IS 3024 : 2015: Grain Oriented Electrical Steel Sheet and Strip (Third Revision)

IS 3024:2015 is an Indian Standard that specifies the requirements for *electrical steel sheets and strips* (also known as cold-rolled grain-oriented (CRGO) and non-oriented (CRNGO) steel). These materials are used primarily in electromagnetic devices, such as transformers, motors, and generators, where they contribute to efficient magnetic performance.

Grain oriented electrical steels are low carbon, silicon-iron alloys with a silicon contents of approximately 3 percent in which low Total Specific Loss (Core Loss) and high permeability in the direction of rolling are achieved by appropriate metallurgical processing. These steel sheets and strips are coated on both sides as part of its manufacturing process with an inorganic insulation to withstand desired stress relief annealing treatment which is necessary to attain the specified magnetic properties. These steels are used primarily in transformer cores operating at moderate to high induction at commercial power frequencies.

This standard covers the requirements of flat rolled, fully processed (in final annealed condition) grainoriented, electrical steel sheets or strips and intended for the construction of transformer cores operating at moderate to high inductions at commercial power frequencies and other magnetic circuits.

The electrical steel grades described in this standard include conventional and high permeability grain oriented electrical steel tested at 1.7 Tesla, 50 Hz or 60 Hz.
These sheets and strips shall be coated on both sides with inorganic insulation capable of withstanding stress relief annealing treatment.

1. **Manufacturing and Processing**:

   Surface Coating: Sheets are coated on both sides with an insulating layer to endure stress relief treatments, which is vital for maintaining magnetic properties.

   Delivery Conditions: The standard defines different forms of supply and surface types, with varying coatings for specific applications.

2. **Magnetic Properties**: Defines core loss and magnetic polarization requirements. Core loss values for each grade must meet specified limits to ensure efficiency in power transformers.

3. **Physical and Mechanical Properties**:
   Stacking Factor: Specifies minimum values for stacking or lamination factor to optimize material density.

   Ductility and Thickness Tolerances: Includes tests for ductility, thickness tolerances, and flatness to ensure material quality for effective lamination.

4. **Testing and Sampling**: Detailed methods are prescribed for measuring core loss, magnetic properties, and insulation resistance. Samples are taken from each coil to verify compliance.

5. **Marking and Certification**: Coils shall be marked with grade, thickness, and manufacturer details. BIS certification marking is also required.

IS 3024:2015 ensures that electrical steel sheets and strips used in high-performance transformers and other magnetic applications meet national standards for efficiency and reliability.