

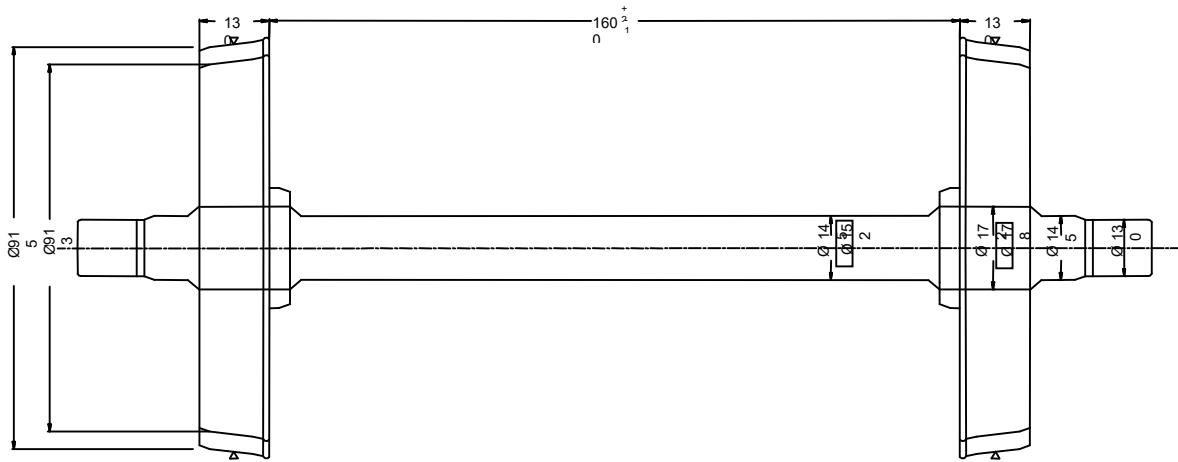
## WHEEL SET – WHEEL, AXLE AND BEARING

### Introduction

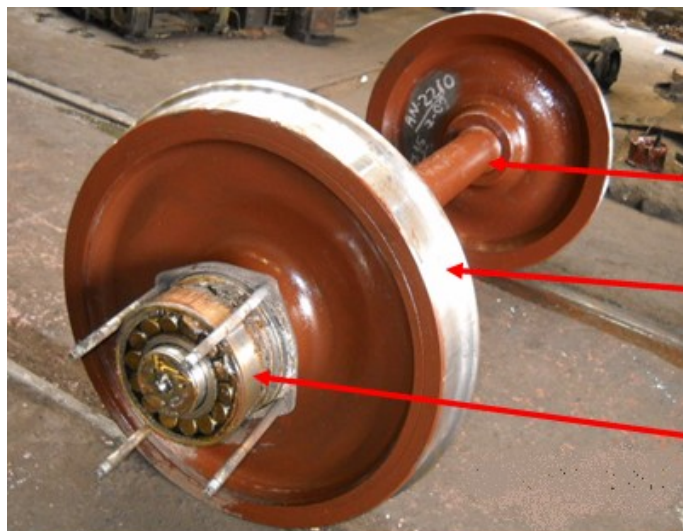
The movement of rolling stock on the track is possible only with the help of wheels. The complete wheel set is shown in the **figure** below with the assembly components. These assembly components are described in detail in the following pages.

A wheel set is an assembly mainly of two components:

- Wheel discs(solid) on both sides of the axle
- An axle to hold these wheel discs in position

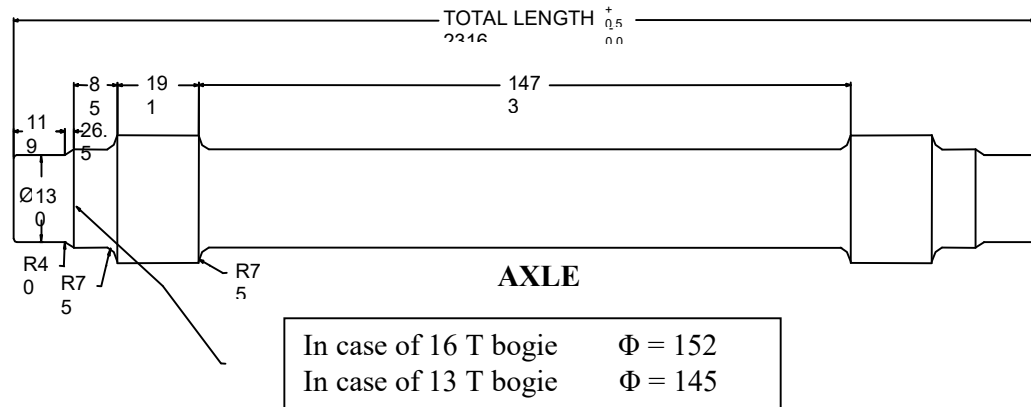


- THE VARIATION IN THE TREAD CIRCUMFERENCE OF WHEELS ON THE SAME AXLE SHOULD NOT EXCEED 0.5 mm ON THE SAME BOGIE
- THE VARIATION IN WHEEL DIA BETWEEN ONE PAIR WHEELS AND THE OTHER ON THE SAME TROLLEY SHOULD NOT EXCEED 5 mm ON THE SAME BOGIE
- THE VARIATION ON DIA UNDER THE SAME COACH SHOULD NOT EXCEED 13 mm.



## Axles

An axle is a component of a wheel set to hold the wheel discs in position. The axle box is also mounted on the journal of the axle



**Note:-** Rly. Bd. vide their letter no. 98/RSF/874/1/SAIL (Pp) dt. 8/10/1998 has decided that only 16.25t axles would be used for wheel set under 13t bogie also for new wheel sets. The existing wheel set in service may however continue till they are required to be changed.

### Axle boxes with roller bearings

The axle boxes used on ICF coaches are **Spherical Roller Bearings No. 22326/C3**. These roller bearings are with **130 mm** parallel bore on the inner ring and are directly shrunk on the axle journals.

#### a) Measurement of a wheel gauge (distance between two wheels flanges on the same axle)

The distance between two wheel flanges on the same axle should be **1600 mm + 2/-1 mm**. This measurement should be taken at three locations apart with the help of an adjustable pi gauge. If wheel gauge is not within permissible limits, then the wheel disc (s) have to be pressed off and then pressed on.

#### Measurement of Wheel Diameter (Tread Diameter)/Wheel Flanges

The wheel diameter is measured with the help of a trammel gauge with a least count of **0.5 mm**. on both sides. However, a gauge with a least count of **0.1 mm**. is recommended as the measurement of a diameter would be more accurate with this gauge.

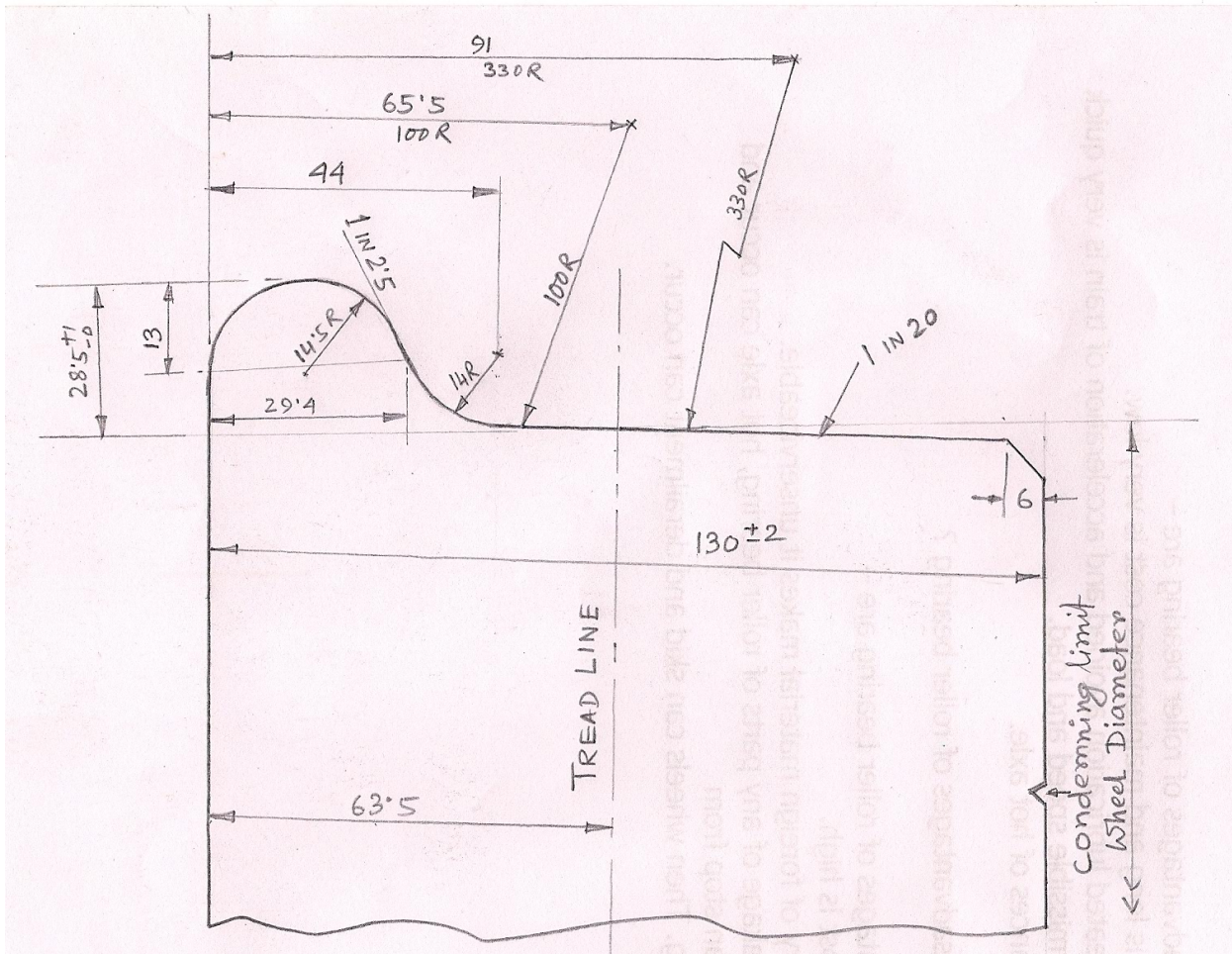
The difference in tread diameter of the two wheels on the same axle should not exceed **0.5 mm** after tyre turning. There is no 'In service' limit for this variation and rejection shall be decided by tyre defect gauge

Type of wheel	New	Min. Shop issue
ICF solid	915	836

## WORN WHEEL PROFILE

### Advantages of solid Wheel

- 1) It is lighter in weight
- 2) It is very strong
- 3) There is no danger of tyre loose and key loose
- 4) Its life is longer than that of tyre wheels due to increased condemning limit on diameter at tread.
- 5) The heat caused due to braking and service run is dissipated at faster rate in solid wheels



(all dimensions are in mm)

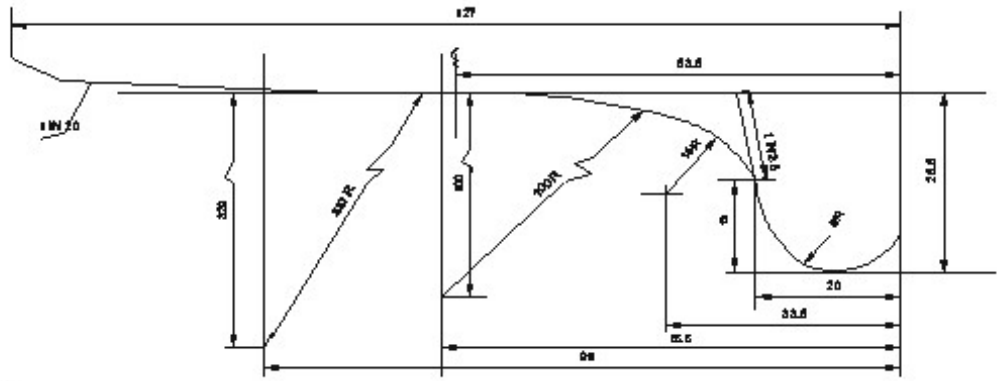


FIGURE - 1

(20 MM THICK FLANGE)

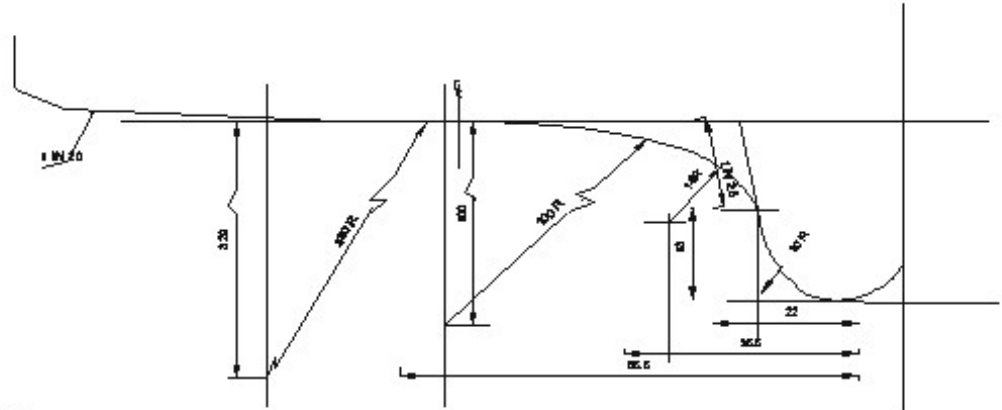


FIGURE - 2

(22 MM THICK FLANGE)

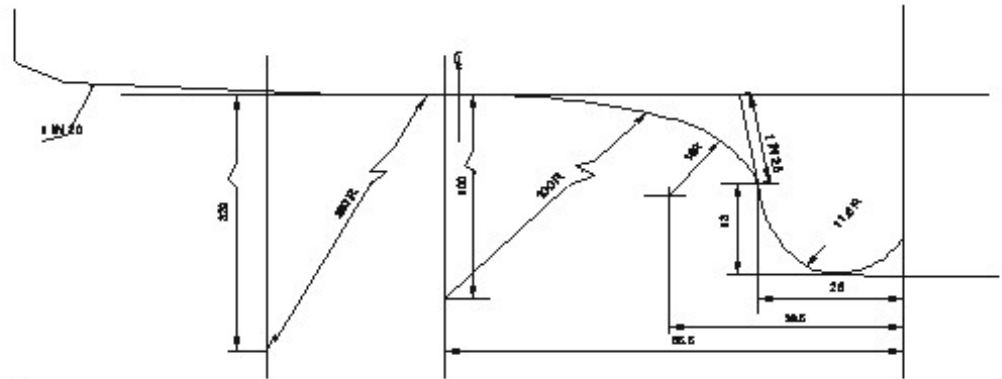


FIGURE - 3

(28 MM THICK FLANGE)

1. FIG. 3 SHOULD BE THE LAST FIGURE IN THE INTERMEDIATE WORN WHEEL PROFILE FILE FOR THE ENGINEERING GROUP FOR THE DESIGN AND HEAD OF THE SECTION FOR THE DESIGN AND HEAD OF THE SECTION. ALL THE THREE INTERMEDIATE WORN WHEEL PROFILES FIG. 1, 2 & 3 FOR THE DESIGN AND HEAD OF THE SECTION FOR THE ENGINEERING GROUP FOR THE DESIGN AND HEAD OF THE SECTION.

DRAWING NO.		INTERMEDIATE WORN WHEEL PROFILE FOR COACHING STOCK
REFERENCE		
SCALE	1:1	
REVISIONS		
B.G. RD 50 (C)		SKETCH-92082

## ▪ Pressing on Wheel on Axle

- Before pressing on operation, wheel seats on the axle and bore of the wheel should be carefully cleaned to remove rust, grit, swarf, dirt etc.
- The wheel seat should be lubricated with a mixture of basic carbonate white lead and boiled linseed oil, in the proportion of **1.2 kg.** of white lead paste to **1 litre** of boiled linseed oil. The wheel and axle should be properly aligned on the wheel press.
- The wheel press should be equipped with a dial pressure gauge and pressure recording gauge with graphs to record mounting pressure diagrams for each assembly.
- Wheels should be mounted within the prescribed pressure limits. Pressing pressure should be **400 to 600 kg/mm** of diameter of wheel seat. For ICF 16t axle with wheel seat diameter from **176mm to 178mm**, the pressing pressure should be **71t to 108t**.
- Wheels should be mounted (pressed in) carefully on the axle such that the wheel gauge distance is maintained.
- The axle end should be stamped with the shop code, date of mounting, pressing in pressure, axle no., cast no., cons. no. to enable identification of wheels. (see **figure 10.5**)
- The wheel gauge should be checked by gauging at three or more equi-angular points around the circumference.

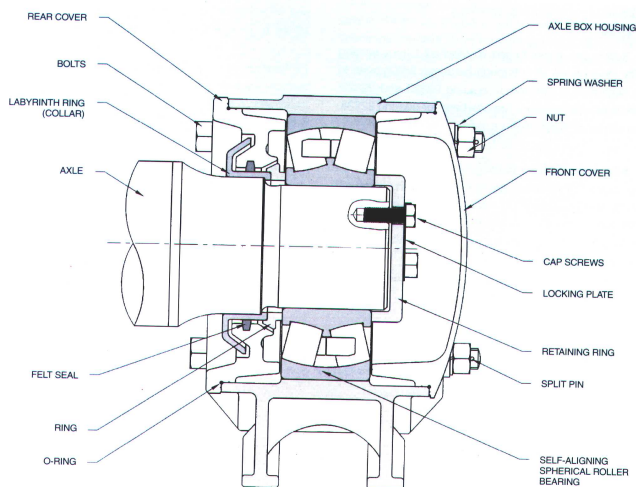
## ROLLER BEARINGS

### Construction feature of Roller Bearings

Spherical roller bearing consist of an outer ring having a continuous spherical raceway within which operate, two rows of barrel shaped rollers, which in turn are guided by an inner ring with two raceways separated by a centre rib. The spherical roller bearings have self-aligning properties and therefore can automatically adjust to any deviation in the centre line of the axle.

Spherical roller bearings have a large capacity for radial loads, axle loads in either direction, and complex loads. They are suited for the applications such as railway rolling stocks where vibrations and shock loads are encountered.

Roller Bearings are named according to the shape of rollers. Roller Bearings with spherical rollers are called as Spherical Roller Bearings.



### **Periodicity of Inspection of Roller Bearing**

- All roller bearings should be cleaned, inspected and filled with fresh grease at every POH.
- All bearings should be dismantled every alternate **POH or 2 lakh km** whichever is earlier in the workshop for renewal of felt sealing ring and overhaul of the roller bearings.

### **WHEEL DEFECTS**

#### **COMMON WHEEL DEFECTS**

- |                     |                        |                             |
|---------------------|------------------------|-----------------------------|
| 1) Thin flange      | 2) Deep flange         | 3) Flat places on tread     |
| 4) Less root radius | 5) Wheel loose on axle | 6) Wheel crack              |
| 7) Flaking on tread | 8) Hollow tyre         | 9) Metal deposited on Tread |

#### **AXLE DEFECTS**

- |                       |                             |                      |
|-----------------------|-----------------------------|----------------------|
| 1) Journal under size | 2) Wheel seat damaged       | 3) Body pitted       |
| 4) Body corroded      | 5) Axle bend                | 6) Journal bend      |
| 7) Deep dent mark     | 8) Axle end thread worn out | 9) Ultrasonic defect |