



IS 11952:1986 – Specification of Steels for Piston pins

In internal combustion engines, the Piston pin connects the piston to the connecting rod, and provides a bearing for the connecting rod to pivot upon as the piston moves. The Piston pin has to operate under the highest temperatures, subject to heavy shear and bending loads, with some of the highest-pressure loadings of any bearing in the engine, with difficulties in lubrication due to its location, while remaining small and light so as to fit into the piston diameter and not unduly add to the reciprocating mass. The steel used to make the piston pins play a crucial role in overcoming the problems.

Good quality steel for piston pins shall have adequate **tensile strength & hardness, accurate chemical composition and Consistent Grain Size**. It must be **free from Slag Inclusions, Surface defects** and exhibit excellent **Hardenability** to ensure the material's performance, durability, and suitability for the intended application.

The Indian Standard IS 11952:1986 addresses the aforesaid quality parameters in the following ways:

- i) IS 11952 includes limits for **Slag inclusions** and **Surface Defects by NDT methods**, specifying that steel should be free seam, scales, rust, folds and other irregularities,
- ii) IS 11952 specifies mechanical property requirements like **Hardness and Tensile strength** which varies based on the grade of the heat-treated Steel,
- iii) IS 11952 defines specific **Chemical composition** limits for each grade, specifying the range of elements like Carbon, silicon, Manganese, Sulphur, Phosphorus, Chromium, Nickel, Molybdenum and Boron that provide sufficient **Hardenability** and adequate **Grain size** during the heat treatment of Steel,
- iv) The standard prescribes **strict tolerances on diameter** to ensure dimensional consistency,
- v) IS 11952 mandates the Steel must be **accompanied with Test certificate** with all technical information such as the **Chemical composition, Mechanical Properties, Grain Size and Inclusion ratings**. Also, **Metal tag** on bundles mentioning **manufacturer's identification, Steel grade & Size and lot number**. These marking helps in traceability and ensures that users can verify compliance with the standards.

By defining above parameters, IS 11952:1986 ensures the Steel meets quality standards necessary for safe, durable, and reliable Piston pins used in internal combustion engines.