

BHARAT HEAVY ELECTRICALS LIMITED
HEEP HARIDWAR INDIA-PIN 249403
FAX NO: 0091 1334 226462/223948
PHONE NO: 0091 1334 284144

Sub: Requirement of MS Plates

The Heavy Electricals Equipment Plant (HEEP) located in Haridwar, India is one of the major manufacturing plants of Bharat Heavy Electricals Ltd. The core business of HEEP includes design and manufacture of large steam turbines, turbo generators and so on.

Bids are invited for following items through GeM Portal- <https://gem.gov.in>

Tender No	Item Description	Size (mm)	Qty. (Kg)	Delivery	Delivery Period (in No. of days from PO date)
F/F219/24/3406/K1	HW1011819988 STRUCTURAL STEEL WELDABLE QUALITY (PLATES) SPECIFICATION: AA10119 REV 15	200 x 1500 x 4000	75360	30/07/2025	90 Days

Remarks-

1. Delivery period mentioned in enquiry is indicative, bidders to quote their best possible delivery.
2. Quantity tolerance $\pm 10\%$ is acceptable in view of dimensional tolerances.
3. **Breach of Contract:**

In case of breach of contract, wherever the value of security instruments like performance bank guarantee available with BHEL against the said contract is atleast 10% of the contract value, the same be encashed. In case the value of the security instruments available is less than 10% of the contract value, the balance amount be recovered from other financial remedies (i.e. available bills of the contractor, retention amount, etc. with BHEL) or legal remedies be pursued. The balance scope shall be got done independently without Risk & Cost of the failed supplier/ contractor. Further, levy of liquidated damages, debarment, termination, de-scoping, short-closure, etc., shall be applied as per provisions of the contract. Accordingly, recovery of an amount equivalent to 10% of the contract value shall be made in case of breach of contract.

4. Payment terms shall be as follows:

The payment shall be made within no. of days as defined in the below table from appointed day

Type of Bidder	Payment Terms (Number of days)
Micro & Small Enterprises (MSEs)	45 days

Medium Enterprises	60 days
Non MSME	90 days

Appointed day means

- The day of delivery of material i.e. C-Note Date, subject to submission of non-discrepant documents by vendor as per Purchase Order.
- Or
- Where there is any objection regarding acceptance of goods, the same shall be informed to supplier within fifteen days from the day of the delivery of good. Appointed day will be the day on which such objection is removed by the supplier.
- For BOIs, the appointed day means the date of receipt of material at respective project Site (i.e. MRC date).

Note: Benefits of MSE (Price preference, Payment preference etc.) will be given only to those MSE Vendors who are manufacturers of offered items against the NIT. No MSE benefits shall be provided to Agents / Stockists / Dealers / Traders etc. for the items offered but not manufactured by themselves

5. “A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity’s interests. **The bidder found to have a conflict of interest shall be disqualified.** A bidder may be considered to have a conflict of interest with one or more parties in the bidding process, if”
- a. They have controlling partner (s) in common; **or**
 - b. They receive or have received any direct or indirect subsidy/financial state from any of them; **or**
 - c. They have the same legal representative/ agent for purposes of this bid; **or**
 - d. They have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; **or**
 - e. Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components / sub-assembly/ Assemblies from one bidding manufacturer in more than one bid; **or**
 - f. 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. There can be only one bid from the following:
 1. The principal manufacturer directly or through one Indian agent on his behalf; and
 2. Indian/ foreign agent on behalf of only one principal;

or

- g. A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid;
or
 - h. In case of a holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidder must proactively declare such sister/ common business/ management units in same/ similar line of business.”
- 6. Vendor should raise inspection call for BHEL / TPI inspection at least 4 days in advance to the planned date of inspection. If customer inspection is envisaged at vendor's works, vendor should give inspection call at least 7 days in advance to the planned date of inspection.
- 7. For this procurement, the local content to categorize a supplier as a Class I local supplier/ Class II local Supplier/ Non-local supplier and purchase preference to Class I local supplier, is as defined in Public Procurement (Preference to Make in India), Order 2017 dated 19.07.2024 issued by DPIIT. In case of subsequent orders issued by the nodal ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of Part-II bids against this NIT.
- 8. Test certificate and Guarantee certificate are required.
- 9. Rest terms and conditions shall be as per latest GeM GTC.

Pre- Qualification Requirements
(Plate of IS:2062, Grade E250 BR with mandatory Impact test)

PQR Point	Requirements	Vendor to submit / confirm	Vendor's reply
1	<u>For Plate manufacturer:</u>		
	a Vendor must be having Bureau of Indian Standard (BIS) approval for manufacturing of carbon steel plates of IS 2062 Grade E250BR.	BIS Certificate / BIS Certification number	
	b Enquiry plate will be supplied as per BHEL enquiry specification and dimension.	Vendor's confirmation required	
	c Plates above 12 mm thickness shall be supplied in normalized or an equivalent condition.	Vendor's confirmation required	
2	<u>For trader / stockist / reseller:</u>		
	a Vendor to submit their past experience for supply of carbon steel / alloy steel plates against at least one purchase order in last seven years on enquiry issue date.	➤ At least one purchase order copy and its correlated test certificates. ➤ Invoice / dispatch documents of above purchase order.	
	b Enquiry plates shall be supplied from BIS approved plate manufacturer for IS 2062, Grade E250BR and dimension only.	Vendor's confirmation required	
	c Enquiry plate will be supplied as per BHEL enquiry specification and dimension.	Vendor's confirmation required	
	d Plates above 12mm thickness shall be supplied in normalized or an equivalent condition.	Vendor's confirmation required	

Sl. No.	Quality Requirement	Vendor's confirmation (Y/N)
01	PRE-DISPATCH INSPECTION BY BHEL TPIA TUV AS PER BHEL APPROVED QUALITY PLAN (QA/PMD/001 REV 00). VENDOR TO ENDORSE THE ATTACHED QUALITY PLAN WITH THEIR SIGN & STAMP.	

Signature with stamp

Name:

Name of Firm:


Designation:

Date:

QUALITY PLAN
(QA/PMD/001 Rev 00)

MANUFACTURER'S NAME AND ADDRESS				QUALITY PLAN				TO BE FILLED BY BHEL				TO BE FILLED BY BHEL			
BHEL	VENDOR'S NAME	ITEM	AS PER PO		QP NO.	QA/PMD/001									
				REV	00										
		DRG. NO.	AS PER PO												
		SPEC.	AS PER PO												
		REV	AS PER PO												
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS		CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS		AGENCY		REMARKS		
									M	B	N				
1	2	3	4	5	6	7	8	9	D	10	11				

IN CASE OF PROCUREMENT OF PLATES, PIPES, FLATS, ROUNDS (CS), BARS (CS), STRIPS ETC. IS PROCURED DIRECTLY FROM OEM.												
1.	IN CASE OF PROCUREMENT OF PLATES, PIPES, FLATS, ROUNDS (CS), BARS (CS), STRIPS ETC. IS PROCURED DIRECTLY FROM OEM.	RECEIVING MATERIAL INSPECTION	IDENTIFICATION & VERIFICATION OF MILL TEST CERTIFICATES	CRITICAL	VERIFICATION OF MILL TC	100%	BHEL SPEC	BHEL SPEC	MILL TC / IR	P	V	1. CO-RELATED ORIGINAL OR CO-RELATED COMPUTER GENERATED MATERIAL TEST CERTIFICATE (MTC), ORIGINATED FROM OEM (SEALED AND SIGNED BY OEM) 2. EVERY PLATES, PIPES, FLATS, ROUNDS, BARS, STRIPS ETC. MUST HAVE IDENTIFICATION MARKING OF STEEL MANUFACTURER AS PER APPLICABLE SPECIFICATION/ STANDARD. 3) CO-RELATION WITH TC ALONG WITH CORRELATED INVOICE TO BE PROVIDED WITH SUPPLY OF THE ITEMS.
1A												

MANUFACTURER/SUBCONTRACTOR	FOR CUSTOMER USE		APPROVED BY
<div><div> Digitally signed by Indra Bhushan Kumar DN: cn=Indra Bhushan Kumar, o=BHEL, ou=KEEP, email=indrabhushan.kumar@bhel.co.in, c=IN Date: 2024.11.27 14:58:57 +05'30' Adobe Acrobat Reader version: 2024.004.20272</div><div>LEGEND: ! RECORDS IDENTIFIED WITH 'TICK' UNDER COLUMN 'D' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR/VENDOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / BHEL NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHIP' OF CUSTOMER</div></div>			

MANUFACTURER'S NAME AND ADDRESS				QUALITY PLAN				TO BE FILLED BY BHEL				TO BE FILLED BY BHEL			
VENDOR'S NAME		ITEM	AS PER PO		QP NO.	QA/PMD/001									
BHEL			DRG. NO.	AS PER PO	REV	00									
			SPEC.	AS PER PO											
			REV	AS PER PO											
SL. NO.		COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY	REMARKS				
1		2	3	4	5	6	7	8	9	M	B	N	10		
		Page 2 of 2													

2. IN CASE OF PROCUREMENT OF PLATES, PIPES, FLATS, ROUNDS, BARS, STRIPS ETC. IS PROCURED FROM TRADER/STOCKIST.													
2A	RECEIVING MATERIAL INSPECTION	IDENTIFICATION & VERIFICATION OF MILL TEST CERTIFICATES	CRITICAL	VERIFICATION OF MILL TC	100%	BHEL SPEC	BHEL SPEC	MILL TC / IR	✓	P	V	1. CO-RELATED ORIGINAL OR CO-RELATED COMPUTER GENERATED MATERIAL TEST CERTIFICATE (MTC). ORIGINATED FROM OEM (SEALED AND SIGNED BY OEM) 2. MILL TC (AS PER BHEL ORDERING DOCUMENTS) SHALL BE FROM MANUFACTURER IDENTIFIED IN PO 3. EVERY PLATES, PIPES, FLATS, ROUNDS, BARS, STRIPS ETC. MUST HAVE IDENTIFICATION MARKING OF STEEL MANUFACTURER AS PER APPLICABLE SPECIFICATION/ STANDARD. 4) CO-RELATION WITH TC ALONG WITH CORRELATED INVOICES (FROM STEEL MANUFACTURER TO BIDDER) TO BE PROVIDED WITH SUPPLY OF THE ITEMS.	
2B	For Pipes only	SAMPLE FOR CHEMICAL AND MECHANICAL TEST	MAJOR	VISUAL	AS PER ORDERING SPECIFICATION ON	AS PER ORDERING SPECIFICATION AND DOCUMENTS	AS PER ORDERING SPECIFICATION AND DOCUMENTS	REPORT	✓	P	W		
2C	For Pipes only	REPEAT TEST CHEMICAL COMPOSITION AND MECHANICAL PROPERTIES	MAJOR	VISUAL AND MEASUREMENT	AS PER ORDERING SPECIFICATION ON	AS PER ORDERING SPECIFICATION AND DOCUMENTS	AS PER ORDERING SPECIFICATION AND DOCUMENTS	REPORT	✓	P	W	TESTING TO BE DONE IN NABL APPROVED LABORATORY ONLY.	

NOTE: 1) TPIA TO REVIEW ALL THE REMAINING TCs AS PER ORDERING DRAWING / SPEC / DOCUMENTS (AS APPLICABLE).

[Signature]

MANUFACTURER/SUBCONTRACTOR	LEGEND:		FOR CUSTOMER USE	APPROVED BY
	! RECORDS IDENTIFIED WITH 'TICK' UNDER COLUMN 'D' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR/VENDOR IN QA DOCUMENTATION. M: MANUFACTURER / SUBCONTRACTOR B: BHEL / BHEL NOM. INSPECTION AGENCY N: CUSTOMER INDICATE 'P' PERFORM 'W' WITNESS AND 'V' VERIFICATION ALL 'W' INDICATED IN COLUMN 'N' SHALL BE 'CHIP' OF CUSTOMER			
Digitally Signed by Indra Bhushan Kumar DN: cn=Indra Bhushan Kumar, o=BHEL, ou=BHEL HEIP Hardwar, ou=BHEL/HEIP Hardwar, email=ibkumar@bhel.in, c=IN Date: 2024.11.27 14:59:16 +05'30' Reason version: 204.004.20272				

(Self-Certification for local content)

**DECLARATION REGARDING MINIMUM LOCAL CONTENT IN LINE WITH
REVISED PUBLIC PROCUREMENT (PREFERENCE TO MAKE IN INDIA), ORDER 2017 DATED 04TH
JUNE, 2020 AND SUBSEQUENT ORDER(S)**

(To be typed and submitted in the Letter Head of the Entity/Firm providing certificate as applicable)

To,

(BHEL HEEP Haridwar)

Dear Sir,

Sub: Declaration reg. minimum local content in line with Public Procurement (Preference to Make in India), Order 2017-Revision, dated 04th June, 2020 and subsequent order(s).

Ref: 1) GeM Bid Specification No:

2) All other pertinent issues till date

We hereby certify that the items/works/services offered by..... *(specify the name of the organization here)* has a local content of _____ % and this meets the local content requirement for **'Class-I local supplier' / 'Class II local supplier'** ** as defined in Public Procurement (Preference to Make in India), Order 2017-Revision dated 04.06.2020 issued by DPIIT and subsequent order(s).

The details of the location(s) at which the local value addition is made are as follows:

1. _____ 2. _____

3. _____ 4. _____

...

Thanking you,

Yours faithfully,

**(Signature, Date & Seal of
Authorized Signatory of the Bidder)**

**** - Strike out whichever is not applicable.**

Note:

1. Bidders to note that above format, duly filled & signed by authorized signatory, shall be submitted along with the techno-commercial offer.
2. In case the bidder's quoted value is in excess of Rs. 10 crores, the authorized signatory for this declaration shall necessarily be the statutory auditor or cost auditor of the company (in the case of companies) or a practising cost accountant or practicing chartered accountant (in respect of suppliers other than companies).
3. In the event of false declaration, actions as per the above order and as per BHEL Guidelines shall be initiated against the bidder.

(Specification)

**AA10119 Rev:15, and
cross-referred BHEL Standard AA 0850120**



CORPORATE PURCHASING SPECIFICATION

AA10119

Rev No. 15

PAGE 1 of 2

STRUCTURAL STEEL - WELDABLE QUALITY (PLATES, SECTIONS, STRIPS, FLATS AND BARS)

ORDERING DESCRIPTION

1.0 GENERAL:

The material shall conform to IS 2062 - 2011, E250-Gr.BR (with mandatory Impact Test) or DIN EN 10025-2:2005, Gr. S275JR and comply with following additional requirements.

2.0 APPLICATION:

For general engineering purposes, suitable for welding.

3.0 CONDITION OF DELIVERY:

3.1 Bars & Sections shall be supplied in Hot rolled in straight lengths without twists and bends.

3.2 The material shall be supplied as per IS: 2062 - 2011, E250 Gr.BR (with mandatory Impact Test) or as per DIN EN 10025-2:2005 Gr. 275JR.

3.3 Any other additional requirement as per BHEL Purchase order.

4.0 DIMENSIONS AND TOLERANCES:

4.1 Sizes:

Material shall be supplied to the dimensions specified in BHEL Order.

4.2 Tolerances:

The tolerances on hot rolled material shall comply with IS: 1852 or any other equivalent national standard.

4.3 Straightness for hot rolled bars:

Unless otherwise specified, the permissible deviation in straightness shall not exceed 5 mm in any 1000 mm length.

5.0 TEST SAMPLES:

The selection of test pieces for all tests like Chemical, Mechanical etc. shall be as per IS: 2062, E250-Gr.BR or DIN EN 10025-2, Gr. S275JR.

Revisions:

Clause No. 1, 3, 5 & 8 revised (as per MOM of 38th MRC meeting), Clause 10 added

APPROVED:

INTERPLANT MATERIAL RATIONALISATION
COMMITTEE - MRC(S&GPS)

Rev No.15

Amd No.

Reaffirmed

Prepared

Issued

Dt. of 1st Issue

Dt:11-03-2014

Dt:

Year:

HPEP, Hyderabad

Corp.R&D

June, 1976

26/6/14

CS-52

AA10119

Rev No. 15

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CORPORATE PURCHASING SPECIFICATION



6.0 ULTRASONIC EXAMINATION:

Plates shall be ultrasonically examined in accordance with BHEL standard AA0850120 (or ASTM-A435) as detailed below and shall comply with the acceptance standards specified therein.

6.1 For plates above 40 mm thick:

Shall be ultrasonically examined unless when otherwise specified in order.

7.0 TEST CERTIFICATES:

Unless otherwise specified, three copies of test certificates shall be supplied.

In addition, the supplier shall ensure to enclose one copy of the test certificate along with their dispatch documents to facilitate quick clearance of the material.

The test certificate shall bear the following information:

AA10119 - Rev.No.15/ IS: 2062-Gr: BR (with mandatory Impact test) or DIN EN 10025-2, Gr. S275JR,

BHEL order No.

Melt No, Size & Quantity, Batch No with heat treatment details, Results of Chemical analysis,

Mechanical tests & NDT, Supplier's name, Identification No, TC No, Signature of Competent Authority, etc.

8.0 PACKING AND MARKING:

Plates shall be transported suitably to avoid damage during transit.

Each plate shall be marked with Melt No. Material grade and specification, BHEL Order No, Supplier's Name Identification No, Size & weight, on any one corner and encircled with paint preferably of white colour.

9.0 REJECTION AND REPLACEMENT

If the material does not comply with the requirements of this specification during receipt inspection at BHEL or if any defect is found during further processing of material, BHEL reserves the right to reject the whole consignment and the supplier shall replace the material free of cost. The rejected material shall be taken back by the supplier after fulfilling the commercial terms and conditions.

10.0 REFERRED STANDARDS (Latest publications including amendments):

1) IS: 1852

2) ASTM - A435

3) AA0850120

26/6/14

CS-721



STRAIGHT BEAM ULTRASONIC EXAMINATION OF STEEL PLATES
FOR PRESSURE VESSELS

1.0 SCOPE:

1.1 This standard covers the examination procedures and acceptance standards for straight beam, pulse echo, ultrasonic, examination of rolled carbon and alloy steel plates, 12.5 mm and above in thickness, of fully killed, pressure vessel quality. It was developed to assure delivery of steel plates free of gross internal discontinuities such as pipe, ruptures or laminations and is to be used whenever the corporate purchasing specification states that the plates are to be subjected to ultrasonic examination.

1.2 This standard is generally based on ASTM A 435 — 1982 (Reapproved 1987).

2.0 PERSONNEL REQUIREMENT:

Personnel performing non-destructive examination and evaluation shall be qualified to the recommended practice SNT-TC-1A or any other recognised practice.

3.0 APPARATUS: — EQUIPMENT CHARACTERISTICS:

For clause 3.1, 3.2, 3.3 & 3.4 see Page 3 of 3

3.1 The manufacturer shall furnish suitable ultrasonic equipment and qualified personnel necessary for performing the test. The equipment shall be of the pulse echo straight beam type. The transducer shall be 20 to 30 mm diameter or 25.4 mm square. The test shall be performed by one of the following methods, direct contact, immersion or liquid column coupling.

4.0 TEST CONDITIONS:

4.1 The examination shall be conducted in an area free from operations that interfere with proper functioning of the equipment.

4.2 The plate surface shall be sufficiently clean and smooth to maintain a reference back reflection from the opposite side of the plate at least 50% of full scale during scanning.

4.3 The surface of plates inspected by this method may be expected to contain a residue of oil or rust or both. Any specified identification which is removed when grinding to achieve proper surface smoothness shall be restored.

5.0 PROCEDURE:

5.1 Ultrasonic examination shall be made on either major surface of the plate. Acceptance of defects in close proximity may require inspection

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CS-327

Revisions:

Cl. 7.8 of MOM of WG (NDT)

Approved:

**INTERPLANT
STANDARDIZATION COMMITTEE- WG
(NDT)**

Rev. No. 01

Am'd. No. 01

Reaffirmed

Prepared

Issued

Date

Dt. Nov. '92

Dt. 29.10.99

year: 2002

TIRUCHY

CORP. R&D

NOV. '78



from the second major surface. Plates ordered in the quenched and tempered condition shall be tested following heat treatment.

- 5.2 A nominal test frequency of 2 to 4 MHz is recommended. Thickness, grain size or microstructure of the material and the nature of the equipment or method may require a higher or lower test frequency. However, frequencies, less than 1 MHz may be used only on agreement with BHEL. A Clear, easily interpreted trace pattern should be produced during the examination.
- 5.3 Conduct the examination with a test frequency and instrument adjustment that will produce a minimum 50 to a maximum 75% of full scale reference back reflection from the opposite side of a sound area of the plate.
- 5.4 Scanning shall be continuous along perpendicular grid lines on nominal 230 mm centres, or at the manufacturer's option, shall be continuous along parallel paths, transverse to the major plate axis, on nominal 100 mm centres, or shall be continuous along parallel paths parallel to the major plate axis, on 75 mm or smaller centres. A suitable couplant such as ~~water-soluble~~ oil, or ~~water~~ shall be used.
- 5.5 Scanning lines shall be measured from the center or one corner of the plate. An additional path shall be scanned within 50 mm of all edges of the plate on the scanning surface.
- 5.6 Where grid scanning is performed and complete loss of back reflection accompanied by continuous indications is detected along a grid line, the entire surface area of the square adjacent to this indication shall be scanned continuously. Where parallel path scanning is performed and complete loss of back reflection accompanied by continuous indications is detected, the entire surface area of 230 x 230 mm square centred on this indication shall be scanned continuously. The true boundaries where this condition exists shall be established in either method by the following technique: Move the transducer away from the centre of the discontinuity until the heights of the back reflection and discontinuity indications are equal. Mark the plate at a point equivalent to the **centre** of the transducer. Repeat the operation to establish the **boundary**.

6.0 ACCEPTANCE STANDARD:

- 6.1 Any discontinuity indication causing a total loss of back reflection which cannot be contained within a circle, the diameter of which is 75 mm or one half of the plate thickness, whichever is greater is unacceptable. **Total loss of back reflection means loss of back reflection upto 5% of screen height.**

6.2 ~~BHEL representative may witness the test.~~

Acceptable adjacent discontinuity indications shall be separated from each other by a distance equal to or larger than the larger of the adjacent discontinuity indications unless the adjacent defects can be contained in a circle of diameter equal to the acceptance standard for a single defect.



CORPORATE STANDARD

AA 085 01 20

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7.0 MARKING:

7.1 Plates accepted in accordance with this specification shall be identified by stamping UT: AA 085 01 20 or in some other manner adjacent to marking required by the relevant corporate purchasing specification.

8.0 SUPPLEMENTARY REQUIREMENTS:

8.1 Any supplementary requirements according to ASTM A 435, if required, will be specified in the purchase order.

3.1 Frequency range :

The ultrasonic equipment shall be suitable for operating at frequencies within the range of 0.5 to 6 MHz.

3.2 Sensitivity:

The sensitivity of the equipment shall be tested to ensure that the number of full screen back wall echoes is not less than that given below, when the appropriate probe is placed on the metallised surface of plastic insert of the Indian Standard reference block (IS:4904) IIW block.

Frequency, MHz	Min. No. of full screen back wall echoes
1	5
2	4
4 to 6	2

3.3 Resolution :

The resolution of the equipment and probe combined shall be such as to show separately indications of the three grooves in the IIW-VI block.

3.4 Transducer:

The transducer shall be 20-30 mm dia or 25.4 mm square. The test shall be performed by one of the following methods :

a) Direct contact b) Immersion c) Liquid column coupling.