

**BUREAU OF INDIAN STANDARDS***(Not to be reproduced without permission of BIS or used as an Indian Standard)***Draft AMENDMENT NO. 3****TO****IS 3024: 2015 GRAIN ORIENTED ELECTRICAL STEEL SHEET AND STRIP***(Third Revision)*Wrought Steel Products Sectional  
Committee, MTD 04Last date for receipt of comments:  
**November 06, 2024***(Page 2, clause 5.1)* — Substitute the following for the existing:**5.1** The grades covered by this standard are classified according to the value of maximum specific total loss in watts per kilogram and according to the nominal thickness of the material (0.18, 0.20, 0.23, 0.27, 0.30 and 0.35 mm).*(Page 4, Table 1)* — Substitute the following for the existing table:**Table 1 Magnetic Properties of Conventional Grain Oriented (CGO) Electrical Steel***(Clauses 4.2, 5.2, 8.1 and 8.2)*

Grade	Nominal Thickness mm	Maximum Specific Core Loss at 1.5 T W/kg		Maximum Specific Total Loss at 1.7 T W/kg		Minimum Polarization in Tesla at a Field Strength of 800 A/m	Minimum Stacking Factor
		50 Hz	60 Hz	50 Hz	60 Hz		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
18CG100	0.18	0.68	0.90	1.00	1.35	1.84	0.930
23CG110	0.23	0.73	0.96	1.10	1.45	1.78	0.945
23CG120	0.23	0.77	1.01	1.20	1.57	1.78	0.945
23CG127	0.23	0.80	1.03	1.27	1.65	1.75	0.945
27CG120	0.27	0.80	1.07	1.20	1.58	1.78	0.950
27CG130	0.27	0.85	1.12	1.30	1.68	1.78	0.950
27CG140	0.27	0.89	1.15	1.40	1.75	1.75	0.950
30CG120	0.30	0.83	1.09	1.20	1.58	1.78	0.955
30CG130	0.30	0.85	1.15	1.30	1.71	1.78	0.955
30CG140	0.30	0.92	1.21	1.40	1.83	1.78	0.955
30CG150	0.30	0.97	1.25	1.50	1.90	1.75	0.955
35CG145	0.35	1.03	1.36	1.45	1.91	1.78	0.960
35CG155	0.35	1.07	1.41	1.55	2.04	1.78	0.960
35CG165	0.35	1.11	1.52	1.65	2.12	1.75	0.960

NOTE — Normally the tests should be performed at 50Hz. However, countries where power supply at 50 Hz is not available, testing may be carried out at 60 Hz and accordingly product shall conform to the specified values given in above table. However, in all such cases, the product shall also conform to the specified values of Table when tested in importing country having power supply at 50 Hz.

[Page 4, Table 2, (also see Amendment No. 1 and Amendment No. 2)] — Substitute the following for the existing table:

**Table 2 Magnetic Properties of High Permeability Grain Oriented (HPGO) Electrical Steel**  
(Clauses 4.2, 5.2, 8.1 and 8.2)

Grade	Nominal Thickness, mm	Maximum Specific total loss at 1.7 T W/kg		Minimum polarization in Tesla at a Field Strength of 800 A/m	Minimum stacking Factor
		50 Hz	60 Hz		
(1)	(2)	(3)	(4)	(5)	(6)
20HP70 <sup>d</sup>	0.20	0.70	0.92	1.85	0.940
20HP75 <sup>d</sup>	0.20	0.75	0.99	1.85	0.940
23HP75 <sup>d</sup>	0.23	0.75	0.99	1.85	0.945
23HP80 <sup>d</sup>	0.23	0.80	1.04	1.85	0.945
23HP85 <sup>d</sup>	0.23	0.85	1.12	1.85	0.945
23HP90 <sup>d</sup>	0.23	0.90	1.19	1.85	0.945
23HP95 <sup>d</sup>	0.23	0.95	1.25	1.85	0.945
23HP100 <sup>d</sup>	0.23	1.00	1.32	1.85	0.945
27HP85 <sup>d</sup>	0.27	0.85	1.12	1.85	0.950
27HP90 <sup>d</sup>	0.27	0.90	1.19	1.85	0.950
27HP95 <sup>d</sup>	0.27	0.95	1.25	1.85	0.950
27HP100	0.27	1.00	1.32	1.88	0.950
27HP110	0.27	1.10	1.45	1.88	0.950
30HP95	0.30	0.95	1.25	1.88	0.955
30HP100	0.30	1.00	1.32	1.88	0.955
30HP105	0.30	1.05	1.38	1.88	0.955
30HP110	0.30	1.10	1.46	1.88	0.955
30HP120	0.30	1.20	1.58	1.88	0.955
35HP110	0.35	1.10	1.45	1.88	0.960
35HP115	0.35	1.15	1.51	1.88	0.960
35HP125	0.35	1.25	1.64	1.88	0.960
35HP135	0.35	1.35	1.77	1.88	0.960

NOTES

- Normally the tests should be performed at 50Hz. However, countries where power supply at 50 Hz is not available, testing may be carried out at 60 Hz and accordingly product shall conform to the specified values given in above table. However, in all such cases, the product shall also conform to the specified values of Table when tested in importing country having power supply at 50 Hz.
- Grades may be delivered in domain or non-domain refined condition. In case if it is delivered with domain refinement then it is necessary to apply suffix 'd'. Suffix 'd' indicates use of test method to certify a grade, in line with test methods as defined in 15.4.
- In cases where material gets deteriorated when subjected to heat treatment, the domain refined grades need to be checked by Single sheet method as given in 14.5 and as per IS 649. For other grades/other types of domain refined grades which do not deteriorate when subjected to heat treatment, the test method shall be as Epstein as given in 14.1 and as per IS 649.

(Page 5, clause 10.1) — Substitute the following for the existing:

### 10.1 Stacking Factor

The stacking or lamination or space factor shall be as high as practicable consistent with the surface type and material thickness desired. The typical stacking factor values for the various material thickness and surface types, as determined by quality control tests made in accordance with test method described in IS

649, are shown in Table 4. The test specimen shall consist of at least 24 strips of the same size, in case of dispute, the test shall be made with 100 strips. The strips shall have a width of at least 20 mm and a surface area of at least 5 000 mm<sup>2</sup>, the tolerance on the width and length of strips being respectively equal to  $\pm 0.2$  mm and  $\pm 0.5$  mm, other tolerances can also be used as test area is calculated. The test strips shall be carefully deburred before the test. Epstein strips may be used for this test.

**Table 4 Minimum Stacking Factor**  
(Clause 10.1)

Condition	Surface Type	Stacking Factor, Percent at Nominal Thickness					
		0.18	0.20	0.23	0.27	0.30	0.35
NF	C-2	94.0	95.0	95.5	96.0	96.0	96.5
F	C-5 Over C-2	93.0	94.0	94.5	95.0	95.5	96.0
PQ	C-5 Only	94.0	95.0	95.5	96.0	96.0	96.5

(Page 5, clause 11.1) — Substitute the following for the existing:

### 11.1 Thickness Tolerance

The nominal thicknesses of the product are 0.18, 0.20, 0.23, 0.27, 0.30, and 0.35 mm. For thickness tolerance, a distinction is made between:

- The deviation from the nominal thickness within the same acceptance unit.
- The difference in thickness in a sheet or in a length of strip in a direction parallel to the direction of rolling.
- The difference in thickness in a direction perpendicular to the direction of rolling. This tolerance applies only to products with a width greater than 150 mm.
- At any point, the deviation from the nominal thickness within the same acceptance unit shall not exceed the tolerances of Table 6. The additional thickness due to welds with respect to the measured thickness of the product shall not exceed 0.050 mm.
- The difference in thickness in a sheet or in a length of strip of 1 m in a direction parallel to the direction of rolling shall not exceed 0.030 mm.
- For products with a width greater than 150 mm, the difference in thickness in a direction perpendicular to the direction of rolling shall not exceed 0.020 mm, the measurements being made at least 20 mm from the edges. For narrow strips, other agreements may be needed.

(Page 6, Table 5) — Insert the following new table after Table 5:

**Table 6 Tolerances on nominal thickness**  
(Clause 11.1)

Nominal Thickness mm	Tolerance mm
0.18	$\pm 0.020$
0.20	$\pm 0.020$
0.23	$\pm 0.023$
0.27	$\pm 0.027$
0.30	$\pm 0.030$
0.35	$\pm 0.030$