

CHAPTER - 4

ELIGIBILITY CONDITIONS, SPECIFICATIONS AND ALLIED TECHNICAL DETAILS

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4.1 Minimum Eligibility Criteria for Participation in Tender

1 The bidder should have supplied and commissioned 2 Nos of same or similar capacity machine/ instrument during the last 05 years (as on date of bid opening) in Govt institutes/ Govt. research organizations/ Public funded Universities/National test labs/ reputed private firms in India. The bidder / supplier should provide the PO copies, their installation report and Performance Certificate of the same POs.

(Note: Firms not meeting the minimum eligibility conditions will not be considered for technical evaluation.)

Technical Specification/ Requirements

CSIR-SERC is looking to establish a shock testing facility. Shock testing is critically important in **structural dynamics** because it helps engineers understand how structures and components behave under **sudden, high-magnitude transient loads**. The proposed shock test facility should be capable to represent a highly versatile shock test machine designed to meet rigorous industrial testing standards.

S. No	Parameter	Required Specification
	Shock Test Machine	
1.	Payload Capacity	Minimum 225 kg
2.	Maximum Acceleration	Halfsine: 600g or higher Terminal Peak Sawtooth: 100g or higher Trapezoidal (Square): 100g or higher
3.	Max Velocity Change in m/sec	7 m/sec or higher
4.	Shock Pulse Waveform Types	Half-sine, Trapezoidal, and Terminal peak sawtooth shock pulses
5.	Range of Pulse Duration	Minimum Requirement: Halfsine : 2ms, 6ms, 11ms, 18ms and 30ms. Sawtooth : 6ms to 11ms Trapezoidal : 10ms to 20ms
6.	Tolerance for repeatability	± 5 % or better
7.	Shock Generation Mechanism	Ex: pneumatic, hydraulic, or electromechanical actuators
8.	Shock Table Dimensions	Minimum 70 cm x 70 cm
9.	Grid Hole pattern	Minimum 10 cm
10.	Grid hole insert specification	Minimum M10 x 1.5
11.	Shock Table Material	Mg alloy or Aluminium alloy or better
12.	Option for Low Impulse Shock test for pulses below 150 cm/sec	Required
13.	Test Fixtures	- The vendor shall provide minimum 6 specialized mounting fixtures with following dimensions designed in accordance with IEC 60068-2-47. - Cube Fixture – Small: 200mm × 200mm × 200mm - Cube Fixture – Large: 300mm × 300mm × 300mm - L-Bracket – Small: 250mm × 250 mm × 200mm, thickness 25mm - L-Bracket – Large: 400mm × 400mm × 300mm, thickness 30mm - Adapter Plate – Small: 300mm × 300mm × 25mm - Adapter Plate – Large: 600mm × 600mm × 40mm - Detailed drawing and dimension to be supplied.

S. No	Parameter	Required Specification
		- These fixtures must be of lightweight material (6061-T6 Aluminum or Magnesium Alloy), have a first natural frequency well above the test frequency range (minimum 2000 Hz) to avoid resonance during 600g half-sine shocks. - The set must include all necessary high-tensile fasteners and a calibrated torque wrench for specimen installation.
14.	Accessories & others	It is the responsibility of the supplier/ bidder/OEM to include, quote and supply all the essential accessories required for proper functioning of the shock testing machine at CSIR-SERC. List of accessories to be given. Any special tools required for routine/ preventive & Breakdown maintenance are to be quoted and supplied
15.	Test Standard Compliance (industrial, and corporate shock testing standards and specifications)	IS 9000-7, MIL-STD-810, IEC 60068-2-27, ASTM D3332 and other relevant standards
16.	Seismic Base	Low frequency seismic base to limit shock energy transmission to the floor
17.	Safety Features	Emergency stop buttons, protective barriers, and interlocks
18.	Standards Compliance	Conformance with relevant national/international standards such as IS 9000, ASTM D3332 and IEC 60068-2-27
19.	Calibration	Calibration of the shock Test Machine traceable to National / International standard should be provided. The System performs shock simulation tests as per various national/international test standards such as MIL, IEC, BIS, JIS, ISO, etc. The shock test machine should be manufactured under ISO 9001 :2015 or (latest) norms and conforms to the norms meeting international safety requirements. The system should be supplied with calibration valid for three years and traceable to NABL/Government Test House.
20.	Power Requirement	415 VAC $\pm$ 10%, Three Phase, 50 Hz or 220 VAC $\pm$ 10%, Single Phase, 50 Hz.
21.	Utility requirements	Bidder should provide details of the utilities required for operation of the shock test machine like power requirements, space requirements, overall dimension. In case of pneumatic system, all associated accessories such as moisture free compressor and nitrogen (if any) required for operation of the machine has to be quoted and supplied by the vendor.

S. No	Parameter	Required Specification
22.	Operating Temperature / Humidity Range	0°C - 50°C/ up to 95% non-condensing
23.	Testing and Acceptance at CSIR-SERC	Bidder shall conduct acceptance testing of the shock testing machine after installation at CSIR-SERC as per the criteria given in Annexure-A.
	Data Acquisition and control system	
24.	Control System	Computer-controlled system with user-friendly interface to monitor, analyze and acquire acceleration waveform in all channels simultaneously with external PC with software control.
25.	Waveform Monitoring System	Waveform monitoring software with following options - To monitor acceleration level, wave form duration and shock count - Time markers and amplitude markers
26.	Controller and control software version & year of launch	The controller has to be latest model/ version. Specify the model no and year.
27.	No of Channels	4 or more
28.	Resolution of each channel	16 bit or better
29.	No of sensors	Minimum 4 acceleration sensors with mounting accessories and atleast 20 Meters Low Noise Cables shall be provided.
30.	Type of sensors	Shock rated acceleration sensor ICP type with Sensitivity: ≥ 0.5 mV/g and Measurement Range: ± 10000 g pk
31.	Voltage Range	± 10 V
32.	TEDS Standards	IEEE 1451.4.2001 or latest version
33.	Sampling Rate	Up to 1 MHz per individual channel, which has the ability to capture the shock waveform accurately and quickly
	Computer Specifications	
34.	Preferred Make	Reputed Make
35.	Processor	Intel Core i910900 X 3.7GHz 2933MHz 10C165WCPU or better
36.	RAM	32GB nECC, DDR42933MHz memory support to 256GB; Total 8 DIMM Slots or better
37.	Hard Disk	1TBM.22280 PCIe NVMe TLC Solid State Drive & 1TB SATA7200RPM HDD or better. Option for future expansion of additional up to 4 SATA/SSD Hard drives
38.	Graphics Card	NVIDIA Quadro P2200 5 GB GDDRS dedicated or RadeonProW5500 or better
39.	Keyboard and Mouse	Minimum USB Keyboard and USB Optical Scroll Mouse of reputed make
40.	Audio	High-Definition Integrated Audio with internal Speaker

S. No	Parameter	Required Specification	
41.	Operating System	Windows Professional- latest version with MS Office preinstalled (Perpetual license validity). Bidders should ensure all the software are compatible with the controller provided	
42.	Warranty for Desktop	3 years Minimum from the date of commission and installation of the whole system	
43.	Display	Minimum 27-inch FHD Monitor IPS with LED backlight of reputed make	
	Other Requirements		
44.	Warranty	Three years comprehensive on-site warranty for the complete system including all the equipment, sub systems etc. from the date of installation and acceptance of the system. All spare parts required for the trouble-free operation of the complete system during the warranty period, needs to be supplied by the bidder, without extra cost. Fault should be resolved on-site within 2 working days of fault reporting.	
45.	Requirement of AMC for the period of 3 years after the expiry of warranty period.	AMC is also required for the maintenance of the complete system including hardware, software, third party items, components etc. after the expiry of warranty period.	
	Note: The bidder should necessarily quote separately for the AMC as detailed below: But, CSIR-SERC will avail the service towards AMC at its discretion. The quoted charges towards AMC will be considered for the evaluation of the bids.		
	Details of Years after the warranty period	Charges towards AMC	Remarks
	1 st year		
	2 nd year		
	3 rd year		
46.	Training on Shock Test Machine	Bidder should provide mandatory on site in-person training and demonstration on operation and routine maintenance of the system for Minimum 3 days to CSIR-SERC staff (Min. 5 people) as part of installation and commissioning	
47.	Documentation	Two set of Operation, Technical, maintenance & trouble shooting manuals in English shall be provided (Hard & Soft Copy)	
48.	Spare parts and service support	The quoted shock test machine & DAQ system with controller should have a minimum product life cycle of 10 years. The OEM has to inform CSIR-SERC, one year before discontinuing the model/product. The OEM has to provide spare parts and service support for minimum 10 years	

S. No	Parameter	Required Specification
		from the date of discontinuing the model/system.
49.	Manuals	Complete set of operation, installation, maintenance and troubleshooting manuals, including spare part no. ordering details, relevant drawings/circuit drawings up to subsystem levels in the shock machine should be provided. Backup copies of all software and O.S. should be supplied in PEN Drive (or) External Detachable Hard Disk
50.	Compliance Statement	The bidder should meet all the technical specifications to qualify the bid. The bidder has to furnish the values/units/parameters against each CSIR-SERC requirement in the compliance sheet. Offer without this information will be rejected without any further reference. Merely stating, “comply” or “yes” does not constitute sufficient information. Exact numerical values are to be specified wherever applicable. Specified technical data should be supported by product catalogues, manuals, test procedures, and test plots etc, along with page number reference to the specified values. In case of insufficient technical data, the quote is liable to be rejected without further intimation. The bidder has to sign and stamp (company seal) on all the pages of compliance sheet.
51.	Eligibility Criteria for Participation in tender	The bidder should have supplied and commissioned 2 Nos of same or similar capacity machine/ instrument during the last 05 years (as on date of bid opening) in Govt institutes/ Govt. research organizations/ Public funded Universities/National test labs/ reputed private firms in India. The bidder / supplier should provide the PO copies, their installation report and Performance Certificate of the same POs .
52.	List of Installations	The bidder should submit a list of these installations giving details of commissioning & contact details (name, email id and telephone number) along with the quote. Offer without this information is liable to be rejected without any further reference.

Acceptance Criteria – Annexure - A

S. No	Parameter	Required Specification
1.	Performance Map	The bidder MUST provide a set of Performance Envelope Curves (Payload vs. Pulse Duration) for all quoted

		waveforms (Half-Sine, Sawtooth, Trapezoidal). This chart must explicitly demonstrate the machine's ability to achieve a minimum of 18ms pulse duration and 7 m/s velocity change with a 225 kg (or maximum) payload. Failure to provide this data, or data showing performance below these thresholds, will result in technical disqualification			
2.	Acceptance Test Bare & at load condition	After installation, the full system will be tested to prove its features as agreed in the Bid. • Bare Table without any payload and • at pay load of 225kg (or max quoted) including fixture. The firm shall make payload arrangements(non-Resonating) to carry out acceptance test			
3.	The bidder must provide the maximum achievable Peak Acceleration (g) for the following pulse durations at the specified payload.	Waveform	Nominal Duration (ms)	Peak Accel (g) @ 225 kg Payload (or max payload offered)	Resulting Velocity Change (m/s)
		Half-Sine	2 ms		
		Half-Sine	11 ms		
		Half-Sine	18 ms		
		Half-Sine	30 ms		
		Sawtooth	6 ms		
		Sawtooth	11 ms		
		Trapezoidal	10 ms		
		Trapezoidal	20 ms		