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MINISTRY OF RAILWAYS

**SPECIFICATION FOR NON CONTACT TYPE WHEEL
AND WHEEL TREAD PROFILE PARAMETER
MEASURING INSTRUMENT SET**

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SPECIFICATION FOR NON CONTACT WHEEL AND WHEEL TREAD PROFILE PARAMETER MEASURING SET

1. SCOPE

This specification describes measuring equipment capable for inspecting railway wheel tread profiles in situ position and wheel back to back distance (Wheel gauge) in a field (workshop/depot) environment. The Measuring Set shall be an 'easy to use' and contact less type with no need for any fix up or contact with the wheel, in order to reduce user's impacts on measuring results to a minimum. It should also provide automatic recording and documentation facility. Optionally the instrument should offer the possibility of measuring break discs, tyre thickness, diameter and defects (flat spots, break outs). It should also be upgradeable for measuring rail profile, switch frogs / harts, rail geometry. Optional measuring- modules to be quoted separately.

2. TECHNICAL REQUIREMENTS

- It should be of contact less type utilising laser-based technology.
- It should copy the wheel profile accurately and generate the same as and when desired.
- It should be able to check compliance with standards.
- It should generate instant reports of wheel condition.
- It should be user friendly; one man should be able to operate and record wheel profile easily.
- It should be Light weight and portable (Maximum weight with all attachment ,if any, must not exceed 8 Kg)
- Its battery should be durable (minimum 4 hours of continuous use) and the battery should be rechargeable.
- It should be shock, dust and water resistant.

3. WHEEL PROFILE PARAMETERS TO BE MEASURED

- Flange Height
- Flange thickness
- Root radius
- Tread Hollow
- Rim Thickness
- Flange Slope
- Wheel Back To Back measurement (wheel gauge)
- Flange wear, root wear and tread wear as per Indian rail standard. For detail refer Fig.3 of Annexure 1.

4. MEASURING RANGE

All standard wheel profiles ranging:

Wheel width (Rim width) 100 mm to 150 mm.

Rim thickness 40 mm to 80 mm.

Wheel diameters 865 mm to 1140 mm.

Wheel gauge from 900 mm to 1650 mm.

Accuracy: $<+/-0.080\text{mm}$

Repeatability: $<+/- 0.035\text{mm}$

Read out resolution: 0.01mm

5. TEST EQUIPMENT CONFIGURATION

The Instrument should consist of a computing unit and a measurement sensor. The measurement sensor has to contain a display for read out of results and a mobile phone-type keyboard for direct operation and has to be preferable one sensor to be used for wheel and rail profiles.

The computing unit and sensor are battery powered, rugged, and easily portable, offering all of the functions needed to evaluate, store and document results.

6. SOFTWARE COMPONENTS:

It should have following facilities.

- Powerful PC Software for reporting & Comparisons
- Profile superimposition to compare wheel wears (For standard new profile refer Fig.1 and 2 of annexure 1.)
- Wear display graph for wear analysis
- Database for Wheel Data Storage with rolling stock ID and wheel position
- Extensive data search and display
- Data trending for all parameters
- Optional user defined data entries for each wheel
- Several reports format (txt,Excel ...)
- It should be able to store at least 20 standard profiles, and option should be available to the user to select one of these for comparing the measured profile. It should also possible to select one of these profile as default standard profile.

7. INDUSTRY STANDARD AND COMPLIANCE

7.1 Climatic:

Operating temperature -5°C to + 55°C

Storage temperature -5°C to + 65°C

Operation humidity 20% - 95% none condensing

Storage humidity 8% - 90% none condensing

7.2 Interfaces/Data transfer:

The Test Equipment shall include the following interfaces for external data transfer: USB, Ethernet, WLAN

The Test Equipment shall be able to download measurement data to PC or compatible device via standard interface or protocol:

XML, CSV

8. DATA STORAGE

It should have

- (a) Ability to store results in hard disk having minimum capacity of 250GB.
- (b) Ability to store test configuration.
- (c) Ability to create and store user defined measurement templates
- (d) Easy and quick upload facility to a data base program / server.

9. INSTRUMENT CALIBRATION

Minimum calibration interval must be 2 years.

An individual self-test and calibration unit should be part of the scope of delivery for self tests and intermediate adjustment.

The Test Equipment shall include:

- User manual
- Sensor and computing unit
- All necessary cables
- Transport case
- Necessary attachments for measuring wheel gauge, Tyre thickness etc.

10. Payments

80% at delivery and remaining 20% after successful commission.

11. Warranty

As per IRS condition.

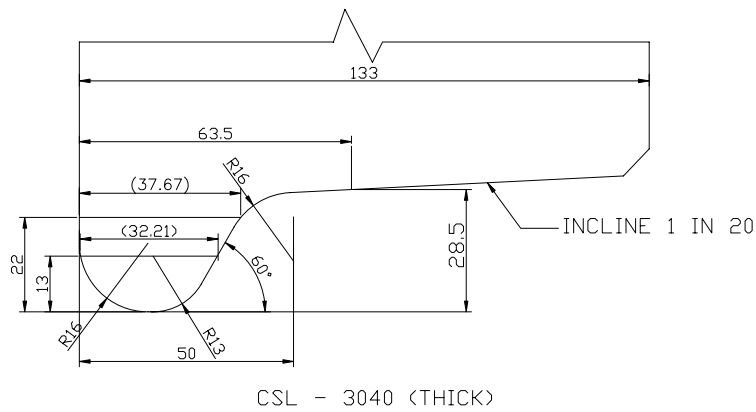


Fig.1

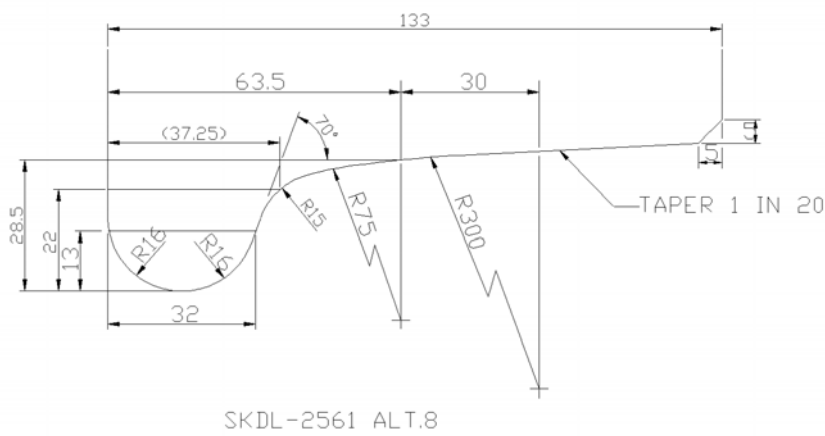


Fig.2

Wheel profile measuring Parameters for B.G locomotives of Indian Rail:

- Flange height (deep flange or tread wear height of flange from corresponding taping line)
- Flange thickness (Flange thickness at a depth of 13 mm below from the flange tip)
- Root thickness (Flange thickness at a depth of 22 mm below from the flange tip)
- Flange wear (With respect to concern new profile)
- Root waer (With respect to concern new profile)
- Tread wear (With respect to concern new profile)

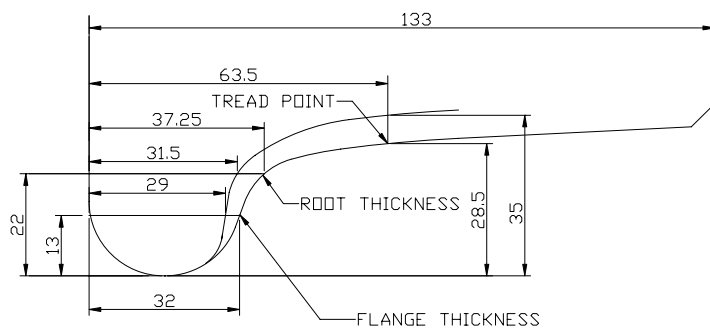


Fig.3