

## The emblem of India is a black and white line drawing of the Lion Capital of Ashoka. It features four Asiatic lions standing back to back on a high, circular abacus. The abacus is decorated with a frieze of four galloping horses and a central wheel (Chakras). The entire emblem is set against a white background.

**ISSUED BY:  
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## **FUNCTIONAL REQUIREMENTS SPECIFICATION FOR POWERED AND NON-POWERED AXLES OF VANDE BHARAT COACHES**

### **1. FOREWORD**

Indian Railway is intended to develop a Technical Specification for 'Powered and Non-Powered Axles of Vande Bharat Coaches' for max. operating speed of 200 Kmph.

### **2. SCOPE**

This document covers the functional requirements for the 'Powered and Non-Powered Axles of Vande Bharat Coaches'.

### **3. FUNCTIONAL REQUIREMENTS**

#### **3.1 PURPOSE OF USE:**

Powered and Non-Powered Axles in Indian Railways bogies are essential for the load transfer, structural integrity, safety and efficient operation of the Railways System.

#### **3.2 DESIRED CHARACTERISTICS:**

Description	Axle Material	Drawing No.
Powered Axle (Axle Load - 17t)	EA1N steel grade to EN 13261:2020 – Category 2	ICF Drawing No. AAA02162 (Latest Version)
Non-Powered Axle (Axle Load – 17t)	EA1N steel grade to EN 13261:2020 – Category 2	ICF Drawing No. AAA02158 (Latest Version)

#### **4 / 4.1 WEATHER CONDITION**

The Powered and Non-Powered Axles is used very widely under the severe weather conditions. The limiting conditions, which have to be withstood in service, are indicated below:

S. No.	Weather condition	Limiting conditions
1	Maximum temperature	+70° C
2	Minimum temperature	-20° C
3	Max. temperature attainable by an object exposed to sun(current carrying object)	100° C
4	Maximum Relative humidity	Up to 100%
5	Average Annual Rainfall	1750 to 6250 mm
9	Maximum wind pressure	200 Kg/Sq. meter
10	Altitude	Up to 3000 m
11	The Axles are subjected to chemical pollution from the effluent gases of Chemical Plants and saline atmosphere in coastal areas.	

#### 4.2 Coach-body displacement encountered under dynamic conditions.

- |      |                                    |              |
|------|------------------------------------|--------------|
| i)   | Vertically-                        | $\pm 100$ mm |
| ii)  | Laterally -                        | $\pm 55$ mm  |
| ii)  | Longitudinally-                    | $\pm 10$ mm  |
| iii) | Bogie rotation about center pivot- | $\pm 4^0$    |
| iv)  | Maximum Speed of train -           | 200 KMPH     |

**Note:** Above functional requirements are indicative and not exhaustive.

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