

वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद्  
Council of Scientific & Industrial Research  
राष्ट्रीय वांतरिक्ष प्रयोगशालाएं  
National Aerospace Laboratories



CSIR - NAL Estd. 1959  
ISO 9001 : 2015  
Certified Organization

INVITATION FOR BIDS/NIT

Tender No. NAL/PUR/STTD/539/20-Y

Dated: 20-Oct-2021

CSIR- National Aerospace Laboratories (NAL), Bengaluru, India is one of the premier laboratories under Council of Scientific and Industrial Research (CSIR), an autonomous body under Department of Scientific and Industrial Research, Government of India, New Delhi. CSIR-NAL is a Science and Knowledge based Research, Development and Consulting Organization. It is internationally known for its excellence in Scientific Research in Aerospace Engineering.

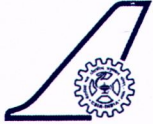
The Director, CSIR-NAL invites online quotation for procurement of the following item(s) for day to day research work.

Sl.No.	Description of Items	Unit	Quantity
1	Movable compression / tensile SHPB Gasgun with aligned mounting table.	Set	01
Please refer annexure for detailed specification.			

Single / Double Bid	Two Bid	Tender Type	Open
Bid Security (EMD) (in INR)	Bid Security Declaration should be enclosed with quotation	Bid submission end date	08-Nov-2021 10.00 Hrs
Performance Security	3% of the purchase order value	Bid opening date	09-Nov-2021 11.00 Hrs

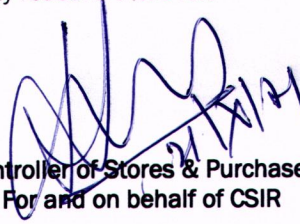
01. Tender Documents may be downloaded from Central Public Procurement Portal <https://www.etenders.gov.in>. Aspiring Bidders who have not enrolled/ registered in e- procurement should enroll/ register before participating through the website <https://www.etenders.gov.in>. The portal enrolment is free of cost. Bidders are advised to go through instructions provided at 'Instructions for online Bid Submission'.
02. Tenderers can access tender documents on the website (For searching in the NIC site <https://www.etenders.gov.in>, kindly go to Tender Search option, select tender type and select ' Council of Scientific and Industrial Research' in organization tab and select NAL-Bengaluru-CSIR in department type. Thereafter, Click on "Search" button to view all CSIR-NAL, Bengaluru tenders). Select the appropriate tender and fill them with all relevant information and submit the completed tender document online on the website <https://www.etenders.gov.in> as per the schedule given in the next page.
03. Either the Indian Agent on behalf of the Foreign principal or the Foreign principal can bid directly in a tender but not both. However, the offer of the Indian Agent should also accompany the authorization letter from their principal. To maintain sanctity of tendering system, one Indian Agent cannot represent two different Foreign principals in one tender.
04. Unsolicited / conditional / unsigned tenders (Quotations)/Quotations received after the due date and time **shall be summarily rejected**. The Bidder shall comply the terms and conditions of the tender, failing which, the offer shall be liable for rejection.
05. The bids of those Bidders failing to comply with the following clauses will be summarily rejected.
  - a. The Bidders proposing to supply finished products directly/indirectly from vendors of countries sharing the land border with India should submit copy of registration done with the Ministry of Home Affairs and Ministry of External Affairs.
  - b. If the Products supplied are not from vendors of countries sharing land border with India, the Bidders have to enclose a declaration to that effect.

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## **CSIR-National Aerospace Laboratories, Bengaluru-560 017, INDIA**

06. Bidders are requested to refer to the instruction regarding Procurement Policies for Make in India issued by Ministry of Commerce and Industry, Department of Industrial Policy and Promotion dated. 28-May-2018 and 4-Jun-2020 and guidelines as and when issued.
07. **The prospective bidders are requested to refer to the Standard Terms and Conditions available on NAL Internet ([www.nal.res.in](http://www.nal.res.in)) under the icon Tender-Purchase before formulating and submitting their bids**
08. The Director, CSIR- National Aerospace Laboratories, Bengaluru reserves the right to accept any or all the tenders either in part or in full or to split the order without assigning any reasons there for.

  
**Controller of Stores & Purchase**  
**For and on behalf of CSIR**

**Annexure I:****Specifications for Table/Platform and Airgun assembly for the Integrated  
Tensile-Compressive Split Hopkinson Bar Test Setup**

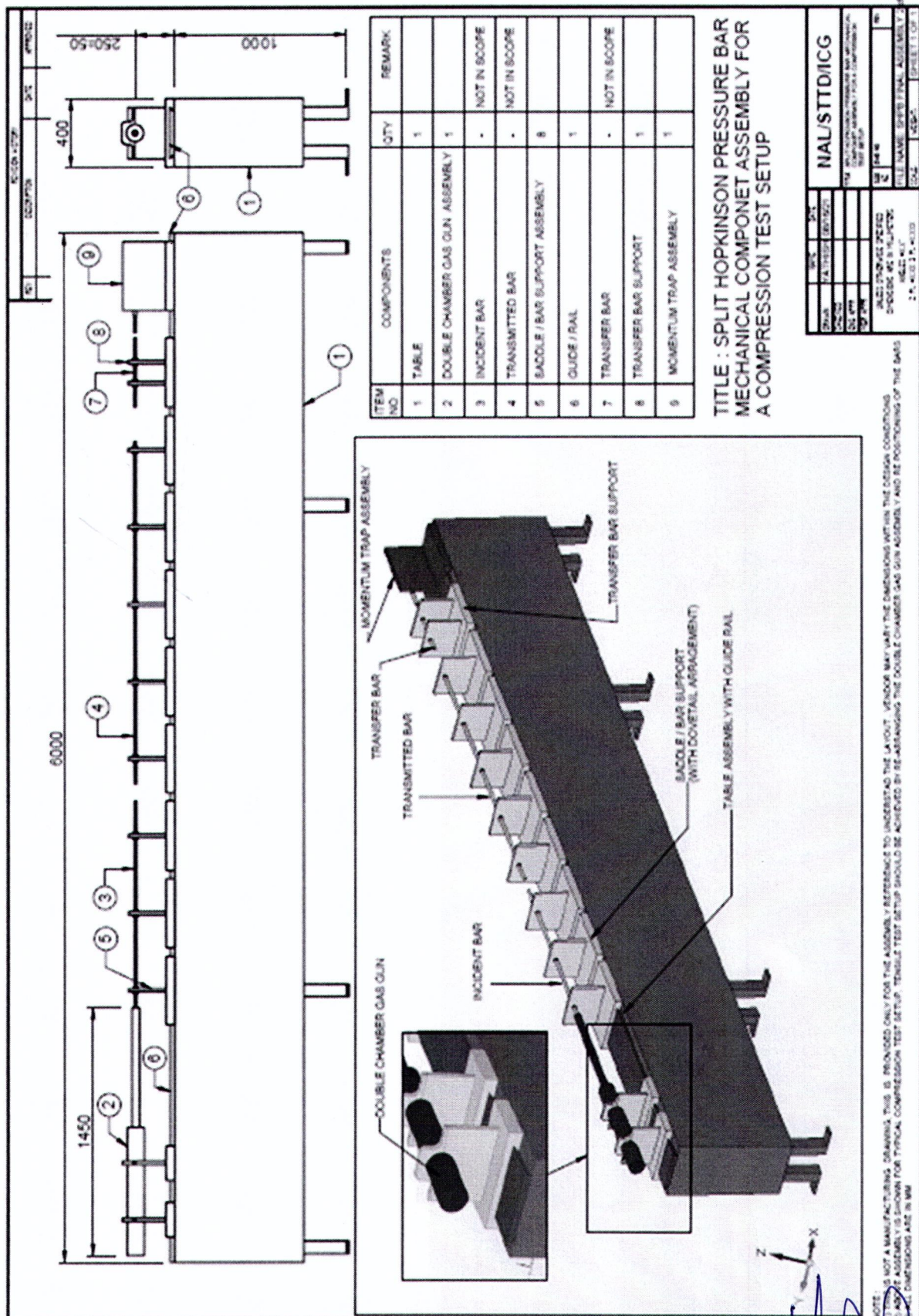
The platform consists of the following

- 1) Table
- 2) Rail Base/Slide
- 3) Dovetail arrangement (Saddle) for the bar holders
- 4) Bar Supports and transfer bar
- 5) Momentum Trap
- 6) Double Chamber Reservoir with barrel

The drawings supplied in the spec is simple and self-explanatory. Figure 1 below shows the schematic view of the Integrated Tensile-Compressive Split Hopkinson Bar Setup with its major components.



Figure 1: Three Dimensional View of the Integrated Tensile Compressive SHPB setup with its components (Note: Vendor is free to change over all physical dimension within 5 to 10% to meet the design requirements. The provided drawings are tentative and not for fabrication).



**1. Specification for the Table:**

1	Dimension:		6000 mm (Length) X 400 mm (Breadth) X 1000 mm (Height) (Refer Figure 2)			
2	Number		1 Table			
3	Material:		Mild Steel			
4	Chemical Composition					
Element	Carbon (C)	Manganese (Mn)	Phosphorus (P)	Sulphur (S)	Iron (Fe)	
Weight%	0.14-0.2	0.6-0.9	0.04	0.05	98.81-99.6	
5	Strength (Tensile)		370MPa			
6	Hardness		126 Brinell			
7	Finish		Matt Paint Finish with Glossy Top Plate			
8	Levelling Screws		M16 Levelling Screws should be provided. (Refer Figure 2)			
9	Selection of Fasteners:		Vendor can decide the size and number of fasteners based on the maximum load			
10	Finish and Tolerance / Alignment		Tolerance of 0.1mm/m throughout 6 meters of base			

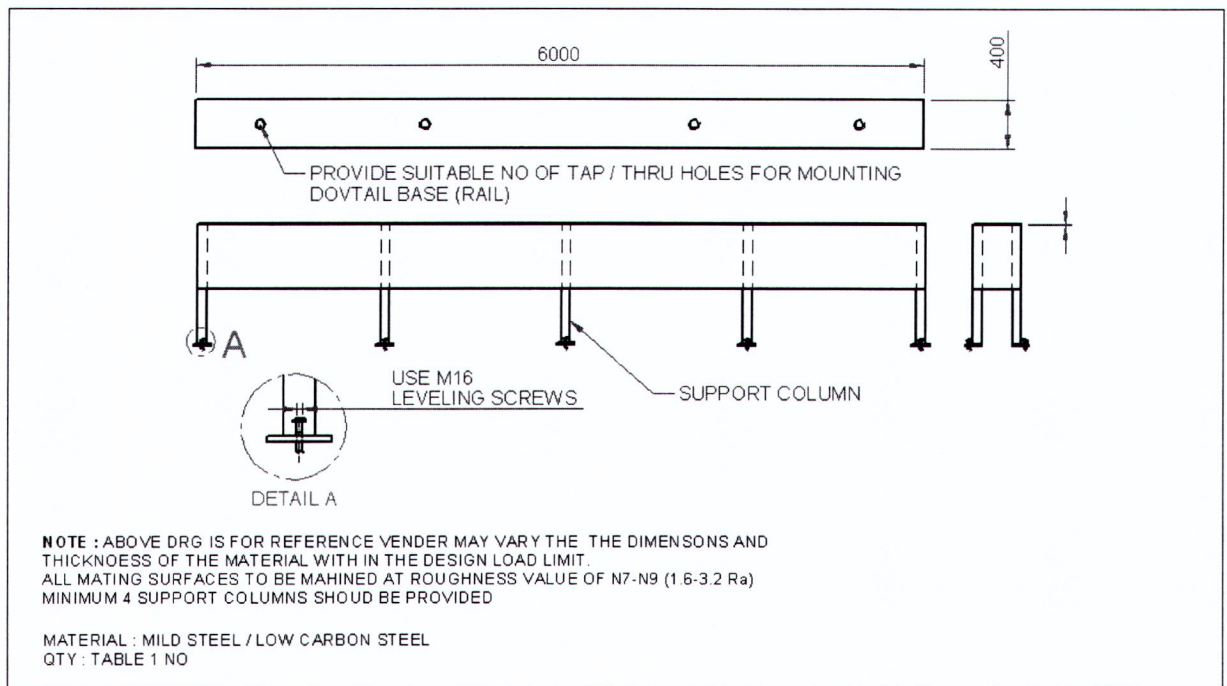


Figure 2: Table for the Split Hopkinson Bar

**2. Specification for the Rail Base/Slide:**

1	Dimension:		Total length of 6metres, (smaller units can be fitted to achieve this) (Refer Figure 3)		
2	Material:		Mild Steel		
3	Numbers		Can be a single monolithic piece or number of pieces attached.		
4	Chemical Composition				
Element	Carbon (C)	Manganese (Mn)	Phosphorus (P)	Sulfur (S)	Iron (Fe)
Weight%	0.14-0.2	0.6-0.9%	0.04	0.05	98.81-99.6
	Alignment		0.1mm/m		
5	Strength (Tensile)		370MPa		
6	Modulus of Elasticity		205 GPa		
7	Hardness		126 Brinell		
8	Finish		Smooth finish with 1mm tolerance		

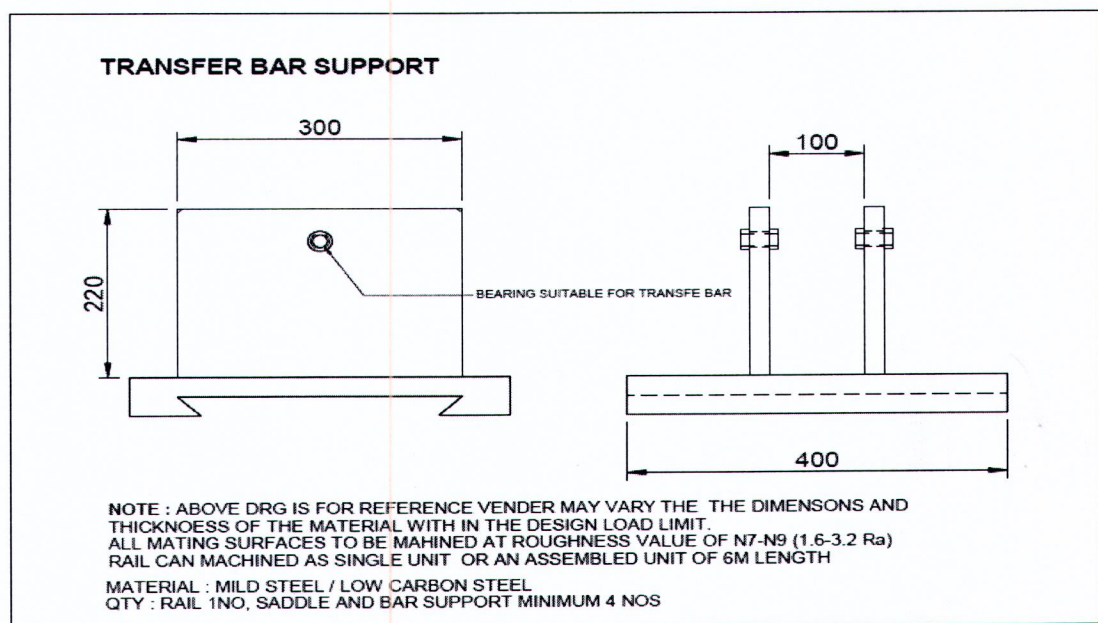
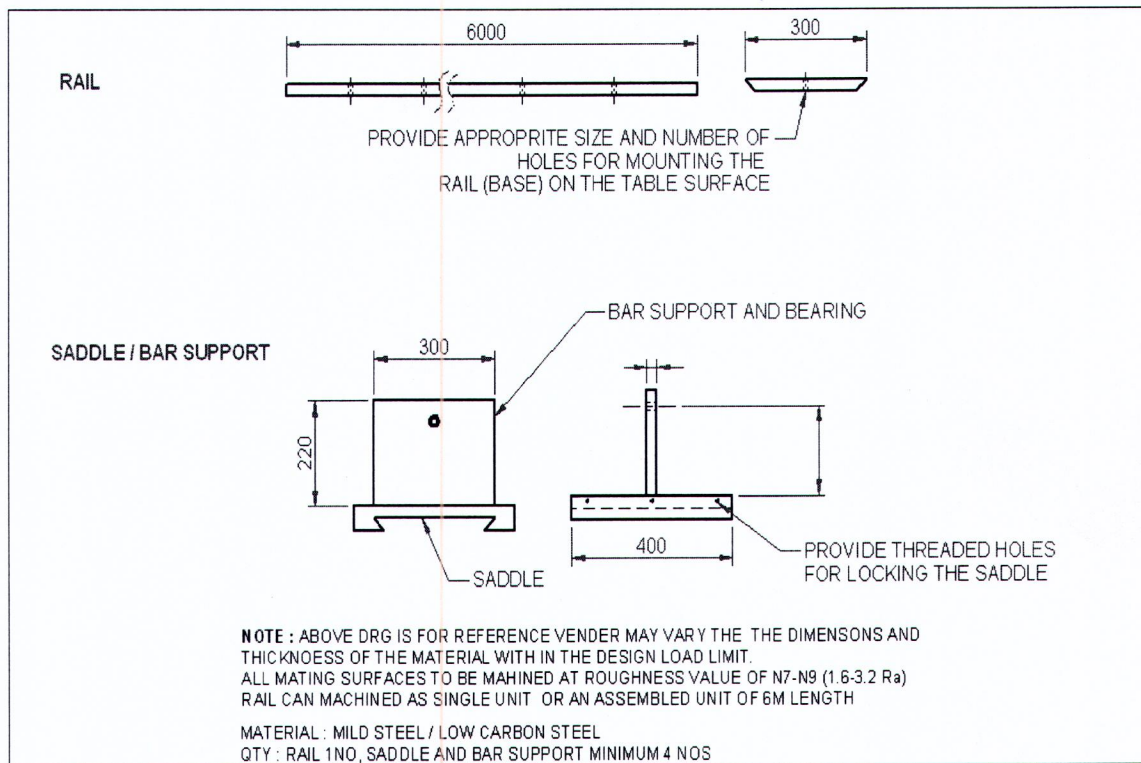


Figure 3: Rail, Bar Support , Dovetail arrangement and Transfer Bar Support

**3. Specification for the Dovetail arrangement (Saddle) for the bar holders and transfer bar :**

<b>1</b>	Dimension	400 mm (Length) X 300 mm (Breadth) (Refer Figure 3) ( The thickness of saddle (dovetail) must be based on rail thickness. Vendor should provide sufficient clearances for the parts to slide on the rail.			
<b>2</b>	Total number	9 (8bar supports+1 transfer bar support)			
<b>3</b>	Material:	Mild Steel/ Low Carbon Steel			
<b>4</b>	<b>Chemical Composition</b>				
Element	Carbon (C)	Manganese (Mn)	Phosphorus (P)	Sulfur (S)	Iron (Fe)
Weight%	0.14-0.2	0.6-0.9	0.04	0.05	98.81-99.6
<b>5</b>	Strength (Tensile)	370MPa			
<b>6</b>	Modulus of Elasticity	205 GPa			
<b>7</b>	Hardness	126 Brinell			
<b>8</b>	Finish	Smooth finish with 1mm tolerance			

**4. Specification for the Bar Supports and transfer bar:**

<b>1</b>	Dimension:	25 mm (Length) X 250 mm (Breadth) X 220 mm (Height) (Refer Figure 3)			
<b>2</b>	Number of bar supports and transfer bar	10 (8 bar support+ 2transfer bar)			
<b>3</b>	Material:	Mild Steel/ Low Carbon Steel			
<b>4</b>	<b>Chemical Composition</b>				
Element	Carbon (C)	Manganese (Mn)	Phosphorus (P)	Sulphur (S)	Iron (Fe)
Weight%	0.14-0.2	0.6-0.9%	0.04	0.05	98.81-99.6
<b>5</b>	Strength (Tensile)	370MPa			
<b>6</b>	Modulus of Elasticity	205 GPa			
<b>7</b>	<b>Hardness</b>	<b>126 Brinell</b>			
<b>8</b>	Type of sleeves in the bar supports	Brass Bush with End Lockers			
<b>9</b>	<b>Finish</b>	Smooth finish with 0.1mm tolerance			

**Note: The bar supports and transfer bars should be either fastened or welded to the dovetail (saddle) as shown in figure 3**

#### 5. Specification for the Momentum Trap:

1	Dimension:	400 mm (Length) X 200 mm (Breadth) X 30 mm (Height) (Refer Figure 4)			
2	Number	1 Momentum trap			
2	Material:	Mild Steel/ Low Carbon Steel			
3	Chemical Composition				
Element	Carbon (C)	Manganese (Mn)	Phosphorus (P)	Sulfur (S)	Iron (Fe)
Weight%	0.14-0.2	0.6-0.9%	0.04	0.05	98.81-99.6
4	Strength (Tensile)		370MPa		
5	Modulus of Elasticity		205 GPa		
5	Hardness		126 Brinell		
6	Finish		Smooth finish with 1mm tolerance		

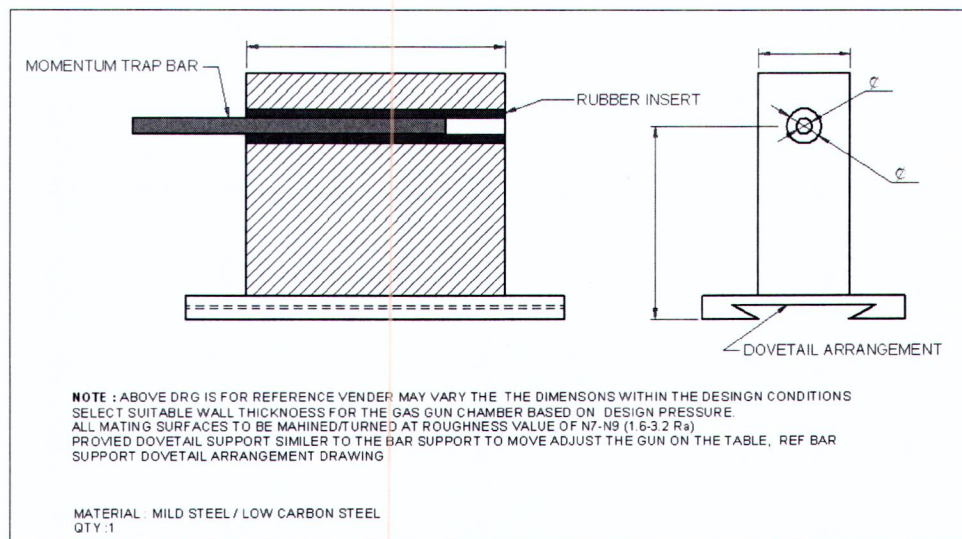


Figure 4: Momentum Trap

#### 6. Specification for the Double Chamber Reservoir with barrel:

1	Type of reservoir and barrel	Double chamber as shown in Fig 5			
2	Dimension of the chamber (second reservoir)				

3	Outside diameter of outside reservoir ( first chamber) and second chamber (refer fig 6) (Note: The outside chamber is connected pneumatically to the pressure source from outside.)	100mm	
4	Length of outside reservoir (first chamber in fig 6)	250mm	
5	Length of second reservoir (outer chamber in fig 6)	500mm	
6	Total Length of barrel (refer fig6)	1450mm	
7	Internal Diameter of barrel	32mm	
8	Thickness of barrel	5mm (If the manufacturer is supplying different thickness they should do as per ASME standards)	
9	Numbers	1 double chamber reservoir with barrel	
10	Material:	Stainless Steel	
11	Strength (Tensile)	250MPa or higher	
12	Minimum combined Volume of the first and second chamber	7 Litres	
13	Solenoid valves	2 (one of the valves for opening into the second chamber from the first chamber and other for the opening into the barrel from the second chamber.) Pressure rating :40 bars (The vendors should also make sure that there is no interference of the solenoids on data collected.)	
14	Pressure Rating for the reservoirs	100 Bars	
15	Finish	Smooth finish with 1mm tolerance	
16	Vents for safe release of pressurized gas. These Vents should be provided at the end of the barrel length. This would prevent any change in velocity of the striker after it has crossed the vents and would be constant when it hits the incident bar.		
17	<b>The suppliers should provide pressure vs velocity curve for a mild steel cylindrical striker of 16mm diameter and 250 mm length with an accuracy of +/- 5% using the SPHB (from 0 to 10bar)</b>		
18	<b>The airgun should be able to carry out both tensile and compressive SHPB test using same double chamber reservoir and barrel arrangement</b>		
19	Inlets should be provided at the chambers for letting the gas in at required pressures from outside source.		

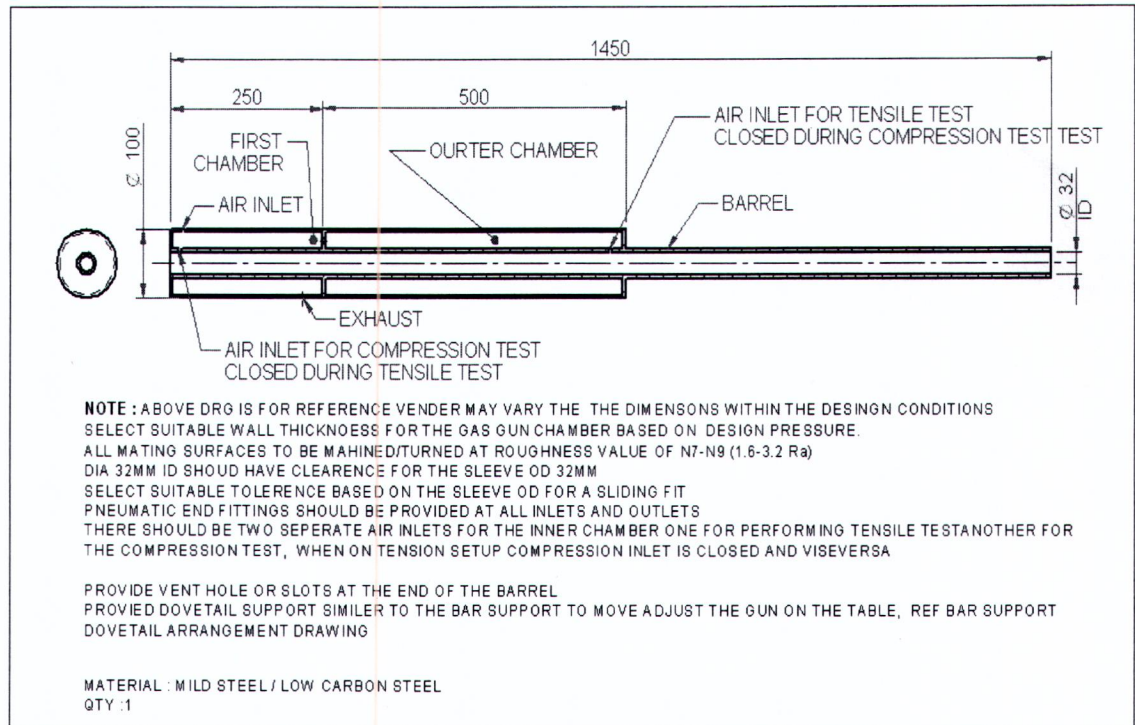


Figure 5 Airgun with Barrel

**Mandatory Requirement:**

- 1) The vendors should meet to all the requirements listed in the specification table. Non-compliance to any point will lead to rejection.
- 2) The dimensions are meant to be approximate and not exact though it is based on the design report. The vendor may change dimensions slightly.
- 3) Warranty should be given for a minimum of 1 year.
- 4) The vendor should supply/provide details of manufacturing and supplying such Integrated Tensile-Compressive Split Hopkinson bar test setup with the Double Chamber Reservoir for a reputed academic institution / industries.
- 5) All the components should be installed at NAL.
- 6) Design document and Manuals along with drawings should be given for the operation of the Split Hopkinson Pressure Bar using Double chamber reservoir with barrel. All the maintenance schedule and procedures should be included in the manual.
- 7) Material certificates should be given for the materials.
- 8) The vendor should also include the cost of transportation.

**BID-SECURING DECLARATION FORM**

Date: \_\_\_\_\_

Bid No. \_\_\_\_\_

To (insert complete name and address of the purchaser)

I/We. The undersigned, declare that:

I/We understand that, according to your conditions, bids must be supported by a Bid Securing Declaration.

I/We accept that I/We may be disqualified from bidding for any contract with you for a period of one year from the date of notification if I am /We are in a breach of any obligation under the bid conditions, because I/We

(a)	have withdrawn/modified/amended, impairs or derogates from the tender, my/our Bid during the period of bid validity specified in the form of Bid; or
(b)	having been notified of the acceptance of our Bid by the purchaser during the period of bid validity  (i) fail or refuse to execute the contract, if required, or  (ii) fail or refuse to furnish the Performance Security, in accordance with the Instructions to Bidders.

I/We understand this Bid Securing Declaration shall cease to be valid if I am/we are not the successful Bidder, upon the earlier of (i) the receipt of your notification of the name of the successful Bidder; or (ii) thirty days after the expiration of the validity of my/our Bid.

Signed: (insert signature of person whose name and capacity are shown)  
in the capacity of (insert legal capacity of person signing the Bid Securing Declaration).

Name: (insert complete name of person signing the Bid Securing Declaration)

Duly authorized to sign the bid for an on behalf of: (insert complete name of Bidder)

Dated on \_\_\_\_\_ day of \_\_\_\_\_ (insert date of signing)

Corporate Seal (where appropriate)

**Note:**

1. In case of a Joint Venture, the Bid Securing Declaration must be in the name of all partners to the Joint Venture that submits the bid.
2. Bid Security declaration must be signed in by the Proprietor/CEO/MD or equivalent level of Officer of the company.

