

NEW ZEALAND GOVERNMENT RAILWAYS MECHANICAL BRANCH	WHEELS, WHEEL CENTRES AND TYRES	CODE No. 15 Page No. 1 of 6 Issue No 4 Date Issued 1/6/72
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- This Code cancels Code No.4 issued 1 May, 1947, and Code No.15 issued 15 May, 1950.

1. PERMISSIBLE DIFFERENCE IN WHEEL TREAD DIAMETER IN A WHEELSET:

- (a) When wheelsets are machined, the tread diameter of the wheels on the same axle must not differ by more than 0.5 mm (0.020 in.).
- (b) Wheelsets which have not been re-machined must not be placed under rolling stock if the tread diameter of the wheels on the same axle differ by more than 1 mm (0.040 in.).

2. PERMISSIBLE DIFFERENCES IN WHEEL TREAD DIAMETERS BETWEEN DRIVING WHEELSETS:

- (a) When driven by axle mounted electric motors:-
 - (i) 13 mm (½ in.).
- (b) When wheelsets coupled with side rods, chains, cardan shafts or gears:-
 - (i) 0.5 mm (0.020 in.) within a bogie or rigid frame.
 - (ii) 13 mm (1/2 in.) between bogies.

3. PERMISSIBLE DIFFERENCES IN WHEEL TREAD DIAMETERS BETWEEN NON-DRIVING WHEELSETS IN BOGIE VEHICLES:

- (a) Wheelsets with a difference in tread diameter of up to 6 mm (¼in.) may be fitted in a bogie without axle box or spring packing to compensate for the difference.
- (b) Wheelsets of any tread diameter may be fitted throughout a vehicle provided that the provisions of Clause 3 (a) above, and Clause 10 of Code 45 and Clause 5, Code 82 relating to drawbar heights and packing of bogie centres and float blocks are complied with.

4. PERMISSIBLE DIFFERENCE IN WHEEL TREAD DIAMETERS BETWEEN WHEELSETS IN FOUR WHEELED WAGONS:

Wheelsets of any tread diameter may be fitted provided that sufficient approved axlebox or spring packing is securely inserted to ensure that drawbar heights are within the limits of Clause 10 of Code 45.

5. TYRE SECTION DETAILS:

Drawing X7600 has a table of tyre applications and shows dimensions of tyre retaining rings and tyre blanks, as well as machining dimensions of finished tyre sections.

6. MACHINING OF WHEEL CENTRES, SOLID DISC WHEELS AND TYRES:

(a) **Wheel Centres:**

The bore must be machined cylindrical and with a surface finish not coarser than 3.2 micrometres CLA. The rim must be machined concentric and parallel with the bore, with a surface finish not coarser than 3.2 micrometres CLA.

(b) **Solid Disc Wheels:**

The bore must be machined cylindrical and with a surface finish not coarser than 3.2 micrometres CLA. The tread profile must be machined concentric with the axle centres.

(c) **Condemning of Solid Disc Wheels:**

When tread profiles will not finish within the last machining size, the wheel is to be condemned and replaced with a new solid disc wheel, except in those cases where provision is made on the appropriate wheel drawings for the wheel to be machined to a wheel centre.

(d) **Machining Bore of Tyres:**

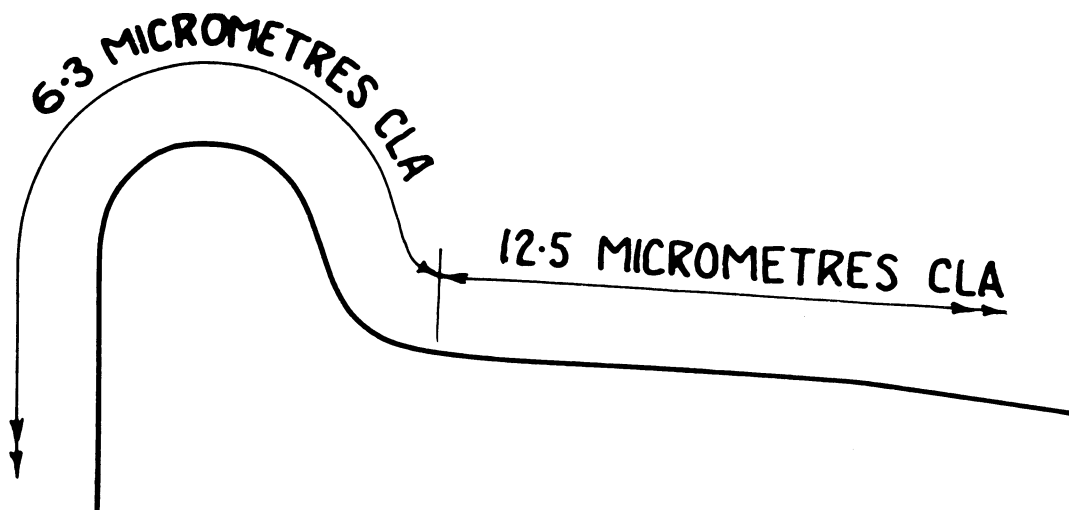
When machining the bore of a new tyre it is to be set up to the outside circumference or tread with the inside face of the tyre parallel with the machine chuck. If this does not permit the bore to be machined to the correct diameter, the minimum of re-positioning is to be carried out. The bore must be machined cylindrical and with a surface finish not coarser than 3.2 micrometres CLA and to give an interference fit as specified in Clause 10 of this Code.

An allowance for wheel centre rim wobble and deformation of the wheel centre diaphragm plate during tyre shrinkage' is to be made when machining the bore depth to ensure the tyre will set far enough on to the wheel centre to enable the inside face of mounted tyres to be machined to the correct distance between them, around the full circumference.

(e) **Machining Profile of Tyres and Solid Disc Wheels:**

The surface finish of tread profiles must not be coarser than 12.5 micrometres CLA and the surface finish of the tapered face of the flange and inside face of the tyre or wheel must not be coarser than 6.3 micrometres CLA. (see sketch).

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Tread profiles must be machined in accordance with the appropriate parts of Drawing X7601. When machining tyres which have just been mounted on wheel centres the tread diameters are to be left as large as possible to avoid wastage of metal. When re-machining worn profiles it is permissible to leave a witness groove on the flange up to 5 mm ($\frac{3}{16}$ in.) wide for the full circumference.

(f) **Condemning of Tyres:**

Tyres on which tread profiles will not finish within the last machining thickness must be condemned.]

7. LAST MACHINING AND CONDEMNING SIZES:

Details of last machining and condemning sizes for all wheels and tyres are shown on Drawing Y/X 7601/4.

8. PRESSING OF WHEELS ON TO AXLES:

All steel wheels must be pressed on to the axles with a force of 4KN per mm (10 tons per inch) of diameter of the wheel seat.

A tolerance of ± 50 KN (5 tons) of the total pressure is permissible.

Tallow must be used to lubricate wheelseats when pressing wheels on to axles. No other lubricant is permitted.

Tyres must be shrunk on to new wheel centres before centres are pressed on to axles.

[Any machined surface still visible following pressing of wheels onto axles must be coated with suitable paint or preservative.]

9. DISTANCE BETWEEN WHEELS:

The inside faces of mounted wheels and tyres must be parallel and the distance between the faces must be within the limits 997^{+1}_{-0} mm ($3'-3\frac{1}{4}''^{+1/32}_{-0}$) for all wheelsets.

An out-of-gauge wheelset, or a wheelset with a bent axle, is permitted to run to the nearest wheel change depot for replacement, provided the distance between the inside faces of the wheels is not, at any point, greater than 999 mm ($3'-3\frac{11}{32}''$) or less than 995 mm ($3'-3\frac{3}{16}''$). Outside these limits the wheelset must be replaced, or the vehicle in which the out-of-gauge wheelset is fitted, must be loaded on to a wagon.

10. SHRINKAGE ALLOWANCE FOR TYRES:

The shrinkage allowance for tyres is 0.001 mm per mm (1/1000 in. per inch) of diameter of the wheel centre.

The machining tolerance for the bore of tyres is:

Bore in Millimetres	Tolerance in Millimetres
457 - 864 (18" - 34")	+ 0.000, - 0.127 (0.005 in.)
864 - 1168 (34" - 46")	+ 0.000, - 0.152 (0.006 in.)

11. SHRINKING TYRES ON TO WHEEL CENTRES:

Tyres must be heated uniformly to a temperature not exceeding 288°C (550°F). Temperature indicating salts ("Tempilstiks" or equivalent) must be used to determine the temperature of the tyres.

When fitted, each tyre must be allowed time to contract, before being moved. Tyres must be allowed to cool in still air and under no circumstances may forced cooling be adopted.]]

[The above section is Pages 3 & 4 of Issue 5; Dated 19/7/78]

	Drawing No.
(d) Tyre thickness at tread for condemning:	
Tread Gauge (Tyred Wheels)	Y/X7601/12
Tread Gauge (Solid Disc Wheels)	Y/X7601/13
(e) Maximum Depth of flange and maximum guttering: Gauge	Y/X7601/14
(f) Condemned flange gauge	Y/X7601/15
(g) Sharp flange gauge	Y/X7601/9
(h) Measurement of wear on flange and tread	PD100766 types 1 and 2
(j) Measurement of tyre tread thickness	PD 100766 Type 1
(j) Measurement of guttering wear	PD100766/4

22. TESTING OF GAUGES:

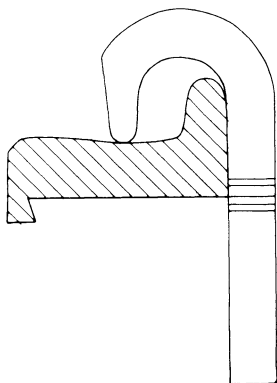
All working gauges listed in Clause 21 of this code, except gauges PD100766 type 2, and PD100766/4 are to be sent to the nearest main workshops (Otahuhu, Hutt, East Town, Addington or Hillside) annually for checking and standardising.

Gauges PD100766 type 2 and PD100766/4 are to be tested monthly, or at any time after the gauge has been dropped, with test plate PD100766 Part A supplied with the gauges. Scales X, Y and V on these gauges should register zero on the test plate. These two gauges need only be sent to Workshops, for standardizing, when the scale readings are inaccurate by more than 0.5 mm (0.020 in.).

Works Managers in the above-named Workshops are to maintain master gauges for checking the working gauges.

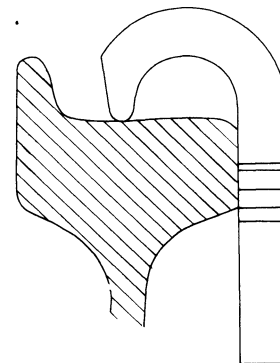
Working gauges are to have the date of the check stamped on with 3 mm (1/8") type and are to be returned promptly to the point of origin.

23. Illustrations showing use of gauges Y/X7601/12, Y/X7601/13, Y/X7601/14, Y/X7601/15, Y/X7601/9, PD100766, type 2, PD100766/4.



Gauge Y/X7601/12

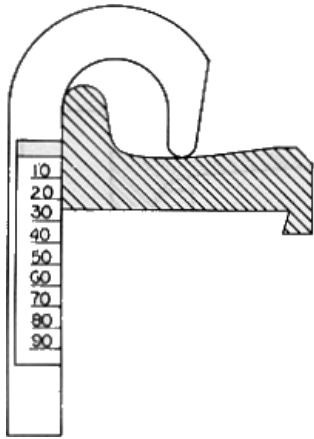
When engraved line on gauge corresponds with tyre seat diameter, the wheelset must be taken out of service.



Gauge Y/X7601/13

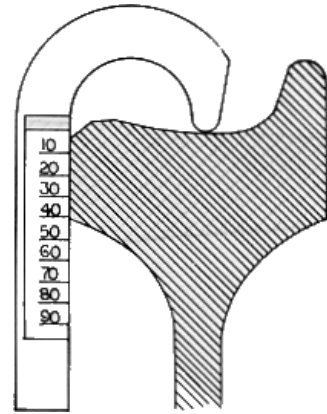
Solid disc wheels. When engraved line on gauge corresponds with wheel rim edge, wheelset must be taken out of service.

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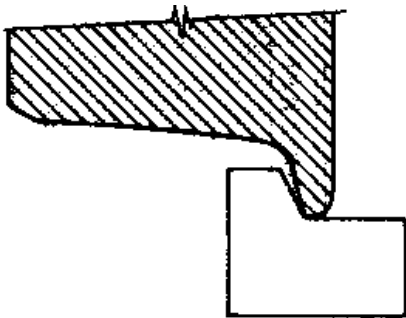
Gauge Y/X 7601/12 (Reverse side)
 Tyred wheels

Drawing References:
 13090011 – scale application
 S3861 – “Z” condemning sizes

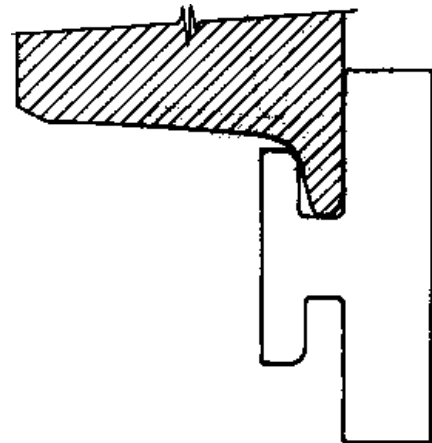


Gauge Y/X 7601/13 (Reverse side)
 Solid disc wheels

Use graduated scale to measure
 tyre thickness "Z" in mm.

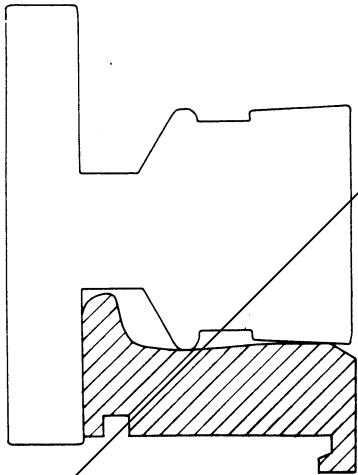


Gauge Y/X7601/9
 When the gauge rocks about its corner radius the tyre is considered to have an excessively sharp flange and action is to be taken to rectify the position.



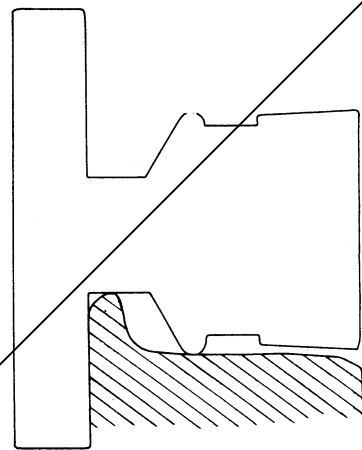
Gauge Y/X7601/15
 For showing when flanges have reached minimum allowable thickness. When gauge bottoms on flange the wheelset is to be removed from service

The above section is pages 9 & 10 of Issue No. 5; 1/4/85]



Gauge Y/X7601/14

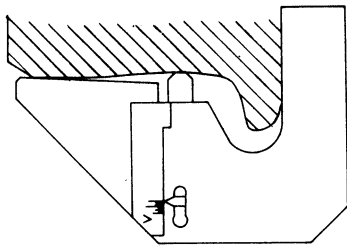
When outer tread contacts gauge the maximum permissible guttering has been reached. Wheelset to be removed from service.



Gauge Y/X7601/14

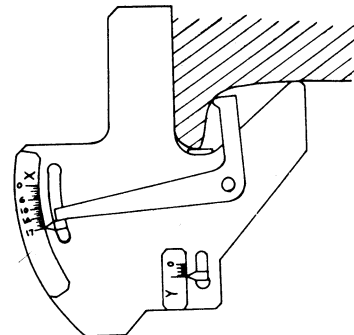
When top of flange contacts gauge the maximum permissible flange height has been reached. Wheelset to be removed from service.

[This figure not in Issue No. 5]



Gauge PD100766/4

Scale marked to show maximum gutterings of 3¼ mm (1/8") and 6½ mm (¼"). Wheelsets to be removed from service when guttering is at the maximum for the group concerned.



Gauge PD100766 Type 1

When "X" reading exceeds 17 mm use gauge Y/X7601/15 to determine when flange is condemned. Wheelset to be removed from service when "Y" reading exceeds 6¼ mm (high flange).