संख्या. पी-63013/173/01/2022/मोड–I/सीसुबल / 2590-2600

भारत सरकार, गृह मंत्रालय
महानिदेशालय सीमा सुरक्षा बल
(रसद निदेशालय: आधुनिकीकरण सैल)
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ब्लाक संख्या . 10,
सीजीओ काम्पलैक्स,
लोधी रोड, नई दिल्ली–03
दिनांक 09 अगस्त 2023

सेवा में,

महानिदेशकः– आसाम राईफलस (through LOAR), केन्द्रीय ओद्यौगिक सुरक्षा बल, केन्द्रीय रिजर्व पुलिस बल, भारतीय तिब्बत बोर्डर पुलिस, सशस्त्र सीमा बल, राष्ट्रीय सुरक्षा गार्ड एवं पुलिस अनुसन्धान एवं विकास ब्योरो

विषयः **अनुमोदित गुणात्मक आवश्यकता /परीक्षण निर्देशों का प्रेषण**

तकनीकी विशेषज्ञों के उप समूह द्वारा किए गये सूत्रीकरण एवं महानिदेशक सीमा सुरक्षा बल द्वारा अनुमोदित Environmental Test Lab (Rain Test Chamber, Humidity Chamber, Hot and Cold Chamber, Shock &Vibration Test Station and Bump Test Station) उपकरणों के गुणात्मक आवश्यकता/परीक्षण निर्देशों को आपकी अग्रिम कार्यवाही हेतु प्रेषित किया जाता हैं।

संल्गन : उपरोक्तनुसार

इ.दे.सिंह

(इन्द्र देव सिंह)
उप महानिरीक्षक (रसद)

प्रतिलिपि :-

1. **तकनीकी निदेशक**
   The Technical Director
   राष्ट्रीय सूचना–विज्ञान केन्द्र, नोर्थ ब्लाक, गृह मंत्रालय, नई दिल्ली
   NIC, North Block, MHA
   New Delhi (द्वारा ई–मेल)
   (ई–मेल पता : mpsugandhi@nic.in)
   : आपसे अनुरोध है कि उक्त उपकरण के गुणात्मक आवश्यकता /परीक्षण निर्देशों को MHA website (Division of MHA+ -Police Modernization Division-Qualitative Requirements- Qualitative Requirements of Machinery & Eqpt Items with Surveillance item) पर अपलोड करने का श्रम करें।
2. SO (IT), North Block, MHA
   (Through E-mail)
   (E-mail address: **soit@nic.in**)
   : कृपया उपरोक्तानुसार कार्यवाही करने का श्रम करें।
3. तकनीकी विंग, सीमा सुरक्षा बल
   : कृपया उक्त उपकरण के गुणात्मक आवश्यकता/परीक्षण निर्देशों को सीमा सुरक्षा बल की वैबसाईट पर अपलोड करने का श्रम करें।
4. SIW, सीमा सुरक्षा बल टिगरी कैम्प, नई दिल्ली
   : आपके यूओ संख्या–1416 दिनांक 27 जून 2023 के सन्दर्भ में अनुमोदित Environmental Test Lab (Rain Test Chamber, Humidity Chamber, Hot and Cold Chamber, Shock &Vibration Test Station and Bump Test Station) के गुणात्मक आवश्यकता /परीक्षण निर्देशों को आपके सूचनार्थ एवं अग्रिम कार्यवाही हेतु प्रेषित जाता है।
5. फाईल

QRs & Trial Directives of Rain Test Chamber

S/No	QRs Specifications		Trial Directives	Result expected/ desired
1.	Ingress Protection Test Conditions consisting of Rain test chamber and Dust Test Chamber capable to carry out tests on equipment exposed outdoors. These equipment must be able to function reliably while withstanding various rain intensities in accordance with various National & International Standards e.g. IEC 60529 (Figure 2 – Test device to verify protection against dust (dust chamber), Hand-held device to verify protection against spraying and splashing water; second characteristic numerals 3 and 4 (spray nozzle) and Test device to verify protection against spraying and splashing water; second characteristic numerals 3 and 4 (oscillating tube), IS 9000 Pt XVI, JSS 55555 & MIL STD-810G, standards.			Must be as per specification
2.	Outer Chamber size	1300 x 1450 x 1960 mm (WDH)	BOO will check physically.	Must be as per specification
3.	Inner Chamber Size	1000 x 1000 x 1000 mm (WDH)	BOO will check physically.	Must be as per specification
4.	Volume	1000 Ltr Minimum	BOO will check physically.	Must be as per specification
5.	Test Bench Area	400 mm dia	BOO will check physically.	Must be as per specification
6.	Number of pipe holes	25 minimum	BOO will check physically.	Must be as per specification
7.	Pendulum Tube water hole	0.4 mm	BOO will check physically.	Must be as per specification
8.	Spray Hole Spacing	50 mm	BOO will check physically.	Must be as per specification
9.	Spray Ring Radius	400 mm	BOO will check physically.	Must be as per specification
10.	Swing Angle Range	0 to 330^{O} (should be adjustable)	BOO will check physically.	Must be as per specification
11.	Swing Speed Adjustment	0 to 20 times	BOO will check physically.	Must be as per specification
12.	Water Pressure	80 Kpa – 100 Kpa	BOO will check physically.	Must be as per specification
13.	Water Supply Quantity	Adjusted as per IP X1, X2, X3, X4, X5 and X6	BOO will check physically.	Must be as per specification
14.	IP Tests	IP X1, X2, X3, X4, X5 and X6	BOO will check physically.	Must be as per specification
15.	Nozzle Diameter	IP 1/2 = 0.4 mm IP 3/4 = 0.4 mm IP 5/6 6.3 mm	BOO will check physically.	Must be as per specification
16.	Caster Wheel	Should be mounted on four caster wheels with two lockable wheels for easy mobility	BOO will check physically.	Must be as per specification

S/No	QRs Specifications		Trial Directives	Result expected/ desired
17.	Inter Circulation Pipe System	i. The internal circulation pipe system is equipped with a water quality filter, a glass flow meter, a pressure gauge, a drain valve and a filter, the pressure gauge can be directly observed. ii. The filter, pressure gauge and glass flow meter are setup by loose joint and easy to be change. iii. Water flow is controlled by the glass flow, automatic control the water flow and ensure the safe operation of the pump. iv. SUS 304 stainless steel material used in internal circulating pipe and connecting parts, which ensure the required water quality.	BOO will check physically.	Must be as per specification
18.	Drain Port	An overflow port and a drain ports are provided	BOO will check physically	Must be as per specification
19.	Safety protection function	Earth leakage protection, water protection, short-circuit protection.	BOO will check physically. Third party certificate of safety protection function of the equipment and OEM certificate should be submitted by the firm	Must be as per specification
20.	Power	220 Volt 50 Hz	BOO will check physically.	Must be as per specification
21.	Control System	PLC based Touch Screen Controller	BOO will check physically.	Must be as per specification
22.	Installation	All installation will be carried out by the firm i.e. electrical wiring, Air compressor line, water supply line & Drainage line.	Under taking in this regard must be obtain from firm.	Must be as per specification
23.	Misc	1. Operation and Maintenance Manual to be provided by firm.	BOO will check physically.	Must be as per specification
		2. Operator level theoretical and practical Trg of 01 week each for 10 technicians to be imparted by the firm.	Under taking in this regard must be obtain from firm.	Must be as per specification

S/No	QRs Specifications		Trial Directives	Result expected/ desired
		3. Warranty period should be minimum 02 year from the date of commissioning of the project.	Under taking in this regard must be obtain from firm.	Must be as per specification
		4. Repair/maintenance and spare parts support to be provided by the firm for minimum 10 years after the expiry of warranty period	Under taking in this regard must be obtain from firm.	Must be as per specification

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Director General
Boarder Security Force

Appendix-'A-II'

QRs & Trial Directives of Humidity Chamber

S. No	QRs Specification		Trail Directives	Result expected / desired
1.	**General Description**: - Humidity Test Chamber is a vital testing instrument for analyzing the prolong effect of humidity on components to fix its quality parameters. This instrument is not subjected to only one industry applications. It is used in pharmaceuticals, plastic and rubber industries for quality assurance testing in accordance with various National & International Standards e.g. IEC 60068-2-14, IS 9000 Pt V 2008, JSS 55555 & MIL STD-810G, standards.			-
2.	Temperature Range	-40 Deg C to +120 Deg C	BOO will check physically.	Must be as per specification
3.	Standard Volume Range	1000 Ltr	BOO will check physically.	Must be as per specification
4.	Test Space Dimension (Interior Dimension)	Width = Approx 1000 mm min. Depth = Approx 1000 mm min. Height = Approx 1000 mm min.	BOO will check physically.	Must be as per specification
5.	Rate of Temperature Range	2 Deg C/min (Average)	BOO will check physically.	Must be as per specification
6.	Refrigeration System	Single Stage	BOO will check physically.	Must be as per specification
7.	Controller	Touch Screen Type	BOO will check physically.	Must be as per specification
8.	Humidity Range	10% to 98% RH	BOO will check physically. OEM/Firm should submit the Lab Test certificate from NABL accredited Lab for the same.	Must be as per specification
9.	Humidity Accuracy	3% RH or better	BOO will check physically. OEM/Firm should submit the Lab Test certificate from NABL accredited Lab for the same.	Must be as per specification
10.	Test Chamber	The test chamber shall be corrosion resistance stainless steel with arrangement to accommodate with shelves (min 2)	BOO will check physically. OEM/Firm should submit the Lab Test certificate from NABL accredited Lab for the same.	Must be as per specification
11.	Lamp	Suitable lamp to be provided in chamber	BOO will check physically.	Must be as per specification
12.	Test Chamber Door	The test chamber shall be completely shield by a door i.e. hinged on the left and opens fully	BOO will check physically. OEM/Firm should submit the Lab Test certificate from NABL accredited Lab for the same.	Must be as per specification

S. No	QRs Specification		Trail Directives	Result expected / desired
		for easy access. It shall be made of corrosion resistance stainless steel plate and equipped with high quality insulation.		
13.	Control and Monitoring System	Microprocessor based humidity control and monitoring system shall be provided and have following features; 1. Provision for interface with computer 2. Password protection provided 3. Graphical representation of set point and actual value 4. Digital display of set point and actual value of humidity 5. Digital input of humidity in manual and automatic operation 6. Fault and diagnosis system 7. Equipped with PLC & HMI have features like DATA logging 8. Chart Recording 9. USB Port 10. Printer Facility 11. 50 Programs setting with SV & PV & maintenance free electronic humidity sensor.	BOO will check physically.	Must be as per specification
14.	Temperature/ Humidity	Machine should be designed with customized temperature and humidity range for accurate results, • High humidity with high	BOO will check physically.	Must be as per specification

S. No	QRs Specification		Trail Directives	Result expected / desired
		temperature range • Low humidity with low temperature range • Uniform temperature with variable humidity range • Uniform humidity with variable temperature range		
15.	Noise	<76 db at a distance of 1 mtr	BOO will check physically. OEM/Firm should submit the Lab Test certificate from NABL accredited Lab for the same.	Must be as per specification
16.	Ingress Protection	IP 32 for the switch and cabinet	OEM/Firm should submit the Lab Test certificate from NABL accredited Lab for the same.	Must be as per specification
17.	Construction	Interior chamber made with complete SS 304 & exterior can be MS powder coated or rust free SS 304 for long life. Heavy duty rugged designed steel wire adjustable shelves with easy maintenance. Outer door comes with glass window, lockable handle, glass wool insulation, silicon gasket and heating tube for moisture removal. Should be mounted on four caster wheels with two lockable wheels for easy mobility.	BOO will check physically. OEM/Firm should submit the Lab Test certificate from NABL accredited Lab for the	Must be as per specification
18.	Heating System	Should provide uniform heating inside the chamber	BOO will check physically.	Must be as per specification
19.	Humidity System	Inbuilt stainless steel water tank with water heater to generate humidity inside the chamber. Water heater used in the tank should be according to international standard	BOO will check physically. OEM/Firm should submit the Lab Test certificate from NABL accredited Lab for the same.	Must be as per specification

S. No	QRs Specification		Trail Directives	Result expected / desired
		for proper heating and moisture generation with quality low water cut off. The system should also have an overflow valve facility in case of self-filling of water from the source.		
20.	Air Circulation System	Suitable motor with impeller for uniform temperature and humidity system	BOO will check physically.	Must be as per specification
21.	Computer Interface	RS 232/RS 485 for computer connectivity and data storage USB port for data transfer	BOO will check physically.	Must be as per specification
22.	Safety Features	Circuit Breaker Over Temperature Protection Door Opening Alarm High Temperature and low Temperature Alarm	BOO will check physically.	Must be as per specification
23.	Power Supply	The chamber shall work on 415 Volt, 50 Hz and 3 Phase main supply	BOO will check physically.	Must be as per specification
24.	Installation	All installation will be carried out by the firm i.e. electrical wiring, Air compressor line, water tank & Drainage line.	Under taking in this regard must be obtain from firm.	Must be as per specification
25.	Misc	1. Operation and Maintenance Manual to be provided by firm.	BOO will check physically.	Must be as per specification
		2. Operator level theoretical and practical Trg of 01 week each for 10 technicians to be imparted by the firm.	Under taking in this regard must be obtain from firm.	Must be as per specification
		3. Warranty period should be minimum 02 year from the date of commissioning of the project.	Under taking in this regard must be obtain from firm.	Must be as per specification

S. No	QRs Specification		Trail Directives	Result expected / desired
		4. Repair/maintenance and spare parts support to be provided by the firm for minimum 10 years after the expiry of warranty period	Under taking in this regard must be obtain from firm.	Must be as per specification

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Appendix-'A-III'

QRs & Trial Directives of Hot and Cold Chamber

S/No	QRs Specification		Trail Directive	Result expected / desired
1.	General Description :- Hot & Cold Chamber is a versatile test equipment to carry out Temperature change tests in accordance with various National & International Standards e.g. IEC 60068-2-14, IS 9000 Pt V 2008, JSS 55555 & MIL STD-810G, standards.			Must be as per specification
2.	Test Space Volume	1000 Ltr	BOO will check physically.	Must be as per specification
3.	Temperature Range	-50 Deg C to +180 Deg C	BOO will check physically.	Must be as per specification
4.	Temperature Regulation	Better than -0.5 Deg C	BOO will check physically.	Must be as per specification
5.	Average Heating Rate	Better than 3 Deg C per minute in the entire range of temperature	BOO will check physically.	Must be as per specification
6.	Average Cooling Range	Better than 2 Deg C per minute in the entire range of temperature	BOO will check physically.	Must be as per specification
7.	Test Space Dimension (Interior Dimension)	Width = Approx 1000 mm min. Depth = Approx 1000 mm min. Height = Approx 1000 mm min.	BOO will check physically.	Must be as per specification
8.	Housing	1. The chamber must be of mono-block construction which compromise all system necessary for operation. 2. The outer housing shall be made from light weight, self-supporting galvanized sheet-steel of 14 swg gauge (approx 2 mm) and outside primed and painted to standard finish with high quality material. 3. The exterior surface shall have corrosion-resistance and high wear resistance.	BOO will check physically. OEM Certificate should be submitted by the firm /Supplier.	Must be as per specification
9.	Insulation	The insulation between the test chamber and exterior housing must be of environmental friendly and guarantees best insulation value and minimum operating	BOO will check physically .OEM Certificate should be submitted by the firm	Must be as per specification

S/No	QRs Specification		Trail Directive	Result expected / desired
		cost. The insulation shall be of multi layered with double vapour barrier. Asbestos free mineral fiber insulation is preferred.	/Supplier.	
10.	Door	1. The door must be of lockable type with hinges on right hand side and self-open fully for easy access and must be provide with high quality insulation. 2. The exterior of the door shall be made of galvanized sheet-steel of 14 SWG gauge (approx 2 mm) and outside primed and painted to a standard finish with high quality materials. 3. The inner side of the door shall be made of 19 SWG gauge thickness (approx 1 mm) nonmagnetic stainless steel. 4. The door must be provided with double continuous seal rings of silicon rubber material. 5. The door is to be provided with a multipane toughened glass inspection window with built in heaters. The size of window shall be 450 x 600 mm or larger.	BOO will check physically. OEM Certificate should be submitted by the firm /Supplier.	Must be as per specification
11.	Illumination /lighting of test space	The chamber must be provide with a light and a switch to illuminate the test space during the test to help visual inspection	BOO will check physically.	Must be as per specification
12.	Shelf	The chamber must be provided with 05 adjustable shelves which is easily removable and adjustable to any height.	BOO will check physically.	Must be as per specification
13.	Ports	The chamber must be provided with a port of minimum 125 mm diameter on the right side and 50 mm dia on the left hand side of the test space. The port must be centrally locked on the sides. Suitable rubber cap are to be provided to close the port air tight.	BOO will check physically.	Must be as per specification
14.	Casters	The test chamber shall be moved easily to different	BOO will check physically.	Must be as per specification

S/No	QRs Specification		Trail Directive	Result expected / desired
		location using 4 castor wheels and of which 2 are preferably fitted with brakes.		
15.	Chamber Regulation and Programming	The chamber shall be provided with PC based control and monitoring systems with following features; 1. Selection of manual and automatic modes. 2. Shall be possible to create temperature programme with immediate graphical check programming. 3. Integrated programme with a programming memory for 99 test programme minimum. 4. Built in capability to restart the test chamber after failure. 5. RS 232/RS 422/RS 485 interface for communication with computer 6. Provision t print any test report in text format and graphical format. 7. The display and control panel should be in the front side of the chamber.	BOO will check physically.	Must be as per specification
16.	Safety and Protection	The over temperature protection for test specimen. A steady state over heating safety thermostat shall be installed that automatically switches off the heater if the chamber temperature range is exceeded.	BOO will check physically.	Must be as per specification
17.	Power Supply	The chamber shall work on 415 Volt, 50 Hz and 3 Phase main supply	BOO will check physically.	Must be as per specification
18.	Installation	All installation will be carried out by the firm i.e. electrical wiring, Air compressor line & Drainage line.	Under taking in this regard must be obtain from firm.	Must be as per specification
19.	Misc	1. Operation and Maintenance Manual to be provided by firm.	BOO will check physically.	Must be as per specification
		2. Operator level theoretical and practical Trg of 01 week each for 10 technicians to be imparted by the firm.	Under taking in this regard must be obtain from firm.	Must be as per specification

S/No	QRs Specification		Trail Directive	Result expected / desired
		3. Warranty period should be minimum 02 year from the date of commissioning of the project.	Under taking in this regard must be obtain from firm.	Must be as per specification
		4. Repair/maintenance and spare parts support to be provided by the firm for minimum 10 years after the expiry of warranty period	Under taking in this regard must be obtain from firm.	Must be as per specification

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QRs & Trial Directives of Shock Test Station

S/No	QRs Specifications		Trail Directives	Result expected / desired
1.	General Description:- Shock Test Machine is a versatile test equipment to carry out shock tests in accordance with various National & International Standards e.g. IEC 60068-2-27, IS 9000 Pt VII – 1979, JSS 55555 & MIL STD-810G, standards.			-
2.	Table Size	750 mm x 750 mm min.	BOO will check physically.	Must be as per specification
3.	Payload	150 Kg	BOO will check physically.	Must be as per specification
4.	Payload Height	Unlimited	BOO will check physically.	Must be as per specification
5.	Max Payload Size	750 mm x 750 mm min.	BOO will check physically.	Must be as per specification
6.	Insert Pattern	100 x 100 mm Matrix	BOO will check physically.	Must be as per specification
7.	Stroke Length	350 mm (Max)	BOO will check physically.	Must be as per specification
8.	Velocity Change (no load)	10 m/s	Firm should submit the Lab Test certificate from NABL accredited Lab for the same.	Must be as per specification
9.	Velocity change (full load)	8 m/s		Must be as per specification
10.	Pulse Shape	Half Sine, Saw tooth, Square Wave & Trapezoidal wave form	BOO will check physically.	Must be as per specification
11.	Shock Rate	1-8 Shocks/min	BOO will check physically.	Must be as per specification
12.	Standard Test	10 'g' – 10 ms 20 'g' – 11 ms 30 'g' – 20 ms 40 'g' – 6 ms 50 'g' – 11 ms 50 'g' – 18 ms 100 'g' – 6 ms 150 'g' – 3 ms 200 'g' – 3 ms	BOO will check physically.	Must be as per specification
13.	Max Deviation of specimen from table center	30 mm	BOO will check physically.	Must be as per specification

S/No	QRs Specifications		Trail Directives	Result expected / desired
14.	Control Panel	Pre-set mechanism with on-off switch	BOO will check physically.	Must be as per specification
15.	Safety	Shock test Machine should be shield with acrylic safety shield around top perimeter	BOO will check physically. OEM will provide certificate for the same.	Must be as per specification
16.	Power Supply	220 V, 50 Hz Single Phase	BOO will check physically.	Must be as per specification
17.	Monitoring and Control System	PC based Shock Monitoring and Control System. The system should Monitor and Control all relevant parameter of the shock test payload	BOO will check physically.	Must be as per specification
18.	Accelerometer with cable	Standard one No Piezo-electric accelerometer.	BOO will check physically and Firm should submit the Lab Test certificate from NABL accredited Lab for the same.	Must be as per specification
19.	Elastomeric Pads	To achieve desired pulse duration vendor should Provide suitable elastomeric pads and lift mechanism control.	BOO will check physically.	Must be as per specification
20.	Safety Interlocks	Main input Over & Under Voltage Phase Drop Programmer Pad Change Protection Over Travel Safe Brake	BOO will check physically.	Must be as per specification
21.	Installation	All installation will be carried out by the firm i.e. electrical wiring & Air compressor line	Under taking in this regard must be obtain from firm.	Must be as per specification
22.	Misc	1. Operation and Maintenance Manual to be provided by firm.	BOO will check physically.	Must be as per specification
		2. Operator level theoretical and practical Trg of 01 week each for 10 technicians to be imparted by the firm.	Under taking in this regard must be obtain from firm.	Must be as per specification
		3. Warranty period should be minimum 02 year from the date of commissioning of the project.	Under taking in this regard must be obtain from firm.	Must be as per specification

S/No	QRs Specifications		Trail Directives	Result expected / desired
		4. Repair/maintenance and spare parts support to be provided by the firm for minimum 10 years after the expiry of warranty period	Under taking in this regard must be obtain from firm.	Must be as per specification

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Appendix-'A-V'

QRs & Trial Directives of Vibration Test Station

S/No	QRs Specification			Trial Directives	Result expected / desired
1.	General Description:- Vibration Test Equipment is used to assess the performance of equipment in terms of its strength or protection. This test method simulates the transport hazards, to produce and equivalent effect or damage during the test. The equipment should comply with International standards e.g. IS, MIL-STD 810G, ISO 5344, IEC 60068-2-6, IEC 60068-2-64, JSS 55 555 & ASTM D999.				Must be as per specification
2.	Shaker Specifications				
	a)	Sine Force (Peak) Kgf	4000 Kgf	BOO will check physically and OEM Certificate should be submitted by the firm /Supplier.	Must be as per specification
	b)	Random Force Kgf	4000 Kgf		Must be as per specification
	c)	Shock Force	8000 Kgf		Must be as per specification
	d)	Frequency Range	DC to 2400 Hz		Must be as per specification
	e)	Max Pk-pk Displacement	51 mm		Must be as per specification
	f)	Max Peak Velocity	1.8 m/sec		Must be as per specification
	g)	Max Peak Acceleration	80 g		Must be as per specification
	h)	Armature Dia	440 mm	BOO will check physically.	Must be as per specification
	i)	Armature Mass	50 Kg	OEM Certificate should be submitted by the firm /Supplier.	Must be as per specification
	j)	Shaker Rotation	Trunion Assembly	BOO will check physically.	Must be as per specification
	k)	Insert Pattern on Armature	No. of Inserts (Total – 17) @ Centre 1 @ 200 mm – 08 Nos @ 400 mm – 08 Nos	BOO will check physically.	Must be as per specification
	l)	Shaker Cooling System	Forced Air	BOO will check physically.	Must be as per specification
	m)	Payload	150 Kg	BOO will check physically.	Must be as per specification
	n)	Body Suspension	Less than 2.5Hz	BOO will check physically.	Must be as per specification

S/No	QRs Specification			Trial Directives	Result expected / desired
		Natural Frequency(Thrust Axis)			
	o)	Shaker mounting	Air isolated, Trunion rotation assembly to orient the shaker for vertical and horizontal operation with Head expander & Slip table respectively.	BOO will check physically.	Must be as per specification
	p)	Testing Axis	All three (x, y and z)	BOO will check physically.	Must be as per specification
3.	Cooling Blower				
	a)	Air Flow Rate	2000 CFM (Minimum)	NABL Certificate should be submitted by the firm /Supplier.	Must be as per specification
	b)	Operating Temperature	0 Deg C to 50DegC	NABL Certificate should be submitted by the firm /Supplier.	Must be as per specification
4.	Power Amplifier				
	a)	Type	Switching type air cooled, should be matched with shaker to achieve the rated Sine, Random and Shock testing capabilities. Amplifier shall be compatible with all standard controllers	BOO will check physically.	Must be as per specification
	b)	Variable field control	Amplifier should accommodate the Field power supply transformer and related circuits. Field power supply system should incorporate easily variable controlled field supply	BOO will check physically.	Must be as per specification
	c)	Rated output Capacity	48 kVA Minimum	OEM Certificate should be submitted by the firm /Supplier.	Must be as per specification
	d)	Signal-to-noise Ratio	> 70 dB	NABL Certificate should be submitted by the firm /Supplier.	Must be as per specification
	e)	Amplifier Efficiency	90% Minimum	OEM Certificate should be submitted by the firm /Supplier.	Must be as per specification
	f)	Power Module	The power module should have independent cooling unit and RFI Filters	BOO will check physically.	Must be as per specification
	g)	Power Loss Protection	The amplifier should have synchronized loss protection facility to have a smooth shut down in the event of power amplifier	BOO will check physically.	Must be as per specification

S.No	QRs Specification			Trial Directives	Result expected / desired
	h)	System Interface	The amplifier should have Microprocessor based user interfaces which improves reliability and fault diagnosis of the system	BOO will check physically.	Must be as per specification
	i)	Protection	Integral protection to prevent output devices from working outside their specified limits	BOO will check physically.	Must be as per specification
	j)	Power Supply	Wiring suitable for 415 VAC ± 10%, 50 Hz ± 2 Hz, 3 Phase, 4 Wire supply.	BOO will check physically.	Must be as per specification
5.	Digital Vibration Controller				
	a)	Input Channels	04 Channels (minimum)	BOO will check physically.	Must be as per specification
	b)	Dynamic Range	95dB (Minimum)	NABL Certificate should be submitted by the firm /Supplier	Must be as per specification
	c)	Sampling rate	50 ks/s	OEM Certificate should be submitted by the firm /Supplier.	Must be as per specification
	d)	Voltage Coupling	AC / DC	BOO will check physically.	Must be as per specification
	e)	Output Voltage	+/- 10V Peak (Minimum)	BOO will check physically.	Must be as per specification
	f)	Built in power source	Built in power source for IEPE type accelerometers.	BOO will check physically.	Must be as per specification
	g)	Fault indicators & safety features	Control signal checks for input over load, open loop, loss of control signal, incorrect conditioning, transducer cable break indication etc.	BOO will check physically.	Must be as per specification
	h)	Emergency shut-down	Abort button for emergency shutdown.	BOO will check physically.	Must be as per specification
	i)	Test documentation	Provision for taking the print out of the signal plots, test data set up parameters, test parameters, drive spectrum, last control etc.	BOO will check physically.	Must be as per specification
	j)	Power supply	220V ± 10 %, 50 ± 2 Hz, Electric supply with Indian socket will be provided on site. Adaptor & necessary cable (if any) to be provided to suite above.	BOO will check physically.	Must be as per specification
6.	Software for Vibration Controller				
	Sine (Swept & fixed		Test Types:		

S/No	QRs Specification		Trial Directives	Result expected / desired
	frequency)	a) Swept Sine.	BOO will check physically.	Must be as per specification
		b) Sine Frequency Dwell.	BOO will check physically.	Must be as per specification
		c) Tracked Resonance dwell – phase dwelling.	BOO will check physically.	Must be as per specification
		Frequency Range: 1 Hz to 5 KHz.	BOO will check physically.	Must be as per specification
		Sweep Rate:		
		a) Log – 0.1 to 10 Oct/Min.	BOO will check physically.	Must be as per specification
		b) Linear – 0.1 to 100 Hz/Min.	BOO will check physically.	Must be as per specification
		c) Sweep Accuracy: Better than 3 %.	NABL Certificate should be submitted by the firm /Supplier	Must be as per specification
		d) Control amplitude accuracy: + 1 dB.	NABL Certificate should be submitted by the firm /Supplier	Must be as per specification
		e) Frequency Accuracy: Better than 1/100th of a Hertz.	NABL Certificate should be submitted by the firm /Supplier	Must be as per specification
		f) Drive signal: User definable maximum drive voltage from 0.5 V to 10 V pk.	BOO will check physically.	Must be as per specification
		Reference spectrum definition:		
		a) Number of Segments: ≥ 100.	BOO will check physically.	Must be as per specification
		b) Definition of any segment by: Acceleration, Velocity, Displacement, Sloped Acceleration.	BOO will check physically.	Must be as per specification
		c) Individual Alarm & Abort level definition for each segment.	BOO will check physically.	Must be as per specification
		d) Importing of reference spectrum from a stored file.	BOO will check physically.	Must be as per specification
		Definitions specific to Dwell, Resonance dwell tests:		
		a) Provision should exist for multiple Dwell frequency definition within a single test.	BOO will check physically.	Must be as per specification
		b) Configurable wrt:		Must be as per specification
		i) Dwell duration.	BOO will check physically.	Must be as per specification
		ii) Dwell range.	BOO will check physically.	Must be as per specification
		iii) Dwell frequency.	BOO will check physically.	Must be as per specification
		iv) Dwell phase.	BOO will check physically.	Must be as per specification
		v) Dwell level.	BOO will check physically.	Must be as per specification

S/No	QRs Specification		Trial Directives	Result expected / desired
		c) Dwell mode: Manual OR Automatic.	BOO will check physically.	Must be as per specification
7.	Random	Frequency Range: 1 Hz to 5 KHz.	BOO will check physically.	Must be as per specification
		Number of spectral lines: User selectable from 100 to 3200.	BOO will check physically.	Must be as per specification
		Output signal:		
		a) True Gaussian with minimum 3-sigma control.	BOO will check physically.	Must be as per specification
		b) Provision for Drive clipping with the following user definable parameter:	BOO will check physically.	Must be as per specification
		i) Sigma level between 2 to 6. or	BOO will check physically.	Must be as per specification
		ii) Drive voltage limit.	BOO will check physically.	Must be as per specification
		c) Control Equalization: Equalization of within 2 control loops.	BOO will check physically.	Must be as per specification
		Reference Spectrum Definition:		
		a) Number of Break points or segments > 50.	BOO will check physically.	Must be as per specification
		b) Definition of any segment by slope or amplitude.	BOO will check physically.	Must be as per specification
		c) Scaling of the spectrum by defining overall g RMS level.	BOO will check physically.	Must be as per specification
		d) Individual alarm/abort level definition for each segment.	BOO will check physically.	Must be as per specification
		e) Importing of reference spectrum from a stored file.	BOO will check physically.	Must be as per specification
		Display and Analysis features:		Must be as per specification
		a) Power Spectral Density function of a given channel.	BOO will check physically.	Must be as per specification
		b) Transmissibility – Amplitude and phase transfer function of a channel with respect to another channel.	BOO will check physically.	Must be as per specification
		c) Along with the display of the plot of the select channel, statistical parameters to be displayed like Test Time, g RMS, Maximum & Minimum Amplitude with frequency.	BOO will check physically.	Must be as per specification

S/No	QRs Specification			Trial Directives	Result expected / desired
8.	Horizontal Slip Table Assembly				
	a)	Type	Oil film guided with linear/ hydrostatic bearing	BOO will check physically.	Must be as per specification
	b)	Slip Plate Dimension	Minimum 800 mm x 800 mm	BOO will check physically.	Must be as per specification
	c)	Slip Table Mass	78 Kg	BOO will check physically.	Must be as per specification
	d)	Material of Table Top	Magnesium / Magnesium Alloy	NABL Certificate should be submitted by the firm /Supplier	Must be as per specification
	e)	Slip table inserts	100mm Matrix Pattern with SS M10 inserts	BOO will check physically.	Must be as per specification
	f)	Coupling / Drive Bar	Magnesium Alloy Drive bar type for vibrator coupling.	NABL Certificate should be submitted by the firm /Supplier	Must be as per specification
	g)	Cross Axis Sensitivity	< 5%	BOO will check physically.	Must be as per specification
	h)	Slip table mounting	On a combined base with Shaker.	BOO will check physically.	Must be as per specification
	i)	Railing Guard	Around Slip Table Bed for safety	BOO will check physically.	Must be as per specification
	j)	Power Supply	Wiring suitable for 415 VAC ± 10%, 50 Hz ± 2 Hz, 3 Phase, 4 Wire supply.	BOO will check physically.	Must be as per specification
9.	Head Expander				
	a)	Size	Minimum 800 mm x 800 mm.	BOO will check physically.	Must be as per specification
	b)	Table Mass	95 Kg	BOO will check physically.	Must be as per specification
	c)	Material of Table Top	Magnesium Alloy	NABL Certificate should be submitted by the firm /Supplier	Must be as per specification
	d)	Inserts	M10 SS Inserts at regular pitch of 100 mm	BOO will check physically.	Must be as per specification
	e)	Railing Guard	Around Head Expander for safety	BOO will check physically.	Must be as per specification
	f)	Bolts	04 Set of suitable bolts to be supplied to attach head expander with shaker plate.	BOO will check physically.	Must be as per specification
10	Miniature single axis IEPE		Features:		

S/No	QRs Specification		Trial Directives	Result expected / desired
	mode Accelerometer	a) Quantity: 04 nos.	BOO will check physically.	Must be as per specification
		b) Adhesive mounting.	BOO will check physically.	Must be as per specification
		c) Weight: 3 gm or less.	BOO will check physically.	Must be as per specification
		d) Mounting: Flat mounting surface for adhesive mount.	BOO will check physically.	Must be as per specification
		e) Sensitivity: 100 mV/g (nom.) or better.	NABL Certificate should be submitted by the firm /Supplier	Must be as per specification
11	PC Interface	PC Controller Configuration:		
		a) Processor: i7 or better	BOO will check physically.	Must be as per specification
		b) 1 TB SATA HDD.	BOO will check physically.	Must be as per specification
		c) 22" LED Monitor.	BOO will check physically.	Must be as per specification
		d) DVD Combo Drive.	BOO will check physically.	Must be as per specification
		e) 4 GB DDR RAM.	BOO will check physically.	Must be as per specification
		f) Keyboard.	BOO will check physically.	Must be as per specification
		g) Optical Mouse.	BOO will check physically.	Must be as per specification
		h) Six USB Ports.	BOO will check physically.	Must be as per specification
		i) One Parallel Port.	BOO will check physically.	Must be as per specification
		j) Two PCI LAN Card.	BOO will check physically.	Must be as per specification
		k) 1 GB NVIDIA Graphics Card.	BOO will check physically.	Must be as per specification
		l) One 1 KVA UPS.	BOO will check physically.	Must be as per specification
		m) Genuine Licensed copy of Windows 10 or higher, 64 bit operating system.	BOO will check physically.	Must be as per specification
12.	Printer	Network ready multifunction Laser Colour Printer required for plotting test profiles with Temperature and Vibration plots in different colours.	BOO will check physically.	Must be as per specification
13.	Air Compressor	Air Supply Capacity 8 Bar (Minimum)	BOO will check physically.	Must be as per specification
14.	Safety Features			
	Interlock and System Level Indication Protection	Amplifier should have all standard safety interlocks and monitoring.		
		a) Interlocks:	BOO will check physically.	Must be as per specification
		i) Amplifier cooling fan.	BOO will check physically.	Must be as per specification

S/No	QRs Specification		Trial Directives	Result expected / desired
		ii) Vibrator cooling blower.	BOO will check physically.	Must be as per specification
		iii) Vibrator Over travel.	BOO will check physically.	Must be as per specification
		iv) Field Failure.	BOO will check physically.	Must be as per specification
		v) Module over Current.	BOO will check physically.	Must be as per specification
		vi) Slip Table.	BOO will check physically.	Must be as per specification
		vii) Amplifier High Temperature.	BOO will check physically.	Must be as per specification
		viii) Vibrator High Temperature.	BOO will check physically.	Must be as per specification
		b) Indication System Level:	BOO will check physically.	Must be as per specification
		i) Output over current.	BOO will check physically.	Must be as per specification
		ii) Output over voltage.	BOO will check physically.	Must be as per specification
		iii) Output short circuit.	BOO will check physically.	Must be as per specification
		iv) Output DC fault.	BOO will check physically.	Must be as per specification
		v) Amplifier cooling failure.	BOO will check physically.	Must be as per specification
		vi) Amplifier over temperature.	BOO will check physically.	Must be as per specification
		vii) Vibrator cooling.	BOO will check physically.	Must be as per specification
		viii) Vibrator over travel.	BOO will check physically.	Must be as per specification
		ix) Vibrator cooling failure.	BOO will check physically.	Must be as per specification
		x) Vibrator over temperature.	BOO will check physically.	Must be as per specification
		xi) Field failure.	BOO will check physically.	Must be as per specification
		xii) Supply low / high voltage.	BOO will check physically.	Must be as per specification
		xiii) Emergency stop.	BOO will check physically.	Must be as per specification
		c) Protection:		
		i) Over Voltage Protection	BOO will check physically.	Must be as per specification
		ii) Under Voltage Protection	BOO will check physically.	Must be as per specification
		iii) Phase Error Protection	BOO will check physically.	Must be as per specification
15	Installation	All installation will be carried out by the firm i.e. foundation work, electrical wiring & Air compressor line.	Under taking in this regard must be obtain from firm.	Must be as per specification
16.	Misc	1. Operation and Maintenance Manual to be provided by firm.	BOO will check physically.	Must be as per specification
		2. Operator level theoretical and practical Trg of 01 week each for 10 technicians to be imparted by the firm.	Under taking in this regard must be obtain from firm.	Must be as per specification

S/No	QRs Specification	Trial Directives	Result expected / desired
	3. Warranty period should be minimum 02 year from the date of commissioning of the project.	Under taking in this regard must be obtain from firm.	Must be as per specification
	4. Repair/maintenance and spare parts support to be provided by the firm for minimum 10 years after the expiry of warranty period	Under taking in this regard must be obtain from firm.	Must be as per specification

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(Sub Inspr D P Mishra), Assam Rifles

Approved/Not Approved

Director General
Boarder Security Force

Appendix-'A-VI'

QRs & Trial Directives of Bump Test Station

S/No	QRs Specifications		Trail Directives	Result expected / desired
1.	**General Description:-** Bump Test Machine is a versatile test equipment to carry out bump tests in accordance with various IS 9000 Pt I,MIL 810G, IEC 60068-2-29, JSS 55555 standards. The machine is used in product qualification testing transient Analysis of structures or models and fatigue tests on some systems and parts with an object to determine their suitability under repetitive Bump environment (during transportation or in service etc) and to assess structural integrity.			Must be as per specification
2.	Type	Free fall	BOO will check physically.	Must be as per specification
3.	Table Size	750 mm x 750 mm	BOO will check physically.	Must be as per specification
4.	Payload	150 Kg	BOO will check physically.	Must be as per specification
5.	Payload Height	Unlimited	BOO will check physically.	Must be as per specification
6.	Max Payload Size	750 mm x 750 mm	BOO will check physically.	Must be as per specification
7.	Bump Rate	Adjustable 1 to 3 bumps/sec	BOO will check physically.	Must be as per specification
8.	Bump Rate Counter	Digital	BOO will check physically.	Must be as per specification
9.	Acceleration	3 – 60 g	BOO will check physically.	Must be as per specification
10.	Pulse Shape	Half Sine	BOO will check physically.	Must be as per specification
11.	Pulse Duration	2 to 18 ms	BOO will check physically.	Must be as per specification
12.	Standard Test	2 'g' – 10 ms 3 'g' – 10 ms 7 'g' – 10 ms 20 'g' – 11 ms 30 'g' – 6 ms 40 'g' – 6 ms	BOO will check physically.	Must be as per specification
13.	Max Drop Height	50 mm	BOO will check physically.	Must be as per specification
14.	Control Panel	Pre-set mechanism with on-off switch	BOO will check physically.	Must be as per specification
15.	Safety	Bump Machine should be shield with acrylic safety shield around top perimeter	BOO will check physically.	Must be as per specification
16.	Power Supply	220 V, 50 Hz Single Phase	BOO will check physically.	Must be as per specification

S/No	QRs Specifications		Trail Directives	Result expected / desired
17.	Monitoring and Control System	PC based Shock Monitoring and Control System. The system should Monitor and Control all relevant parameter of the bump test payload	BOO will check physically.	Must be as per specification
18.	Accelerometer with cable	Standard one No Piezo-electric accelerometer.	BOO will check physically and Firm should submit the Lab Test certificate From NABL accredited Lab for the same.	Must be as per specification
19.	Elastomeric Pads	To achieve desired pulse duration vendor should provide suitable elastomeric pads and lift mechanism control.	BOO will check physically.	Must be as per specification
20.	Safety Interlocks	Main input Over & Under Voltage Phase Drop Programmer Pad Change Protection Over Travel Safe Brake	BOO will check physically.	Must be as per specification
21.	Installation	All installation will be carried out by the firm i.e. electrical wiring & Air compressor line	Under taking in this regard must be obtain from firm.	Must be as per specification
22.	Misc	1. Operation and Maintenance Manual to be provided by firm.	BOO will check physically.	Must be as per specification
		2. Operator level theoretical and practical Trg of 01 week each for 10 technicians to be imparted by the firm.	Under taking in this regard must be obtain from firm.	Must be as per specification
		3. Warranty period should be minimum 02 year from the date of commissioning of the project.	Under taking in this regard must be obtain from firm.	Must be as per specification

S/No	QRs Specifications		Trail Directives	Result expected / desired
		4. Repair/maintenance and spare parts support to be provided by the firm for minimum 10 years after the expiry of warranty period	Under taking in this regard must be obtain from firm.	Must be as per specification

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