

ISO 9001:2008	Document No. RDSO/M&C/NDT/130/2007(B-Scan) Rev-III, July2017	Version No. 4.0	Effective Date:
Technical specification of Digital Ultrasonic Double Rail Tester with minimum two base Lines coloured signals and real A-scan pulse echo with continuous recording of B-Scan storage along with data setup			



RESEARCH DESIGNS & STANDARDS ORGANISATION
Manak Nagar, Lucknow-226011

RDSO/M&C/NDT/130/2007 REV-III, JULY 2017

**TECHNICAL SPECIFICATION OF DIGITAL ULTRASONIC DOUBLE RAIL TESTER
WITH MINIMUM TWO BASE LINES, COLOURED SIGNALS AND REAL A-SCAN
PULSE ECHO WITH CONTINUOUS RECORDING OF B-SCAN STORAGE ALONGWITH
DATA SETUP.**

Amendment history:

S. No.	Amendment date	Version	Reasons for Amendment
1.	NA	1.0	First issue specification No. RDSO/M&C/NDT/130/2007, February 2009.
2.	28.10.2014	2.0	As 83rd TSC committee has recommended to standardize the specification for DRT with multi-channel for better reliability. Approval accorded by Director/M&C at np-23 of file No. M&C/NDT/130/2007, Rev-I Date of enforcement accorded by Directorate head at np-22 as per clause No. 4.7 of document No. QO-D-7.1-2 on file No. M&C/NDT/130/2007, Rev-I.
3.	07.02.2017	3.0	1. Rewording in clause 2.1 and 3.9. 2. Inclusion of test specification no. in clause no. 4.12. 3. Clause 5.1 display area has been replaced by Screen display size. 4. Clause 18'Guarantee' for one year has been replaced by 'Warranty' clause for three years 5. The word 'guarantee' replaced by 'warranty'in clause 19. 6. Addition of Clause 20 (Extensive Field Trial). 7. Addition of note no. 4 mentioned below clause no. 20. 8. Change in length of aluminium/wooden housingfor sensitivity setting Block in Fig 1. Approval accorded by competent authority at np-1, 4, 9& 16of file No. M&C/NDT/130/2007, Rev-II, June 2016, Vol-land np- 34 of file no. M&C/NDT/130/2007, Rev-I
4.	---	4.0	With reference Rly. Board letter no. Track/21/2017/0903/7 Pt.II, Dated: 26.05.2017 to revise technical specification and introduce USFD testing of Rail in Track using B-Scan USFD machine with continuous and complete recording etc. Approval accorded by competent authority at np-.....of M&C/NDT/DRT (B-Scan) as per document no. QO-D-7.1-2, ver. 7.0, date effective 07.05.2015.

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Abbreviations:

- i) Equipment: Portable Digital Ultrasonic Double Rail Tester

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1. Scope:

This standard stipulates the technical and functional requirements for multi-channel with minimum two base line, real time portable digital ultrasonic double rail tester for rail testing with LCD-TFT screen to display A-scan pulse echo and B-Scan. The Equipment shall have facility to record A-Scan defect echo envelope in real time as and when required by the operator along with continuous B-Scan recording for different sliding/wheel probes fitted in double rail testing trolley. The Equipment shall be capable to scan both left and right rail in a single run of testing. The Equipment shall be capable to display A-Scan and B-Scan simultaneously for both left and right rail during testing. The Equipment shall be capable to display 7 colours for echoes/ signals of A-Scan and B-Scan in such a way that each type of probe (i.e. 70° central, 70° GF and 70° NGF) shall indicate separate colour for forward and backward echoes for each rail. The 0° probe shall have also a separate colour indication. Same colour combination shall be followed for probes of both rails and facility storing A-Scan with data setup. The Equipment shall be capable to scan rail head for detection of transverse defect in rail head including gauge face corner and non-gauge face corner defects in rail in a single run of testing and there shall be no need to identify any flaw by operating the control of individual probe i.e. signals appearing on the screen shall indicate from which probe the flaw is coming without operating any control switch and the operator may use respective control touch keys only for classifying the defect. The Equipment shall be tropicalised to suit Indian climatic condition.

2. General requirements:

- 2.1 The Equipment shall be of A-Scan pulse echo technique with solid state printed circuit board giving reduced inter connection noise. The Equipment shall have facility to record 400 nos. real time A-Scan defect echo envelope as and when required by the operator. The Equipment shall have facility to record continuous B-Scan of minimum 50 Track Km length corresponding to A-Scan echo crossing particular threshold level. Threshold level can be set by the operator. Default threshold level will be 20% of full screen height. Flexibility to change the gate / threshold level should be available as per requirement of para 3.7 for A-Scan and B-Scan both. The Equipment along with its trolley arrangement shall be light weight and should work with portable battery. Equipment shall be displaying minimum two base line on screen for better visibility in indirect light. The Equipment shall be suitable to work at ambient temperature up to 55°C. The Equipment shall have a system of storing minimum 10 calibration sets. The Equipment shall be perfectly EMI sealed to work properly under high tension electrified track.
- 2.2 The Equipment shall be equipped with simultaneous display of A- Scan in real time and continuous B- Scan on the screen and the saved defect echo envelope, which shall consist of signals appearing on the screen along with data setup, time of saving and respective B-scan indication.
- 2.3 The Equipment shall have facility of location stamping km/m/cm by digital encoder (Odometer) and GPS (latitude and longitude) recording.
- 2.4 The Equipment shall have facility of time stamping, which shall be duly synchronized with GPS satellite clock. In case signal is missing from satellite, real time clock on the ultrasonic flaw detector shall record the time.

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- 2.5 The Equipment shall have facility for offline recreation of A- Scan defect echo envelope display from recorded B-Scan.
- 2.6 The Equipment shall have facility to down load recorded data from DRT to USB based Pen-Drive without use of any external adaptor.
- 2.7 The Equipment shall record requisite data at a maximum interval of 1mm for all the probes for the purpose of creation of B-scan
- 2.8 Equipment's characteristics as mentioned in Para 4 shall be determined as per procedure laid down in IS: 12666-1998 or latest version. However, limits specified in this specification for these characteristics shall be applicable.
- 2.9 The battery shall be capable for working minimum 8 hours continuously without drop in performance of the Equipment.
- 2.10 The battery shall be easily detachable from the Equipment and it should be able to charge without need of-Equipment.

3. Technical Requirement:

Functional parameters:

The technical requirements of the Equipment shall be as under:

- 3.1 Test mode: The Equipment shall be capable of working in single crystal mode (T+R mode), double crystal mode (T/R mode) and multi- channel mode.
- 3.2 Frequency range: The Equipment shall have one band amplifier capable of working in the frequency range from 1 MHz to 6MHz.
- 3.3 Test range: The Equipment shall cover test range from 50 mm to 1000mm.
- 3.4 Trace delay: The Equipment shall have trace delay facility of minimum 100 mm length in steel.
- 3.5 Gain/ Amplification: The Equipment shall have minimum 120dB total gain (including internal gain). The operatable gain shall be 80dB. It shall be provided with suitable gain control steps. The gain steps shall cover 0.5 dB, 1dB, 2 dB and 6dB in the Equipment.
- 3.6 Suppression/ Reject: The Equipment shall have reject facility or suppression of vertical signals from 0 to 80% minimum of the full screen height without affecting the desired signals.
- 3.7 Monitor gate: The Equipment shall be provided with minimum one monitor gate expandable to cover horizontal screen display from 5% to 99% and the level (vertical height) of the gate shall be adjustable to 5% to 99%.
- 3.8 Calibration Data Display: The Equipment shall have provision of display of different data set-up values of test parameters on screen itself.
- 3.9 Memory provision:
 - i. The Equipment shall have arrangement of storing minimum 10 calibration sets The Equipment shall have arrangement to record 400 numbers A-Scan defect echo envelope in real time in JPG/JPEG format for selected /all channel.
 - ii. The Equipment shall have arrangement for continuous B-Scan recording of minimum 50 Track km.

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iii. **The Equipment shall have facility for** re-calling the memory as and when required by the operator.

3.10 A-Scan and Data logging: The Equipment shall have facility to entering and recording following data through alpha numeric keys during testing.

- i. Date & Time of start of testing
- ii. Operator Name/Code
- iii. Division
- iv. **Block** Section
- v. **Line** -Up/Dn/SL/NL/SL/3L/4L
- vi. Km.Post of start of testing
- vii. Rail-LH/RH
- viii. Location of defect (14 digit **Alphanumeric** character)
- ix. Rolling Mark
- x. Probe Type
- xi. Flaw Code
- xii. Peak details: Horizontal movement & vertical height
- xiii. Classification of defect OBS/IMR/OBSW/IMRW
- xiv. Previous Classification

4. Important characteristics:

The Equipment shall possess the following values in regard to the important characteristics when tested in accordance with IS:12666-1988 or latest version using 2.0/2.5 MHz single crystal probe with 20mm crystal diameter.

- 4.1 **Linearity of time base:** The variation shall be within $\pm 1.25\%$ at ranges 100mm, 250mm and 500mm.
- 4.2 **Linearity of Amplification:** The Linearity shall be within $\pm 3\%$ at ranges 100mm, 250mm and 500mm.
- 4.3 **Penetration Power:** The equipment shall give at least 5 full echoes and 6th appearing with single crystal probe (2/2.5MHz) in 23mm perspex of IIW block. It has to be checked by using T+R mode (single crystal probe).
- 4.4 **Dead Zone:** The dead zone shall not be more than 7 mm with single crystal probe (2/2.5MHz) and not more than 3mm for double/twin crystal 0°/4 MHz.
- 4.5 **Echo Resolution:** The resolution shall be 6 mm or better in steel.
- 4.6 **Sweep drift:** Sweep drift shall not be more than $\pm 1\%$ between room temperature and at 55^oC temperature. To check sweep drift, the equipment shall be kept for 2 hrs. at 55^oC.

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- 4.7 **Vertical drift:** Vertical drift shall not be more than ± 3 dB between room temperature and at 55°C temperature. To check vertical drift, the equipment shall be kept for 2 hrs at 55°C .
- 4.8 **Alarm:** The Equipment shall be provided with audible alarm and LED glow for signals exceeding pre-set threshold value.
- 4.9 **Signal to noise ratio:** Signal to noise ratio shall not be more than 10% of full screen height at 500mm range on 23mm perspex of IIW block with 2.0/2.5 MHz/20 mm diameter single crystal probe with 5 full echoes & 6th appearing.
- 4.10 **Trace Pattern:** Trace on the screen shall be free from bow, kinks and under shoots. It shall be horizontal and free from tilts etc.
- 4.11 **Bump Test:** The Equipment shall withstand 40 g, 4000 ± 10 bumps as per IS: 9000 (Part-VII, Section-2).
- 4.12 **Resistance to vibration:** The Equipment shall give normal performance after being subjected to 1g, 10 to 100 Hz vibrations for 30 minutes as per IS: 9000 (Part-VIII) clause 6.1,6.2 and 6.3.
- 4.13 **Tropicalisation and HumidityTest:**The Equipment shall be tropicalized to suit Indian climate for damp heat cyclic test as per IS:9000(Part-V/Sec- 2).
- 4.14 **Electromagnetic Interference (EMI)Test**
- 4.14.1 The Equipment shall pass the radiated susceptibility test as per specification IEC: 61000-4-3

Clause No. (of IEC: 61000-4-3.)	Requirement
5	Test level – table -1: level 3 (test field strength 10V/m) should be considered.
8.1.1	Climatic conditions: Humidity within 40% to 75% RH and any temperature range between 0° to 55° C.
9	Test results should be evaluated with classification a. Normal performance within limits specified. Limits: Unit performance shall be checked as per manufactures instructions and unit shall not malfunction throughout the test and display of the echo pattern.

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4.14.2 The Equipment shall pass the power frequency magnetic field immunity test as per specification IEC: 61000-4-8.

Clause No. (of IEC: 61000-4-8.)	Requirement
5	Test level 4 with magnetic field strength 30 A/m should be considered for the test.
9	Test results should be evaluated with classification as follows: a. Normal performance within limits specified. Limits: Unit performance shall be checked as per manufactures instructions and unit shall not malfunction throughout the test and display of the echo pattern.

4.15 **Equipment Protection:** The ultrasonic flaw detector shall be protected in the level of IP66 as per IEC 60592

Note:

- Bump, resistance to vibration & tropicalisation test will be conducted as under
 - Any new developmental unit shall be subjected for these tests at the time of its approval and the test certificates for these tests, submitted by the firm shall be from a NABL/NABCB accredited agency/organisation or government organization authorised to do above mentioned tests.
 - Other than the new developmental unit, one unit within a period of 06 months shall be subjected to these tests. From the date of completion of these tests, another unit selected from the lot offered for the inspection after a period of six month will be tested for these tests. Ultrasonic apparatus viz SRT, DRT, having similar type of ultrasonic flaw detector shall be treated as one lot. The test certificates for these tests, submitted by the firm shall be from a NABL/NABCB accredited agency/organisation or government organization authorised to do above mentioned tests.
- One unit shall be subjected to EMI tests and Equipment Protection test once in five years, but for developing new unit, tests mentioned in clause 4.14 & 4.15 shall be carried out before applying for approval .The test certificates shall be from a NABL/NABCB accredited agency/organisation or government organization authorised to do above mentioned tests.

5. Standard parameters:

- Screen Display Size:** The Equipment shall have minimum 150mm (L) x 120(W) mm screen display size.
 - For A-Scan the display shall have two base lines.Each base line shall cover minimum 120 mm length and minimum 45mm space for displaying vertical signal height.
 - For B-Scan the display shall cover minimum 120 mm (L) x 25 mm (W).
- Data Transfer:** The Equipment shall have facility to transfer the saved data directly on to the removable USB device without use of any external adaptor.

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6. Power Supply:

- 6.1 The Equipment shall be operatable by re-chargeable Li-ion or any other re-chargeable battery.
- 6.2 The battery shall be capable for working minimum 8 hours continuously per full charge.
- 6.3 The battery shall be easily detachable and should be chargeable without need of Equipment.
- 6.4 Automatic cut-off facility shall be provided to protect against deep discharge of battery below the workable voltage.
- 6.5 Facility of automatic cut-off for battery and battery charger shall be available to protect the battery from overcharge.
- 6.6 The charger shall be provided with an indicator to show full charge condition of battery.
- 6.7 In built Automatic cut-off circuit should be available to protect against over loading of Equipment
- 6.8 Battery level indication should be available on display screen along with low battery indication by audible beep and change in colour of display.

Note:

Firm has to provide a declaration along with the details regarding various features of the power supply like type of battery, its optimum voltage in full charge condition, provision of cut-off switches/circuit for clause 6.1 to 6.8

7. Probes

The rail tester shall have contact (sliding) or wheel probe. The description of each is as follows:

7.1 Contact (Sliding) Probe:

The rail tester shall be capable of working with minimum fourteen probes simultaneously i.e. seven probes for left rail and seven probes for right rail. The probe shall be of transmitter receiver type having Lead Zirconate -Titanate Piezo-electric crystals. The details of probes for each rail shall be asunder:

7.1.1 Normal Probe:

There shall be one normal probe for each rail. The normal probe shall be 18-20 mm diameter (crystal) with split crystal of 4 MHz ($\pm 10\%$) frequency in stainless steel casing and perspex insert having a path length equal to 50mm in steel. The probe shall meet test requirements as stipulated in clause 4.4 and 4.5.

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7.1.2 Angle Probes:

There shall be a provision of 6 angle probes for each rail i.e. six nos. of 70° (±1°) for left rail and six nos. of 70°(±1°) for right rail. The frequency of 70°probe shall be 2MHz(±10%).The angle probes shall have 20 mm crystal diameter or 20mm x 20mm square crystal.

The details of probe are as under:

- a) 70° Forward (centre)
- b) 70° Backward (centre)
- c) 70° Gauge face forward (central line of probe shall be shifted 12-15 mm towards gauge face side from central line of the rail table)
- d) 70°Gauge face backward (central line of probe shall be shifted12-15 mm towards gauge face side from central line of the rail table)
- e) 70° Non-Gauge Face forward (central line of probe shall be shifted 12-15 mm towards non gauge face side from central line of the rail table)
- f) 70°Non-GaugeFace backward (central line of probe shall be shifted12-15 mm towards non gauge face side from central line of the rail table).

Each pair of 70° probe (±1°) shall work in forward and backward direction. One pair shall be capable of scanning transverse defects in central portion of the rail head and centre line of other pairs of probe's central line shifted to 12-15 mm towards gauge face side and non-gauge face side from central line of rail table they shall work to detect gauge face corner and non-gauge face side corner defects respectively in forward and backward direction.

7.1.3 Wheel Probe:

In case of Equipment with wheel probes all crystals shall be mounted in the wheel probe assembly such that desired angles of beam as mentioned in para 7.1.2 and 0° double crystal probes shall be obtained and assembly shall be capable to detect all simulated defects as shown in Fig.1 and for double crystal normal probe of 4 MHz frequency as per para: 17.2.The material used in tyre of wheel probe (consumable) shall have sufficient wear resistant to withstand normal service condition and whole assembly shall be easily replaceable by the operator at site. The wheel probe assembly shall be fitted in between the wheels of the trolley. The pressure maintained within the wheels shall be specified by the manufacturer.

8. Co-axial Cable:

Co-axial cable used for the probes shall be flexible, oil proof, durable good quality and strength to withstand service condition. The junction of the cable and connector shall be suitably protected to avoid snapping of the cable during operation. The co-axial cable impedance shall be at the range of 50 Ohms and matching with the impedance of the Equipment. Manufacturer shall submit a certificate in connection with quality parameters of co-axial cable.

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9. Odometer:

- 9.1 Digital odometer shall be used for measurement of distance and for determining the location of defect. Continuous display of location shall be available on the screen in the format 9999.9999. Error in distance measurement shall not be more than 0.1% per Km when measured on straight track of 1 Km length.
- 9.2 The odometer should have facility of locking the chainage while removing the tester from the track and unlocking the same while resuming the work.

9.3 The odometer shall have facility to correct reading automatically during backward movement

10. GPS location coordinates:

- 10.1 A Global Positioning System (GPS) receiver shall be integrated with the hardware design to get the latitude and longitude during ultrasonic testing.
- 10.2 The accuracy of GPS receiver shall be as follows
Horizontal (CEP) ≤ 3 m
RMS (2σ) ≤ 5 m

11. Equipment cover:

The Equipment shall be provided with a cover to-

- 11.1 Protect it from ingress of dust, grease, oil etc, and
- 11.2 Accommodate the unit.

12. Carrying case:

The carrying case shall be of moulded luggage type fitted with wheels and shall accommodate the Equipment, battery, co-axial cable, probes etc. The case shall have a carrying handle and locking facility.

13. Testing Trolley for the Equipment:

- 13.1 The trolley shall be fabricated using light in weight material e.g. fibre glass, aluminium alloy, carbon fibre, etc and shall move on track freely.
- 13.2 The trolley shall run on double rail and suitable arrangement for mounting and fixing the Equipment in a convenient position and angle to facilitate easy visibility of the screen to the operator. The movement of trolley on rail track shall be smooth.
- 13.3 The trolley shall be provided with a pair of wear resistant insulated replaceable wheel to suit 60 kg, 52 kg and 90R etc. rail sections profiles with a possibility of accommodating a variation of 10 mm in the width of rail head.
- 13.4 The dimensions of the trolley shall be such as to accommodate all sets of probes preferably within the wheel base. The centre-to - centre distance of wheels shall be kept minimum required for proper positioning and operation of the probes and easy maneuverability of the trolley. In case of wheel probes, its assembly shall be placed within the wheel base.

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- 13.5 The probe holders and carrier brackets shall be of aluminium alloy or stainless steel or chrome plated steel. Each carrier shall have adjustable screws. Each assembly shall be capable of self-alignment so as to ensure efficient contact of probe on the rail table. Suitable device shall be provided for raising and lowering of the probe assemblies with conveniently placed control levers near the trolley handle.
- 13.6 There shall be suitable arrangement to keep the alignment of the probe assembly at their desired location in order to ensure scanning of rail.
- 13.7 The watering system shall consist of two sturdy containers each of minimum 05 litres capacity (01 number for each side) connected to controlled water supply nozzles placed adjacent to each probe assembly and provided with independent regulators and main cock. One additional detachable water tank of minimum 20 litre capacity should be provided on trolley.
- 13.8 Space is to be provided in the trolley for keeping trolley maintenance tools, paint and brush.
- 13.9 Drawing of the trolley should be furnished by firm to Track Design Dte./RDSO for approval of the trolley.
- 14. Multichannel:** The Equipment shall have inbuilt multichannel facility in the ultrasonic flaw detector itself.
- 15. Over all weight of rail tester:** The total weight of rail tester (trolley with probes and its assemblies, digital ultrasonic flaw detector, battery and empty water container) shall not exceed -60 Kg.
- 16. Accessories:**

The Supply shall include the following standard accessories with each Equipment:

A: Standard Accessories		<u>Qty.</u>
i.	probe (4 MHz, 18-20 mm diameter, Double Crystal)	02 nos
ii.	70° angle probe assembly (as per clause 7 of angle probe) (03 forward and 03 backward for each rail)	12 nos
iii.	Plastic bottles (1 litre capacity)	02 nos
iv.	Battery(rechargeable)	02 nos
v.	Battery Charger	02 nos
vi.	Tool kit as required for trolley	01 no
vii.	Cover for electronic unit	01 no
viii.	Carry case	01no
ix.	Water container 05 litre minimum capacity (01 no.each side)	02 nos
x.	Detachables water tank of 20 litre minimum capacity	01 no.

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xi.	Umbrella of standard size(3 Feet Diameter and 35 inch length)	01no
xii.	Normal Probe, single crystal 2.0/2.5 MHz, 20 mmdiameter crystal	01 no
xiii.	45° angle probe mounted in Test rig for hand probing	02 nos

B: Optional Accessories

i.	Desktop/ Laptop for transferring saved data	01no.
ii.	Standard rail test piece with simulated defects	02 nos
iii.	IIW Block	01no
iv.	Printer for use with desktop/laptop	01 no
v.	Step Gauge of 25 mm width in steps of 1mm (covering 2mm to10 mm)	01no
vi.	Pen drive 32GBMinimum.	01 no

(Note: Consignee shall provide the specification for Desktop /Laptop, printer and pen drive and inspection shall be done by consignee only.)

17. Performance of the rail tester:

The overall performance of the rail tester shall meet the requirements given below:

17.1 The ultrasonic rail tester shall be capable of:

17.1.1 Smooth running on the rails and detecting flaws in the rails.

17.1.2 The performance of rail tester shall be checked on standard rail test piece having simulated flaws. The standard rail test piece shall be as mentioned in Fig-1. For Double rail tester trolley, two such test pieces shall be laid on either side and fixed maintaining proper gauge as done while framing track.

17.2 Normal Probe(0°):

The normal probes of the Equipment shall be able to show 100% of full screen height from the rail bottom at an operable gain of 55 dB maximum.

17.3 70 ° Central Angle probe (forward and backward):

The Equipments shall be capable for detecting simulated 12mm through hole as shown in Fig.-1 in the standard rail test piece. Reflection from the simulated defects for each forward and backward probe shall be adjusted to 60% of full screen height and the operable gain used shall not be more than 50 dB for individual probe.

17.4 70° Angle probes for Gauge Side (forward and backward):

The Equipment shall be capable for detecting simulated 5 mm flat bottom hole as shown in Fig.-1 in the standard rail test piece. Reflection from the simulated defects for each forward and backward probe shall be adjusted to 60% of full screen height and the operable gain used shall not be more than 50 dB for individual probe.

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17.5 70° Angle probes for Non-Gauge Face Side (forward and backward):

The Equipment shall be capable for detecting simulated 5 mm flat bottom hole as shown in Fig.-1 in the standard rail test piece. Reflection from the simulated defects for each forward and backward probe shall be adjusted to 60% of full screen height and the operatable gain used shall not be more than 50 dB for individual probe.

18. Data Analysis: The manufacturer shall provide post processing software for analyzing recorded A- Scan and B-Scan data and recreation of A-Scan defect echo envelop display from B-Scan.

19. Technical Literature:

One set of operating instructions with day to day maintenance and minor troubleshooting tips, DOs, DONTs and FAQs etc should be provided.

20. Commissioning and Training:

The manufacturer shall train two operators per Equipment in operation and minor trouble shooting of the Equipment at the time of installation. Training shall also be provided in use of post processing software for analysis of recorded A-Scan and B-scan data and recreation of A-scan defect echo envelop display from recorded B-scan.

21. Warranty:

The manufacturer shall give warranty for satisfactory operation of the Equipment and its trolley except consumables like battery, probes, cables, charger and trolley consumables (wheel assembly with flange, guide roller, probe carriage assembly with shoe) for a period of three year from the date of commissioning of the Equipment.

22. Service facility:

The supplier shall provide and ensure servicing facilities throughout the warranty period of the Equipment. After the warranty period is over, the supplier should give service support for AMC throughout the codal life of Equipment which is estimated as 08 years for which payment will be made separately.

23. Extensive Field Trial:

Once the Equipment is developed after satisfactory inspection of one machine. Field trial of one Equipment and its testing trolley shall be conducted on at least two different Zonal Railways (spaced quite apart) for a cumulative period of minimum 30 days. The minimum length of USFD testing done would be 100 Track Km on each Zonal Railways. The satisfactory performance of Equipment from Zonal railways where trial has been carried out shall be considered for necessary approval.

- For any dispute between Zonal Railways and manufacturers regarding performance of Equipment and its testing trolley, during Extensive field trial. RDSO will be third party and decision of RDSO will be binding on Zonal Railways and manufactures.
- Field trial format will be supplied by RDSO.

Note:

1. This specification is property of RDSO. Its reproduction, copying wholly or partially or assigning new number, for any purpose by Railways or any other agency is not permitted.

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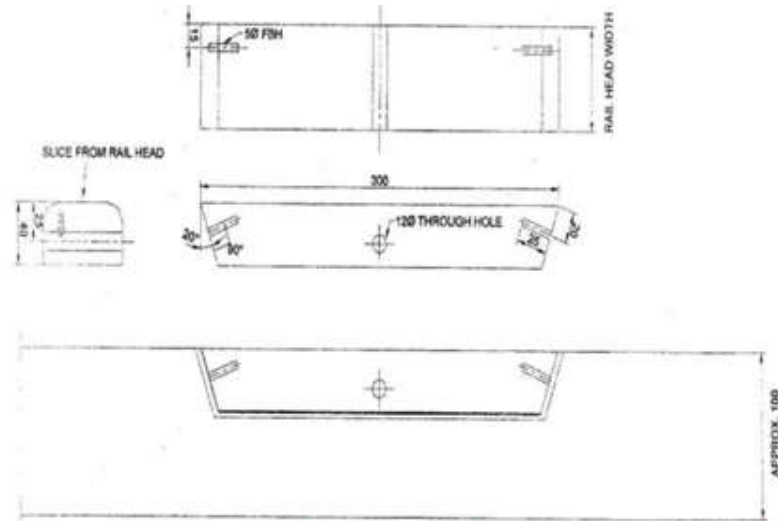
ISO 9001:2008	Document No. RDSO/M&C/NDT/130/2007(B-Scan) Rev-III, July2017	Version No. 4.0	Effective Date:
Technical specification of Digital Ultrasonic Double Rail Tester with minimum two base Lines coloured signals and real A-scan pulse echo with continuous recording of B-Scan storage along with data setup			

2. RDSO reserve the right to modify this specification time to time based on the requirements.
3. Any features and technical requirements mentioned in the above specification cannot be changed /modified by the manufacturer against approved model.
4. All the provisions contained in RDSO's ISO procedures laid down in Document No. QO-D-7.1-11 dated 19.07.2016 (titled "Vendor-Changes in approved status") and subsequent versions/amendments thereof, shall be binding and applicable on the successful vendor/vendors in the contracts floated by Railways to maintain quality of products supplied to Railways.

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Technical specification of Digital Ultrasonic Double Rail Tester with minimum two base Lines coloured signals and real A-scan pulse echo with continuous recording of B-Scan storage along with data setup



1.5m Long Aluminium / Wooden housing for test piece having top table width equal to rail head width

Fig-1: Sensitivity block for 70° 2 MHz (Centre and gauge face) probes (All dimensions are in mm and drawing is not to scale)