



ARNOLD
MAGNETIC TECHNOLOGIES

Precision Thin Metals
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Arnold Capabilities for Coated and Silt Silicon Steel

Magnetic Material	Three Percent Silicon Electrical Steel	Tolerance (Inch unless otherwise specified)										
		Grain Oriented					ARNOLD™ (Non-Oriented)					
Coating Material	AISI Type C-5 - Inorganic magnesium phosphate coating with inorganic fillers and organic resin	1-mil	2-mil	4-mil	6-mil	5-mil	7-mil	7-mil	7-mil	Special		
Characteristic	Width Range (Inch)											
Loss per ASTM A348 (Max.)	All Available	11.0 Watts per Pound @ 12 KG, 400 Hz	8.5 Watts per Pound @ 15 KG, 400 Hz	6.8 Watts per Pound @ 15 KG, 400 Hz	9.0 Watts per Pound @ 15 KG, 400 Hz	5.5 Watts per Pound @ 10 KG, 400 Hz	7.5 Watts per Pound @ 10 KG, 400 Hz	6.5 Watts per Pound @ 10 KG, 400 Hz				
		±0.00070	±0.00015	±0.00020	±0.00030	±0.00025	±0.00035	±0.00035				
Thickness	All Available											
Width	Up to 1.00											
		> 1.00 and up to 9.00										±0.003
Burr (Maximum)	All Available											
		> 9.00 and up to 16.00										±0.005 ±0.010
Flatness (Maximum Deviation from Flat)	All Available	0.0001	0.0002	0.0004	0.0006	0.0005	0.0007	0.0007	0.0007	0.0007		
Flatness	All Available											
Height to Length Ratio (Max.)	All Available											
Crossbow (Maximum Deviation from Flat)	All Available											
Crossbow	All Available											
Height to Length Ratio (Max.)	All Available	5%	4%								3%	
Coil Set (Max. in 3 ft. Vertical)	Up to 0.500											
Camber (Max. in 8 ft.)	> 0.500 and up to 16.00											
		Up to 0.250										6
Coil Size (I.D. x Max. O.D.)	Less than 0.75											
		0.75 to 16.00										3
Center Type	Up To 7.00											
		Cardboard center										1.50
Stacking Factor	All Available											
		Steel Center										0.50
Coating Thickness	All Available											
		Material shall be coated with an AISI Type C-5 type insulated coating to a thickness that provides a minimum insulation resistance of 100/cm ² per lamination when tested in accordance with ASTM A717										0.25
Average Surface Insulation Resistivity per ASTM A 717-81 (Min.)	All Available											
		10 Ω cm ² per lamination (two surfaces)										6 x 20
Surface	All Available											
		Uniformly coated. Minimum surface irregularities such as creases, wrinkles, pinpricks, dents, scratches using the best practices of Precision Thin Metals. Surface irregularities occur randomly; no repeating irregularities within a ten-foot section are permitted.										16 x 32
Miscellaneous	All Available											
		Non-Oriented coils may be formed by interleaving continuous lengths. Grain Oriented coils may be formed by tape splicing. All breaks will be flagged.										Cardboard center
As Rolled Width available upon request.												



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Table 1. Max Coil Weights for Non-Oriented and Grain Oriented Silicon Steels

Characteristic	Width Range (Inch)	Weight (Lbs)
Coil Weights for All Gauges	Up To 4.00	70 lbs. Max
Max Coil Weights for 1-mil (When Not Silt With Narrow Widths 4.00" or less)	> 4.00 and up to 16.00	Max 100 lbs per inch of width
Max Coil Weights for 2-mil thru 7-mil (When Not Silt With Narrow Widths 4.00" or less)	> 4.00 and up to 16.00	Max 185 lbs per inch of width
Max Coil Weights for All Gauges (When Silt Simultaneously With Narrow Silt Widths 4.00" or less)	5.00	700 lbs. Max
	6.00	840 lbs. Max
	7.00	980 lbs. Max
	8.00	1120 lbs. Max
	9.00	1,260 lbs. Max
	10.00	1,400 lbs. Max
	11.00	1,540 lbs. Max
12.00	1,680 lbs. Max	
13.00	1,820 lbs. Max	
14.00	1,960 lbs. Max	
15.00	2,100 lbs. Max	

Table 2. Recommended Grain Oriented Silicon Steel Thicknesses for Various Operating Frequency Values

Frequency	Recommended Thickness	Approximate Induction for 300 mW/cc, 18 W/lb, 40 W/kg*
400 Hz	4-mil or 6-mil	15000 G*
1 KHz	4-mil	10000 G
2 KHz	2-mil	6000 G
5 KHz	1-mil	3000 G

*For reference only. Based on Arnold C-core data records. (Arnold no longer manufactures C-cores.) At 400 Hz, magnetizing current limits the maximum flux density.



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Table 3. Recommended Grain Oriented Silicon Steel Thicknesses for High-Power Pulse Operating Conditions*			
Pulse Width	Recommended Thickness	Pulses per Second	
2 to 1000 microseconds	4-mil or 6-mil (D-U, U-I, L-L Laminations)	To 1000	
0.25 to 2 microseconds	1-mil or 2-mil (C-Core)	To 1000	

*Reference: Transformers for Electronic Circuits, Nathan R. Grossner, McGraw-Hill, New York, 1967, pp. 285 and 286, Table 11.1.

Table 4. For Grain Oriented and Non-Oriented Silicon Steel Recommended Edge Drop For Slit Widths - All Gauges	
Recommended Edge Drop Per Side On An As Rolled Edge	0.50" minimum
Recommended Edge Drop Per Side On An As Slit Edge	0.125" minimum

Table 5. For Grain Oriented and Non-Oriented Silicon Steel - Max Number Of Breaks Per Coil			
Gauge	Width	Max Number Of Breaks	Minimum Length Between Breaks
1-mil	Up To 4"	5	100 ft.
1-mil	> 4" and up to 16" and As Rolled	5	100 ft.
2-mil	Up To 4"	4	100 ft.
2-mil	> 4" and up to 16" and As Rolled	5	100 ft.
4-mil	Up To 4"	3	100 ft.
4-mil	> 4" and up to 16" and As Rolled	4	100 ft.
5-mil	Up To 4"	3	400 ft.
5-mil	> 4" and up to 16" and As Rolled	4	400 ft.
6-mil	Up To 4"	3	100 ft.
6-mil	> 4" and up to 16" and As Rolled	4	100 ft.
7-mil	Up To 4"	3	400 ft.
7-mil	> 4" and up to 16" and As Rolled	4	400 ft.