

THE MEASUREMENT OF SIDEWEAR IN PLAIN RAIL AND RAILS WITH FULL HEAD SECTION INSTRUCTIONS FOR USE OF THE 'NR4' STEPPED SIDEWEAR GAUGE

The Network Rail 2004 (NR4) Stepped Sidewear Gauge has been developed from established designs and is capable of measuring all current rail sections and older sections back to and including 85lb RBS Bull Head.

The new NR4 Stepped Sidewear Gauge Set for plain rail comprises a profile gauge, and a stepped wedge. The profile gauge can be clearly identified from earlier gauges by its dual rail head width capability, and the revised stepped wedge by a range of steps marked 'N' for calibration purposes.

When using the NR4 gauge on locations previously measured with earlier versions of the stepped gauge, step readings are likely to be higher than previously recorded. See Track Engineering Advice Note No. 2 for explanation.

Versions of the earlier stepped gauges with either a coloured plastic or self colour handle, and the 18 step wedge, must no longer be used. Measurements taken by use of the 'NR4' Gauge are the only source of sidewear measurement on which decisions for turning, transposing or renewal of rail will be accepted.

1. SELECTION OF CORRECT CUT-OUT IN THE PROFILE GAUGE

- 1.1. The 'NR4' Stepped Sidewear Gauge for plain rail and rails with full head section, combines cut-outs for as-new railhead widths of both 70 mm and 72 mm into a single profile.
- 1.2. For CEN60 rails the cut out with two holes in the field face jaw is to be used. The holes identify the cut out for use with an as-new railhead width of 72 mm. When held with fingers through the central hand-hold, in either the right or left hand, two detents are situated under the thumb as a further indication of the 72 mm cut-out being in use.
- 1.3. For all other rail sections, the cut out with no holes in the field face jaw is to be used. When held with fingers through the central hand-hold, in either the right or left hand, there are no detents under the thumb, indicating the cut out for use on as-new railhead widths of 70 mm.

Remember: 2 holes and detents: cut-out for as-new railhead widths of 72 mm.

No holes or detents: cut-out for as-new railhead widths of 70 mm.

- 1.4. The profile gauge, although primarily designed for use on 1:20 tapered head rails may also be used to measure sidewear on rail heads with parallel sides such as 95RBS BH, 98 and 109 FB rails. The difference between 1:20 tapered head rails and parallel sided head rail at 14 mm below the head is insignificant in sidewear terms.
- ### **2. METHOD OF USE OF THE SIDEWEAR GAUGE**
- 2.1. The gauge is placed on the railhead with the jaws across the rail. The straight jaw is lined up with the field face of the rail and the rounded jaw rests on the gauge corner.
 - 2.2. The stepped wedge is placed with the long straight side along the rail crown, and the thinner end is slid into the slot in the centre of the gauge jaws as far as it will go.
 - 2.3. Note the reading of the last step, (S) that fits into the slot in the centre of the gauge jaws.
- ### **3. LIMITATIONS ON USE OF SIDEWEAR GAUGE**
- 3.1. The gauge cannot be relied upon to give accurate readings where any lipping is present on the field face of the rail. Lipping on the field face must be removed to ensure an accurate reading.

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- 3.2. The gauge cannot be used on turned or transposed rails where there is insufficient vertical surface on the field face against which to accurately align the straight jaw.
- 3.3. See Track Work Instruction for alternative means of measurement.
4. LOCATION OF MEASUREMENT POINTS
 - 4.1. Sidewear should be measured at a minimum of 4 locations per quarter mile along a curve. These points should be selected by visual examination, where the sidewear appears to be greatest.
 - 4.2. The locations selected for measurement should be clearly marked in the web of the rail, to ensure that subsequent sidewear readings are at the same location.
 - 4.3. The mileage of each measurement point must be recorded, and on routes equipped with OLE, a note of the distance from the nearest OLE mast will aid relocation when subsequent readings are taken.
5. FREQUENCY OF MEASUREMENT
 - 5.1. The minimum frequency of measuring sidewear is set out in current Network Rail Specifications.
6. RECORDING AND INTERPRETATION OF RESULTS
 - 6.1. The sidewear measurement for any curve may be recorded in a list, spreadsheet or chart format. Over successive measurements, a prediction of when the sidewear will reach the point at which the rail should be turned, transposed or re-railed should be made.
 - 6.2. The gauge is designed to accurately measure the 9 mm maximum permitted lateral head loss. Where rail has been transposed or turned due to sidewear, then a field face sidewear reading is also required to ascertain the total lateral head loss.
 - 6.3. Conversion of the step gauge reading (S) to lateral head loss (L) in mm, is to be calculated from the formula $L = 9 - (0.5 \times S)$. This is a simplified formula, which gives an approximate value but is suitable for this purpose.
7. ACTION TO BE TAKEN ON CERTAIN GAUGE READINGS
 - 7.1. Actions should be based on measurements taken at the location on the curve where the maximum sidewear is present.
 - 7.2. The following actions are required on lines with speeds up to 125 mph;
If the sidewear scar reaches the bottom of the gauge face, or if the stepped wedge enters the gauge slot only to the position 'I', then immediate renewal is required.
If the stepped wedge enters the gauge slot to the position 'P', plan the turning, transposing or re-railing based on the measured wear rate.
8. CALIBRATION OF GAUGES
 - 8.1. During manufacture, profiles and stepped wedges are calibrated as a matched set against a sample of new rail. After issue, it is the responsibility of the user to ensure that the sidewear gauge set remains within tolerance.
 - 8.2. The gauge is manufactured from stainless steel, and will resist corrosion, wear and deformation in normal use.
 - 8.3. On at least an annual basis, each gauge set must be checked against a piece of rail known to be new. The reading on the step should be 18, ± 1 . Gauge sets which read outside this range marked 'N' on the stepped wedge, must be withdrawn from use immediately.