaser, the successful completion of the test specified. • In the event of the ordered item failing to pass the acceptance test, a period not exceeding one weeks will be given to rectify the defects and clear the acceptance test, failing which the Purchaser reserve the right to get the equipment replaced by the Supplier at no extra cost to the Purchaser. • Successful conduct and conclusion of the acceptance test for the installed goods and equipment shall also be the responsibility and at the cost of the Supplier.
18.	**Resolution of Disputes**: The dispute resolution mechanism to be applied pursuant shall be as follows: • In case of Dispute or difference arising between the Purchaser and a domestic supplier relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996, the rules there under and any statutory modifications or re-enactments thereof shall apply to the arbitration proceedings. The dispute shall be referred to the Director, Indian Institute of Technology Delhi and if he is unable or unwilling to act, to the sole arbitration of some other person appointed by him willing to act as such Arbitrator. The award of the arbitrator so appointed shall be final, conclusive and binding on all parties to this order.
19.	**Applicable Law:** The place of jurisdiction would be New Delhi (Delhi) INDIA.
20.	**Right to Use Defective Goods:** If after delivery, acceptance and installation and within the guarantee and warranty period, the operation or use of the goods proves to be unsatisfactory, the Purchaser shall have the right to continue to operate

	or use such goods until rectifications of defects, errors or omissions by repair or by partial or complete replacement is made without interfering with the Purchaser's operation.
21.	**Supplier Integrity:** The Supplier is responsible for and obliged to conduct all contracted activities in accordance with the Contract using state of the art methods and economic principles and exercising all means available to achieve the performance specified in the contract.
22.	**Training:** The Supplier is required to provide training to the designated Purchaser's technical and end user personnel to enable them to effectively operate the total equipment.
23.	**Installation & Demonstration:** The supplier is required to done the installation and demonstration of the equipment within one month of the arrival of materials at the IITD site of installation, otherwise the penalty clause will be the same as per the supply of materials. In case of any mishappening/damage to equipment and supplies during the carriage of supplies from the origin of equipment to the installation site, the supplier has to replace it with new equipment/supplies immediately at his own risk. Supplier will settle his claim with the insurance company as per his convenience. IITD will not be liable to any type of losses in any form.
24.	**Insurance:** For delivery of goods at the purchaser's premises, the insurance shall be obtained by the supplier in an amount equal to 110% of the value of the goods from "warehouse to warehouse" (final destinations) on "All Risks" basis including War Risks and Strikes. The insurance shall be valid for a period of not less than 3 months after installation and commissioning.
25.	**Incidental services:** The incidental services also include: • Furnishing of 01 set of detailed operations & maintenance manual. • Arranging the shifting/moving of the item to their location of final installation within IITD premises at the cost of Supplier through their Indian representatives.
26.	**Warranty**: (i) Warranty period shall be (as stated at page #2 of this tender) from date of installation of Goods at the IITD site of installation. The Supplier shall, in addition, comply with the performance and/or consumption guarantees specified under the contract. If for reasons attributable to the Supplier, these guarantees are not attained in whole or in part, the Supplier shall at its discretion make such changes, modifications, and/or additions to the Goods or any part thereof as may be necessary in order to attain the contractual guarantees specified in the Contract at its own cost and expense and to carry out further performance tests. The warranty should be comprehensive on site. (ii) The Purchaser shall promptly notify the Supplier in writing of any claims arising under this warranty. Upon receipt of such notice, the Supplier shall immediately within in 02 days arrange to repair or replace the defective goods or parts thereof free of cost at the ultimate destination. The Supplier shall take over the replaced parts/goods at the time of their replacement. No claim whatsoever shall lie on the Purchaser for the replaced parts/goods thereafter. The period for correction of defects in the warranty period is 02 days. If the supplier having been notified fails to remedy the defects within 02 days, the purchaser may proceed to take such remedial action as may be necessary, at the supplier's risk and expenses and without prejudice to any other rights, which the purchaser may have against the supplier under the contract. (iii) The warranty period should be clearly mentioned. The maintenance charges (AMC) under different schemes after the expiry of the warranty should also be mentioned. The comprehensive warranty will commence from the date of the satisfactory installation/commissioning of the equipment against the defect of any manufacturing, workmanship and poor quality of the components.

	(iv) After the warranty period is over, Annual Maintenance Contract (AMC)/Comprehensive Maintenance Contract (CMC) up to next two years should be started. The AMC/CMC charges will not be included in computing the total cost of the equipment.
27.	**Governing Language:** The contract shall be written in English language. English language version of the Contract shall govern its interpretation. All correspondence and other documents pertaining to the Contract, which are exchanged by the parties, shall be written in the same language.
28.	**Applicable Law:** The Contract shall be interpreted in accordance with the laws of the Union of India and all disputes shall be subject to place of jurisdiction.
29.	**Notices:** • Any notice given by one party to the other pursuant to this contract/order shall be sent to the other party in writing or by email and confirmed in writing to the other party's address. • A notice shall be effective when delivered or on the notice's effective date, whichever is later.
30.	**Taxes:** Suppliers shall be entirely responsible for all taxes, duties, license fees, octroi, road permits, etc., incurred until delivery of the contracted Goods to the Purchaser. However, GST etc, in respect of the transaction between the Purchaser and the Supplier shall be payable extra, if so stipulated in the order.
31.	**Duties:** IIT Delhi is exempted from paying custom duty under notification No.51/96 (partially or full) and necessary "Custom Duty Exemption Certificate" can be issued after providing following information and Custom Duty Exemption Certificate will be issued to the shipment in the name of the Institute, (no certificate will be issued to third party): The procured product should be used for teaching, scientific and research work only. a) Shipping details i.e. Master Airway Bill No. and House Airway No. (if exists) b) Forwarder details i.e. Name, Contact No., etc.
32.	**Payment**: 90% payment shall be made by the Purchaser against delivery, inspection, successful installation, commissioning and acceptance of the equipment at IITD in good condition and to the entire satisfaction of the Purchaser and on production of unconditional performance bank guarantee as specified in Clause 8 of tender terms and conditions & 10% payment will be released after four (04) months of successful operation of the equipment.
33.	**User list:** Brochure detailing technical specifications and performance, list of industrial and educational establishments where the items enquired have been supplied must be provided. (Ref. Annexure-III)
34.	**Manuals and Drawings:** (i) Before the goods and equipment are taken over by the Purchaser, the Supplier shall supply operation and maintenance manuals. These shall be in such details as will enable the Purchaser to operate, maintain, adjust and repair all parts of the works as stated in the specifications. (ii) The Manuals shall be in the ruling language (English) in such form and numbers as stated in the contract. (iii) Unless and otherwise agreed, the goods equipment shall not be considered to be completed for the purposes of taking over until such manuals and drawing have been supplied to the Purchaser.
35.	**Application Specialist**: The Tenderer should mention in the Techno-Commercial bid the availability and names of Application Specialist and Service Engineers in the nearest regional office. (Ref. to Annexure-III)

36.	**Site Preparation**: The supplier shall inform to the Institute about the site preparation, if any, needed for the installation of equipment, immediately after the receipt of the purchase order. The supplier must provide complete details regarding space and all the other infrastructural requirements needed for the equipment, which the Institute should arrange before the arrival of the equipment to ensure its timely installation and smooth operation thereafter. The supplier shall visit the Institute and see the site where the equipment is to be installed and may offer his advice and render assistance to the Institute in the preparation of the site and other pre-installation requirements.
37.	**Spare Parts** The Supplier may be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier: ii. Such spare parts as the Purchaser may elect to purchase from the Supplier, providing that this election shall not relieve the Supplier of any warranty obligations under the Contract; and iii. In the event of termination of production of the spare parts: iv. Advance notification to the Purchaser of the pending termination, in sufficient time to permit the Purchaser to procure needed requirements; and v. Following such termination, furnishing at no cost to the Purchaser, the blueprints, drawings and specifications of the spare parts, if requested. Supplier shall carry sufficient inventories to assure ex-stock supply of consumable spares for the Goods, such as gaskets, plugs, washers, belts etc. Other spare parts and components shall be supplied as promptly as possible but in any case within six months of placement of order.
38.	**Defective Equipment**: If any of the equipment supplied by the Tenderer is found to be substandard, refurbished, un-merchantable or not in accordance with the description/specification or otherwise faulty, the committee will have the right to reject the equipment or its part. The prices of such equipment shall be refunded by the Tenderer with 18% interest if such payments for such equipment have already been made. All damaged or unapproved goods shall be returned at suppliers cost and risk and the incidental expenses incurred thereon shall be recovered from the supplier. Defective part in equipment, if found before installation and/or during warranty period, shall be replaced within 45 days on receipt of the intimation from this office at the cost and risk of supplier including all other charges. In case supplier fails to replace above item as per above terms & conditions, IIT Delhi may consider "Banning" the supplier.
39.	**Termination for Default:** The Purchaser may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Supplier, terminate the Contract in whole or part: i. If the Supplier fails to deliver any or all of the Goods within the period(s) specified in the order or within any extension thereof granted by the Purchaser; or ii If the Supplier fails to perform any other obligation(s) under the Contract. iii If the Supplier, in the judgment of the Purchaser has engaged in corrupt or fraudulent practices in competing for or in executing the Contract. ● For the purpose of this Clause: i. "**Corrupt practice**" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. ii. "**Fraudulent practice**" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition;""

	• In the event the Purchaser terminates the Contract in whole or in part, the Purchaser may procure, upon such terms and in such manner, as it deems appropriate, Goods or Services similar to those undelivered, and the Supplier shall be liable to the Purchaser for any excess costs for such similar Goods or Services. However, the Supplier shall continue the performance of the Contract to the extent not terminated.
40.	**Downtime:** During the warranty period not more than 5% downtime will be permissible. For every day exceeding permissible downtime, penalty of 1/365 of the 5% item value will be imposed. Downtime will be counted from the date and time of the filing of complaint with in the business hours.
41.	**Training of Personnel:** The supplier shall be required to undertake to provide the technical training to the personnel involved in the use of the equipment at the Institute premises, immediately after completing the installation of the equipment for a minimum period of one week at the supplier's cost.
42.	**Disputes and Jurisdiction**: Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in the court of competent jurisdiction located within New Delhi.
43.	**Compliancy certificate**: This certificate must be provided indicating conformity to the technical specifications. (Annexure-I)
44.	**As per Ministry of Finance, Deptt. of Expenditure, Public Procurement Division Order (Public Procurement No.1) issued from file No.6/18/2019-PPD dated 23rd July, 2020** regarding Restrictions under Rule 144 (xi) of the General Financial Rules (GFRs) 2017, it is directed that any bidder from a country which shares a land border with India will be eligible to bid in any procurement whether of goods, services (including consultancy services and non-consultancy services) or works (including turnkey projects) only if the bidder is registered with the Competent Authority i.e. the Deptt. for Promotion of Industry and Internal Trade (DPIIT). *The said order will not apply to bidders from those countries (even sharing a land border with India) to which the Government of India has extended lines of credit or in which the Government of India is engaged in development projects (updated lists of the countries are given in the Ministry of External Affairs)* "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participated in a procurement process. "Bidders from a country which shares a land border with India" for the purpose of this Order means: i. An entity incorporated, established or registered in such a country; or ii. A subsidiary of an entity incorporated, established or registered in such a country; or ii. An entity substantially controlled through entities incorporated, established or registered in such a country; or *v.* An entity whose *beneficial owner* is situated in such a country; or *v.* An Indian (or other) agent of such an entity; or *vi.* A natural person who is the citizen of such a country; or *ii.* A consortium or joint venture where any member of the consortium or joint venture falls under any of the above The *beneficial owner* for the purpose of above will be as under: - 1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person (s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercise control through other means. Explanation-

	a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent of share or capital or profit of the company; b. "Control" shall include the right to appoint majority of the directors or to control the management of policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements; 2. In case of a partnership firm, the beneficial owner is the natural person (s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership; 3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person (s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals; 4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official; 5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership. An agent is a person employed to do any act for another, or to represent another in dealings with the third person. For Works contracts, including Turnkey contracts, the successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority. **A certificate shall be submitted by bidders in the tender documents regarding their compliance with the said order**. If the certificate submitted by a bidder whose bid is accepted is found to be false, this would be a ground for immediate termination and further legal action in accordance with law. Annexure VI (For Goods/ Services contracts)/ *Annexure VII (For Works contracts, including Turnkey contracts)*
45	**<u>It is mandatory for bidders to quote items having local content minimum 20%.</u> Refer revised Public Procurement (Preference to Make in India), Order 2017, No. P-45021/2/2017-PP (B.E-II) dated 16.09.2020 issued by DPIIT, Ministry of Commerce and Industry, Govt. of India. (Submit duly filled Annexure VIII for the same). *<u>The Annexure VIII once submitted in the Technical Bid will be final. Submission of Revised Annexure VIII will NOT be accepted.</u>*** ***As per O.M. of* DPIIT, Ministry of Commerce and Industry, Govt. of India *No.P-45021/102/2019-BE-II- Part (1) (E-50310) Dated 04.03.2021, Bidders offering Imported products will fall under the category of Non_Local Suppliers. They cannot claim themselves as Class-I or Class –II Local Suppliers by claiming the services such as Transportation, Insurance, Installation, Commissioning, Training and After Sale Service Support like AMC/ CMC etc. as Local Value Addition.***

ANNEXURE-I

COMPLIANCE SHEET

TECHNICAL SPECIFICATION

Sl. No.	Technical Specifications	COMPLIANCE Y/N
01	✓ **MANDATORY ITEMS:** ✓ **Seismic Table** ✓ The shake table shall include a bearing-mounted horizontally sliding simultaneously in two orthogonal directions table with base plates under the bearings for attachment to a suitable floor. The table shall also include accelerometers and cabling and dynamic, fatigue rated actuators. ✓ The table may be purchased as a single axis system with bearing only for the single axis. The table shall also be upgradeable to a biaxial system where installation of the additional bearings and actuators can be performed after the initial installation of the single axis system. ✓ Shake table shall be of a welded steel, box type construction with internal webs to add stiffness and minimize weight. ✓ Shake table should be of stable with minimum weight. ✓ The shake table shall be designed for dynamic testing and have a pay load capacity of 10000 kg (approx.). The overturning moment capacity is 30 ton-force meters. The yaw moment capacity is 10 ton-force meters approximately. ✓ The weight and height of the shake table shall be approximately 6500 kg and 800 mm, respectively. ✓ The base plate shall include mounting holes with spacing intervals of 500 mm (approx.). It should also include leveling screws and access holes for grouting the table to the floor. ✓ The two accelerometers shall be rigidly mounted to the side of the shake table for measurement in the two horizontal directions. They should also have protective covers. ✓ No. maximum accelerometer = 2; Minimum capacity of each accelerometer = ±8 g. ✓ Maximum specimen weight = 10 metric tons; Maximum table acceleration with maximum specimen mass = 1g @ rated load; Minimum table acceleration without specimen = 2g; Maximum table velocity = 1 m/s @ rated load; Testing frequency = 0 - 50 Hz. ✓ The shake table shall provide horizontal specimen mounting surface of 3000 mm by 3000 mm including equally spaced M24 threaded holes.	

- ✓ Linear guide bearing assembly must have protective bellows.

- ✓ **Servo-Controlled Hydraulic Actuators (2 Nos.)**

- ✓ The actuators shall have non-metallic bearings that are capable of withstanding continuous off-center loads.
- ✓ Double-ended, double-acting, fatigue-rated for combined balanced dynamic performance.
- ✓ Minimum force capacity: 200 kN; Minimum stroke: 500 mm.
- ✓ Load measurement through differential pressure transducer.
- ✓ The actuators shall each have 3.8 liter close-coupled accumulators for both pressure and return.
- ✓ The actuators shall have hydraulic cushions built into both end caps for system protection and safety against piston rod over-travel.
- ✓ The actuators shall have internally mounted LVDT type displacement transducers for measuring actuator displacements. Total LVDT stroke shall be identical to the total actuator stroke i.e. 500 mm.
- ✓ The actuators shall use swivel assemblies to attach to both the shake table and the reacting structures. The swivel angle of the swivels shall be -75 degrees and +90 degrees. The tilt angle of the swivels shall be +/-14 degrees.
- ✓ Shake table performance to be measured as below performance parameters:

Payload	Frequency	Double Ampl. (mm)	Velocity (mm/s)	Acceleration (g)
0	1 Hz	200	1250	Approx.1
	5 Hz	20	800	Approx.2.1
	10 Hz	6	400	Approx.2.1
	20 Hz	1.5	200	Approx.2.1
10T	1 Hz	200	1250	Approx.1
	5 Hz	10	300	Approx.1
	10 Hz	2	150	Approx.1
	20 Hz	0.6	80	Approx.1

- ✓ Performance curve of system shall be submitted
- ✓ Actuator swivels shall include an adjustment mechanism to control the backlash in the spherical bearing joint.
- ✓ Servo valve mount position on actuators – axial; Servo valve type – 3 stage; Flow rate of servo valve at 50 Hz = 630 LPM.
- ✓ The three-stage servo valve must have spool control managed by an internal LVDT or other displacement transducer.
- ✓ Load measurement through differential pressure transducer at rated temp range 15-35° C:

Static rated pressure: 5000 psi approximately
Fatigue rated pressure: 3000 psi approximately
Output at static rated pressure: 20 mV approximately
Nonlinearity: 0.002
Repeatability: 0.1% full scale

- ✓ The swivel should be of fatigue rated load bearing capacity of minimum: 300 kN
- ✓ Clamping bolt in swivel should be of rated minimum torque: 750 N-m

3) Hydraulic Power Unit (01 No)

- ✓ The system shall include a minimum flow of 500 LPM of a hydraulic power unit to operate each axis independently at the maximum performance level.
- ✓ The HPU should be modular designed and equipped with high pressure variable volume pump and motor assembly submerged in hydraulic oil reservoir. Pump-motors must operate at an efficiency level of at least 85%.
- ✓ Number of pumps required – maximum 5 numbers
- ✓ Flow rate of pump-motor assembly = 100-125 LPM.
- ✓ Future addition/upgrade of pumps to have total maximum flow rate of system without adding another power unit chassis = 600 LPM.
- ✓ The power unit shall operate at minimum pressure = 21 MPa.
- ✓ The power unit shall include minimum filtration of 3 micron.
- ✓ The hydraulic power unit shall have a free field sound level of less than 75 dB(A). Documentary evidence of the sound should be provided.
- ✓ HPU motor efficiency class should meet or exceed the standard mentioned or equivalent: IEC 60034-30-1.
- ✓ Hydraulic Hose Conforms with industry standards: SAE J517, SAE J343.
- ✓ Hydraulic Hose Conforms with industry test & procedures standard: SAE 100R
- ✓ Hydraulic Hose Conforms with industry contamination control standards: ISO 11171
- ✓ Hydraulic Hose should have oil resistant labels with Part number, date of manufacture, diameter and working pressure.
- ✓ Minimum required Hose Set from Distribution Manifold to HPU: 25 ft
- ✓ Minimum required Hose Set from Distribution Manifold Channel to Service Manifold Station: 10 ft
- ✓ Minimum required Hose Set; Actuator to Service Manifold Station 2 no's: 15 ft
- ✓ **Hydraulic Service Manifold (two Stations):**

- ✓ The service manifold accumulator to minimize pressure ripple.

- ✓ The service manifolds shall include 19-liter pressure and 7-liter return line accumulators to minimize pressure ripple.
- ✓ To minimize pressure, drop in the system, the hydraulic service manifolds shall have a flow rating of not less than 900 lpm.
- ✓ Manifold slow proportional turn on capability adjustable range: 2-21 MPa
- ✓ The hydraulic service manifolds shall provide local ON/ LOW/HIGH/OFF control to isolate the pump pressure from the actuator. Fast emergency unload for system depressurization.
- ✓ The hydraulic service manifolds shall include minimum filtration of 10 micron.
- ✓ The hydraulic service manifolds should be compliant with safety standards or equivalent to: EN 13121, EN 13849-1, and EN ISO 4413.

4) Controller, PC, Software

- ✓ The servo hydraulic test system shall be controlled by a desktop computer workstation which is integrated into the controls system and provides the main operator's software interface. The operating system of the PC should be preemptive, multi-tasking, and multi-threaded.
- ✓ Servo hydraulic closed loop control shall be provided by the use of a digital controller, which provides complete control of the servo-loop, data acquisition, and function generation.
- ✓ The system should have the capability to be programmed by the operator using a standard library of procedure calls designed specifically for real-time control of the system.
- ✓ The system shall have the capability for fully automated seismic simulation testing with the addition of a software applications program.
- ✓ The software which controls the system should run under the latest Windows Operating System.
- ✓ The system software will provide each user a customized desktop that includes screen position memory and saved settings for the controller.

4.1) Closed Loop Controller

- ✓ A digital controller shall be provided which provides for closed loop control of the systems.
- ✓ The digital controller shall be able to be field upgraded to include more control channels and/or more powerful controller processor in the same chassis.
- ✓ The controller shall have the capability to allow for any transducer, whether conditioned by the controller or not, to be selected for control. Control modes will include load control, displacement control, acceleration control, velocity control or calculated channel control.

	✓ The conditioners shall be fully integrated into the control system and possess the capability for computer control of ranging, transducer zero, transducer excitation, and linearization. All of the conditioners will be available for use as control channels. ✓ Chassis should be compact to occupy a tabletop. ✓ The controller shall have the capability to assign actions for detectors. The actions shall include ramp to, stop at level, digital output, off, indicate, hydraulics off, and valve clamp. These actions shall be set up by the user in the system software. Once set up, the actions can be saved and recalled. ✓ Minimum 3 nos. of I/O channels shall be available for control of peripheral devices. ✓ An emergency stop will be provided external to the controller. ✓ The closed loop controller shall include the following high-level fixed control techniques: The controller shall be capable of control of three state variables (displacement, velocity, acceleration) to generate high fidelity command waveforms. This is required for the broad spectrum of frequencies in seismic time history files. Method for reference generation, error generation and application of signal output to be explained. Schematic of internal algorithm to be provided. ✓ Minimum Number of hydraulic stations upgradability of the controller - future upgradation in same controller: 4 Nos ✓ Minimum required number of configured hydraulic stations for present seismic table, actuators: 2 Nos ✓ Minimum number of channels upgradability of the controller - future upgradation in same controller: 8 Nos ✓ Minimum required number of configured channels for present seismic table, actuators: 2 Nos ✓ Minimum number of Auxiliary Data Inputs - future upgradation in same controller: 32 Nos ✓ Number of Digital I/O channels for future upgradation in same controller: 16 Nos 4.2) Transducer Signal Conditioners, Digital Universal Conditioners (DUC) ✓ For conditioning of acceleration, load, LVDT, or strain gage DUC signal conditioners shall be provided. Each DUC channel shall be available for test control if desired with mode switching between any channel available during a test. ✓ The signal conditioners should have computer-controlled ranging to allow for fully automated testing. Full range conditioning will be employed. ✓ Each signal conditioner should have computer control of linearization for accurate, automated calibration of transducer.	

- ✓ The signal conditioners should have computer control of transducer zeroing to allow for fully automated testing.
- ✓ The signal conditioners shall have computer control of transducer excitation to allow for fully automated testing.
- ✓ The signal conditioners shall have computer control of signal filters cut off frequency on and off.
- ✓ Each conditioner shall have the capability to detect excitation loss and have computer control of limit detection for operator and system safety.
- ✓ The signal conditioners will support eight (8) wire bridge conditioning cabling to improve accuracy of the signal with long cable. The cabling shall also be compatible with 4 to 8 wire transducer bridges.
- ✓ The DUC will supply excitation voltages from 0 to 20V DC with current loads up to 100 mA. The excitation signal noise will be less than 0.25 mv peak to peak at frequencies from 10 to 500 Hz.
- ✓ DUC supply excitation voltage range: 0-20V DC
- ✓ DUC supply excitation current loads = 100 mA approximately
- ✓ DUC supply excitation noise should be less than peak to peak: 0.25 mV
- ✓ Frequency range: 10 - 500 Hz
- ✓ D/A converter resolution = 16 bit

4.3) Valve Driver

- ✓ For each axis of control, a valve driver shall be provided.
- ✓ A valve driver shall support two- and three-stage servo valves.
- ✓ The D/A output to the servo valve driver minimum resolution of 16 bit.
- ✓ The maximum current output of the valve driver = 100 milliamps.
- ✓ Amplitude and frequency shall be computer controlled.
- ✓ Maximum frequency = 500 Hz.
- ✓ Amplitude: up to 50% peak output.
- ✓ To ensure accurate valve balance, each individual valve driver shall have the valve balance computer controlled. Valve balance up to ± full scale will be possible.

4.4) Function Generator

- ✓ Function generation shall be fully integrated into the system control software and electronics with the capability to stop and start tests in an automated mode through a computer.
- ✓ The function generator shall be capable of generating cyclic, random, earthquake files and external control (digital or analog) for both axes simultaneously or independently.

- ✓ The system should be capable of generating and controlling from wave shapes which are defined by specific applications programs.
- ✓ The wave forms frequency range: 0.001 to 500 Hz.
- ✓ The function generator will include mean, amplitude, and frequency adjustment for square, triangle, sine, sine dwell and sine sweep. Mean and amplitude controls for ensuring that the system operates to the desired mean and amplitude will be included.
- ✓ The function generator will include band-limited and shaped random signals with adjustable RMS levels. Shapes shall include flat, $(1/f)^2$, (1/f), f, $(f)^2$.

4.5) Data Recorder

- ✓ The data record shall capture all control and feedback signals used to operate the seismic simulator.
- ✓ Analog to Digital converter minimum resolution = 16 bit.
- ✓ The data acquisition rate shall be minimum on all channels = 2 kHz.

4.6) Control Software

- ✓ The main user interface for the system shall be through a personal computer and utilize a mouse driven, windowed user interface. This is a requirement for fully automated testing and to minimize the chances for operator error.
- ✓ The setting of all machine parameters and machine status information will be available through windows on the workstation screen that can be changed to icons when not required.
- ✓ The control software should allow user-defined detector actions such as indicate, hydraulics off, system interlock, or actions such as hold in a specified control mode, or ramp to a specified end level upon activating a detector.
- ✓ The control software will allow data from the system transducers to be collected and stored to disk during any test.
- ✓ The control software shall allow detection of digital inputs to the test system controller and allow digital output signals to be output from one of the control system digital output channels.
- ✓ Control software should be capable of stabilization of differential oil pressure through control loop signal updates. The required signal shall be calculated and programed to dampen the oil column compliances that change with the movement of heavy masses at high frequencies.
- ✓ The control software shall include the following adaptive control techniques:

- ✓ Control software should have compensation technique that can adapt to changing system dynamics. Amplitude and phase irregularities should be corrected in real-time by adaptation at every point of the wave of fixed and wave frequency, not just the peaks. Input signal must be scaled by the inverse of the amplitude error and shifted by the negative of the phase error. Schematic of internal algorithm to be provided.

- ✓ Software shall be capable to reduce or cancel spurious harmonics based on the science of active noise cancellation. Software shall be capable of combining this functionality with amplitude-phase correction. Schematic of internal algorithm to be provided.

- ✓ Software shall be capable to improve input-output frequency response of the control system. FRF (frequency response function) of the system is to be measured using a digital filter and command must be scaled by an inverse of this function to help the overall frequency response approach unity. Automatic adjustments must be made based on system/specimen response. Schematic of internal algorithm is to be provided.
- ✓ Software should be capable of handling a desired file (unchanging) and drive file (modified) to allow online iterations on an individual sample-by-sample basis till the control system response is a perfect replica of the original desired command.

4.7) Programming Environment

- ✓ The operator shall have the capability to program the system using a library of real time procedure calls.
- ✓ The library of procedure calls shall include a set to control function generator processes. The function generator processes to be controlled include: definition of wave shape, frequency, random signals and earthquake files.
- ✓ The library of routines shall include a set which controls the functions of the analog readout output and digital I/O channels.

4.8) Personal Computer

- ✓ A Personal Computer of the latest model shall be included for use with the control system. The PC shall be as follows (minimum configuration):
  Uninterruptible Power Supply for the Controller and PC (Please provide the details for the same in technical bid)

4.9) System Capabilities

- ✓ Must be able to represent forward and inverse models to allow for general specimen model definitions such as mass, center-of-gravity, and damping ratios. Modelling will help understand issues prior to running the test.
- ✓ Must have capability to upgrade in the future to perform hybrid simulations, which will allow structure sub-components to be tested in conjunction with full component simulations. System should have capability upgrade to combine physical testing and computer modeling for a more efficient and affordable way to examine how structural systems respond to realistic dynamic or seismic loading. It should allow modeling the complete structure while physically testing only a portion with the seismic table.

4.10) System Services

4.10.1) System Installation

- ✓ Bidders must provide grout material and include services to grout seismic simulator test system base plate and actuator mounting fixtures. Bidder must level the baseplate within a tolerance of 0.2mm per meter. All bearing rails must be parallel in the vertal direction within +/- 0.05mm. A laser measurement system is needed to assure that all bearing rails are parallel.
- ✓ Responding bidders shall include system startup and checkout of the test system at the buyer's facility. This installation will also include on-site training on the use and operation of the system.
- ✓ Bearing Rails level within 0.2mm per meter. Bearing Rails parallel in vertical direction within 0.05mm.
- ✓ Bidders to provide buyers with technical support in the design and fabrication of an appropriate isolation mass for the shake table. Design and fabrication is the responsibility of the buyers.

4.10.2) System Documentation

- ✓ A complete set of operation and maintenance manuals shall be provided with the system.
- ✓ Design Review.
- ✓ Bidders to include at least one on-site design review.

B) REMARKS

- ✓ Supplier’s engineer shall provide installation support and check-out service.

	✓ Structural RC details, noise barriers, guard rails should be provided with detailed specifications and calculations. ✓ Site preparation guidance to be provided from the vendor ✓ On-line system manuals on the CD. ✓ The bidder must note that requirements in the above specifications are intended to be descriptive only and not restrictive. The bids offered under other specifications will be considered, provided that the bid clearly states the offered commodities are substantially superior to those requirements in the above specification. (By descriptive literature, illustrations, etc.) ✓ POs of same/similar items should be provided along-with the technical bids ✓ POs of previous supplies for same or higher configuration systems. Minimum of 5 numbers either in India or globally. ✓ Bidder should have a sound bank balance, annual report for the last five years to be provided. ✓ The supplier must be ISO 9000 series certificated. Suppliers whose products or services do not adhere to the **specified quality standards** (e.g., ISO certifications, safety standards, or industry-specific standards) will be disqualified ✓ Service Support: The Vendor shall define the service support plan in India and shall utilize either factory direct service or through factory trained service personnel located in India with a minimum of five service engineers on staff for servo-hydraulic application. A commitment to the local community shall be evidenced by the existence of this service support for at least 10 years. ✓ 1 year minimum and 3 years maximum system warranty after acceptance ✓ Spares and consumables to be quoted ✓ POs of same/similar items should be provided to any of the govt. institutions like IITs along-with the technical bid ✓ Any supplier who fails to submit all the required documents (e.g., certifications, proof of previous work, financial statements) will be disqualified. ✓ Performance Security will be 5% of the basic value of the item. ✓ The bidder must have an average annual turnover of at least INR 5-7 crores in the last ✓ two financial years. ✓ Past performance of the vendor should be 70% and a **completion report** (detailing milestones achieved, outcomes, and customer satisfaction) may be required to meet the 70% past performance criteria. ✓ Vendors may be required to submit **performance certificates** from previous clients or government departments to demonstrate successful contract completion.	

	✓ **First Demonstration**: The first demonstration might occur **at the time of delivery**, installation, or setup of the equipment or service. The technician would show that the system is installed properly and operating as expected. ✓ **Second Demonstration**: The second demonstration could take place after a period of use (e.g., after a few weeks or months) to verify that the equipment or system continues to function correctly. It may also be part of a **training session** for end-users or the technical team. ✓ **Payment Terms:** 100% payment will be released after the satisfactory installation and 10% payment will be released after four (04) months of successful operation of the equipment.	

I have also enclosed all relevant documents in support of my claims, (as above) in the following pages.

Signature of Bidder

Name: _____

Designation: _____

Organization Name: _____

Contact No. : _____

ANNEXURE-II

<< Organization Letter Head >>

DECLARATION SHEET

We, _____ hereby certify that all the information and data furnished by our organization with regard to this tender specification are true and complete to the best of our knowledge. I have gone through the specification, conditions and stipulations in details and agree to comply with the requirements and intent of specification.

This is certified that our organization has been authorized (Copy attached) by the OEM to participate in Tender. We further certified that our organization meets all the conditions of eligibility criteria laid down in this tender document. Moreover, OEM has agreed to support on regular basis with technology / product updates and extend support for the warranty.

The prices quoted in the financial bids are subsidized due to academic discount given to IIT Delhi.

We, further specifically certify that our organization has not been Black Listed/De Listed or put to any Holiday by any Institutional Agency/ Govt. Department/ Public Sector Undertaking in the last three years.	NAME & ADDRESS OF THE Vendor/ Manufacturer / Agent
1. Phone	
2. Fax	
3. E-mail	
4. Contact Person Name	
5. Mobile Number	
6. GST Number	
7. PAN Number	
(In case of on-line payment of Tender Fees) 8. UTR No. (For Tender Fee)	
9. Kindly provide bank details of the bidder in the following format: a) Name of the Bank	
b) Account Number	

(Signature of the Tenderer)

Name: _____

Seal of the Company

Annexure-III

List of Govt. Organization/Deptt.

List of Government Organizations for whom the Bidder has undertaken such work during last three years (must be supported with work orders)		
Name of the organization	**Name of Contact Person**	**Contact No.**

Name of application specialist / Service Engineer who have the technical competency to handle and support the quoted product during the warranty period.		
Name of the organization	**Name of Contact Person**	**Contact No.**

Signature of Bidder

Name: _____

Designation: _____

Organization Name: _____

Contact No. : _____

PREVIOUS SUPPLY ORDER DETAILS

Annexure - IV

Name of the Firm_____

Order placed by (Full address of Purchaser)	Order No. and Date	Description and quantity of order equipment	Value of order	Date of Completion of delivery as per contract	Has the equipment been installed satisfactorily (Attach a Certificate from the Purchaser/ Consignee)	Contact person along with Telephone No., Fax No. and email address)

Signature and Seal of the Manufacturer/ Bidder

_____

Place: _____

Date: _____

ORIGINAL EQUIPMENT MANUFACTURER (OEM)
Manufacturing Authorization form (MAF)
(On Letter Head of Manufacturer)

ANNEXURE-V (Revised)

Tender No. :- …… Date:- ……..

To
The Director,
Indian Institute of Technology Delhi,
New Delhi- 110016

Dear Sir,

We manufactures of original equipment at (……..address of factory……) do hereby authorize M/s *(Name and address of Agent)* to submit a bid, negotiate and receive the order format against your tender enquiry.

M/s. …….. is authorized to bid and conclude the contract in regard to this business.

We hereby extend our full guarantee and warranty as per clause …… of the terms and conditions NIQ for the goods and services offered by the above firm.

Yours Faithfully,

(Name)

(Name & Seal of Manufactures)

Note: -

1. **Items of indigenous nature or quoted in INR**, more than 1 authorized representative may participate in the same tender and submit their bids on behalf of their OEM/Principal/Manufacturer if the OEM permits more than one authorized bidder in such case as per their policy.

2. **In cases of agents quoting in offshore procurements,** on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. **One manufacturer can also authorize only one agent/dealer**

3. The letter of authority should be on the letterhead of the manufacturer and should be signed by a person competent and having the power of attorney to bind the manufacturer. The same should be included by the bidder in its techno-commercial unpriced bid.

<On Organization Letter Head>

(ANNEXURE-VI)
(For Goods/ Services Contracts)

No._____ Dated:_____

CERTIFICATE

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and hereby certify that this bidder is not from such a country.

OR (whichever is applicable)

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and hereby certify that this bidder is from _____(*Name of Country*) and has been registered with the Competent Authority. I also certify that this bidder fulfills all the requirements in this regard and is eligible to be considered.

(Copy/ evidence of valid registration by the Competent Authority is to be attached)

Signature of Bidder/ Agent

Name: _____

Designation: _____

Organization Name: _____

Contact No. : _____

<On Organization Letter Head>

(ANNEXURE-VII)

(For Works Contracts, including Turnkey contracts)

No._____ Dated:_____

CERTIFICATE

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries and hereby certify that this bidder is not from such a country and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority.

OR (whichever is applicable)

I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India and on sub-contracting to contractors from such countries and hereby certify that this bidder is from _____(*Name of Country*) and has been registered with the Competent Authority and will not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority. I also certify that this bidder fulfills all the requirements in this regard and is eligible to be considered.

(Copy/ evidence of valid registration by the Competent Authority is to be attached)

Signature of Bidder/ Agent

Name: _____

Designation: _____

Organization Name: _____

Contact No. : _____

(ANNEXURE-VIII)

DECLARATION OF LOCAL CONTENT

(To be given on Company Letter Head – For tender value below Rs.10 Crores)
(To be given by Statutory Auditor/ Cost Auditor/ Cost Accountant/ CA for tender value above Rs.10 Crores)

To,
The Director,
Indian Institute of Technology Delhi
New Delhi-110016

Subject: - Declaration of Local Content

Tender Reference No:_____

Name of Tender/ Work: _____

1. Country of Origin of Goods being offered:_____
2. We hereby declare that items offered has _____% local content
3. Details of the Location at which the Local Value Addition is made_____
4. Details of Local Content_____

"Local Content" means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of the imported content in the item (including all customs duties) as a proportion of the total value, in percent.

Bidders offering Imported products will fall under the category of Non Local Suppliers. They cannot claim themselves as Class-I or Class –II Local Suppliers by claiming the services such as Transportation, Insurance, Installation, Commissioning, Training and After Sale Service Support like AMC/ CMC etc. as Local Value Addition.

"*False declaration will be in breach of Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rules for which a bidder or its successors can be debarred for up to two years as per Rule 151(iii) of the General Financial Rules along with such other actions as may be permissible under law."

Yours faithfully,

(Signature of the bidder, with Official Seal)

Note: It is mandatory for bidders to quote items having local content minimum 20%. Refer revised Public Procurement (Preference to Make in India), Order 2017, No. P-45021/2/2017-PP (B.E-II) dated 16.09.2020 issued by DPIIT, Ministry of Commerce and Industry, Govt. of India. (Submit duly filled Annexure VIII for the same). *The Annexure VIII once submitted in the Technical Bid will be final. Submission of Revised Annexure VIII will NOT be accepted.*

(ANNEXURE-IX)

BID SECURITY UNDERTAKING

(To be issued by the bidder on company's letterhead in lieu of EMD)

To,

The Registrar,
I.I.T. Delhi, Hauz Khas,
Delhi – 110016.

We, M/s _____ (Name of the Firm), with ref. to Tender No._____ dated_____ hereby undertake that:

1. We accept all terms and conditions of the tender document.
2. We accept that, we will not modify our bid during the bid validity period and will honour the contract after the award of contract.
3. In the event of any modification to our bid by us or failure on our part to honour the contract after final award, our firm may be debarred from participation in any tender/ contract notified by IIT Delhi for a period of one year.

Yours faithfully,

(signature)
Name:
Date:
Office Seal:

BID SUBMISSION

Online Bid Submission:

The Online bids (complete in all respect) must be uploaded online in **two** Envelops as explained below: -

Envelope – 1 (Following documents to be provided as single PDF file)			
Sl. No.	**Document**	**Content**	**File Types**
1.	Technical Bid	Compliance Sheet (Annexure – I)	.PDF
2.		Organization Declaration (Annexure – II)	.PDF
3.		List of organizations/ clients where the same products have been supplied (in last two years) along with their contact number(s). (Annexure-III)	.PDF
4.		Technical supporting documents in support of all claims made at Annexure-I	.PDF
5.		Previous Supply Order (Annexure – IV)	.PDF
6.		Original Equipment Manufacturing Manufacturing Authorization Form (MAF) (Annexure – V)	.PDF
7.		*(For Goods/ Services Contracts)* Certificate - Bidder Not from/ from Country sharing Land border with India & Registration of Bidder with Competent Authority (Annexure-VI)	.PDF
8.		*(For Works Contracts, including Turnkey Contracts)* Certificate – Bidder Not from/ from Country sharing Land border with India, Registration of Bidder with Competent Authority & not sub-contract any work to a contractor from such countries unless such contractor is registered with the Competent Authority (Annexure-VII)	.PDF
9.		Declaration of Local Content (Annexure-VIII)	.PDF
10.		Bid Security Undertaking in lieu of EMD (Annexure-IX)	.PDF
Envelope – 2			
Sl. No.	**Document**	**Content**	
1.	Financial Bid	Price bid should be submitted in given BOQ_XXXX.xls format. (***Note: -Comparison of prices will be done ONLY on the bids submitted for the Main Equipment and anything asked as 'Optional' in the specs is not to be included for overall comparison.)*** Bids for optional items are to be submitted in 'sheet2_Quote for optional items'	.XLS