

Non-oriented electrical steel sheets commercially also called lamination steel, silicon electrical steel, silicon steel or transformer steel, are special steel sheets tailored to produce certain magnetic properties. They are used in the form of lamination stacks, mainly in electric motors, transformers and alternators, depending on their properties. They are produced from Fe-Si or Fe-Si-Al alloys. Non-oriented electrical steel sheets are incorporated into a wide range of equipment, from the simplest domestic appliances to hybrid and pure electric vehicles. They are widely used in manufacturing of electric motor core. Non-oriented electrical steel sheets can be divided into two categories:

- 1.– fully-processed grades, which are delivered in the finished condition, continuously annealed and sometimes varnished. They have guaranteed magnetic properties.
2. semi-processed grades, that are given the final annealing treatment to develop their magnetic properties by the user.

This Indian Standard, IS 15391, covers the requirements for cold-rolled, non-oriented electrical steel in sheet and strip form delivered in a semi-processed state. This standard is applicable to material intended for the manufacture of magnetic circuits. The steel is semi-processed and requires annealing or heat treatment by the purchaser before use.

Purchasers of cold-rolled non-oriented electrical steel sheet and strip expect specific quality parameters to ensure optimal performance and suitability for their intended applications. One crucial parameter is the surface condition. The surface of the steel should be uniform and clean, free from defects like scratches, blisters, cracks, and physical damage. Dispersed defects are permissible within the limit of thickness tolerance if they do not hinder the intended use or processing method. Another essential quality aspect is the magnetic properties of the material. These properties, including specific total loss, maximum specific total loss, and maximum magnetic polarization, are crucial for determining the steel's performance in electromagnetic applications. Consumers also expect adherence to specified tolerances for dimensions like thickness, width, and length, ensuring consistent and predictable material dimensions.

The IS 15391 standard directly addresses these consumer expectations by outlining specific requirements and testing procedures. It sets clear limits on surface imperfections, ensuring a high-quality finish for the steel. The standard includes detailed tables specifying the acceptable ranges for magnetic properties, guiding manufacturers and purchasers in assessing the steel's suitability for different applications. Additionally, the standard outlines precise tolerances for various dimensional parameters, ensuring uniformity and minimizing variations in the supplied material. By providing a framework for evaluating these critical quality parameters, the IS 15391 standard aims to ensure that cold-rolled non-oriented electrical steel meets the performance and reliability demands of consumers in the electrical and magnetic industries.