

## 6. Cold-rolled electrical steel

### 6.1. THIN COLD-ROLLED ANISOTROPIC ELECTRICAL STEEL SHEET (GRAIN-ORIENTED)

**Table 6.1. Product mix**

Description	Standard	Strip thickness, mm	Grade
Cold-rolled electrical anisotropic steel sheet	GOST 21427.1	0.27	3409; 3408; 3407; 3406; 3405; 3413 3409; 3408; 3407; 3406; 3405; 3404
		0.30	3413; 3412
		0.35	3409; 3408; 3407; 3406; 3405; 3404;
		0.50	3413; 3412; 3411
		0.70; 0.80	3414; 3413; 3412; 3411
Cold-rolled electrical anisotropic slit strip	GOST 21427.4	0.15	3425; 3424; 3423; 3422; 3421
Electrical grain-oriented steel sheet and strip, delivered fully processed	EN 10107	0.23	M100-23P; M110-23S; M120-23S; M127-23S
		0.27	M120-27S; M130-27S; M140-27S
		0.30	M105-30P; M111-30P; M130-30S; M140-30S; M150-30S
		0.35	M125-35P; M140-35S; M150-35S; M165-35S
Cold-rolled grain-oriented magnetic steel slit strips (laminations)	GB/ T 2521	0.27	27QG110; 27Q120; 27Q130; 27Q140
		0.30	30QG120; 30QG130; 30Q130; 30Q140; 30Q150
		0.35	35QG125; 35QG135; 35Q135; 35Q145; 35Q155; 35Q165
Magnetic steel sheet and strip with oriented grain structure	JIS 2553	0.23	23P100; 23G110
		0.27	27P110, 27G120, 27G130;
		0.30	30P110; 30P120, 27G130, 27GL140
		0.35	35P125, 35P135, 35G145, 35G155
		0.23	23P060; 23H070; 23G045
Flat electrical grain-oriented silicon steel, fully processed	ASTM A 876/876M	0.27	27P066; 27H074; 27G051
		0.30	30H083; 30G058
		0.35	35H094; 35G066
Cold-rolled electrical strip in coil, grade 3431	TU 14-1-3441-82	0.20	3431
Cold rolled sheet of grain oriented electrical steel (anisotropic)	STO 05757665-008-2007	0.23	NV23S-100L; NV23S-110; NV23S-120; NV23S-127 NV27P-100
		0.27	NV27S-105L; NV27S-110; NV27S-120; NV27S-130; NV27S-140
		0.30	NV30P-105; NV30S-110L; NV30S-120; NV30S-130; NV30S-140
		0.35	NV35S-120; NV35S-130; NV35S-145
		0.50	NV50S-150; NV50S-200

\* index L – steel flats with laser scribing

On customer's demand rolled steel may be produced to special magnetic properties requirements. Rolled steel is supplied as coils, slit strip and sheets with electrical insulation coating of two types:

- «CC» (Coating Conventional) – prime layer based on magnesium and silicon oxides, over which the layer of phosphates is applied (equivalent to «ЭТ» coating under GOST 21427.1, as well as coating C2+C5 under ASTM A976M);
- «CM» (Coating Magnetoactive) – prime layer based on magnesium and silicon oxides, over which the layer of phosphates and silicon oxides is applied (equivalent to S2 type coating, as well as coating C2+C5 under ASTM A976M).

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Thickness: 0.15; 0.23; 0.27; 0.30; 0.35; 0.50; 0.70; 0.80 mm.

Width of material supplied as:

coils is 914 to 1000 mm incl.

slit strip is 90 to 500 mm

slit strip with the thickness of 0.15 mm is 16 to 80 mm incl.

Rolled steel with other dimensional requirements may be produced to special order upon additional agreement.

Coil ID — 270 (strip thickness 0.15 mm), 500 mm. Coil weights — up to 5 t.

Mass of one piece in a slit strip coil shall not be less than the mass calculated as 0.5 kg per 1 mm of strip width.

Mass of slit strip coils with the thickness of 0.15 mm is 4 to 18 kg.

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**Table 6.2. Magnetic properties of electrical anisotropic steel under STO 05757665-008-2007**

EAS grade	Nominal thickness, mm	Specific losses, W/kg, not more than		Magnetic polarization, T, not less than	
		$P_{1,5/50}$	$P_{1,7/50}$	$J_{800}(B_{800})$	$J_{2500}(B_{2500})$
NV23S-100L	0,23	-	1,00	1,87	-
NV23S-110		0,73	1,10	1,85	-
NV23S-120		0,77	1,20	1,83	-
NV23S-127		0,80	1,27	1,82	-
NV27P-100	0,27	-	1,00	1,88	-
NV27S-105L		-	1,05	1,87	-
NV27S-110		0,75	1,10	1,86	-
NV27S-120		0,80	1,20	1,84	-
NV27S-130	0,27	0,85	1,30	1,83	-
NV27S-140		0,89	1,40	1,82	-
NV30P-105		-	1,05	1,88	-
NV30S-110L		-	1,10	1,87	-
NV30S-120	0,30	0,80	1,20	1,86	-
NV30S-130		0,85	1,30	1,84	-
NV30S-140		0,89	1,40	1,78	-
NV35S-120		0,90	1,20	1,86	-
NV35S-130	0,35	0,95	1,30	1,83	-
NV35S-145		1,00	1,45	1,81	-
NV50S-150		1,50	-	-	1,88
NV50S-200	0,50	2,00	-	-	1,85

**Table 6.3. Technical characteristics of the electrical isolation coatings on electrical anisotropic steel**

Type of coating under STO 05757665-008-2007	Type of coating under GOST 21427.1	Class ASTM 976	EN 10342	Base	Color	Thickness $\mu\text{m}$	Resistance factor $\text{Om}\cdot\text{cm}^2$	Thermal resistance
CC	ЭТ	C2+C5	EC-5-G	Magnesium and aluminium phosphates	Grey, glossy	1,5-5,0	$\geq 20$ $\geq 70$	830°C, 10 h, In protective atmosphere (90% N <sub>2</sub> + 10% H <sub>2</sub> )
CM				Combined (dehydrophosphates of magnesium, aluminium, silicates, chromates)	Grey or grayish brown, glossy	1,0-3,0	$\geq 30$ $\geq 100$	830°C, 10 h, In protective atmosphere (90% N <sub>2</sub> + 10% H <sub>2</sub> )