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# AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 7510/1A

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Superseding 7510/1

MAGNETS, RARE-EARTH/COBALT, PERMANENT  
Samarium-Cobalt, 33/67 - 15 (119) 250

1. SCOPE:

1.1 Form: This specification covers one type of samarium-cobalt permanent magnets.

1.2 Application: Primarily for components of electrical, electronic, and magnetic devices requiring an energy level of 15 MGOe (119 kT·A/m) for use at service temperatures up to 250°C.

1.3 Classification: Nominal composition of 33% samarium and 67% cobalt with an energy level of 15 MGOe (119 kT·A/m) with 250°C maximum service rating.

2. APPLICABLE DOCUMENTS: See AMS 7510.

3. TECHNICAL REQUIREMENTS:

3.1 Basic Specification: The complete requirements for procuring the magnets described herein shall consist of this document and the latest issue of the basic specification, AMS 7510.

3.2 Composition: Shall be nominally 33% samarium and 67% cobalt. Composition variations will be permitted if the magnetic properties are met.

3.3 Condition: Shall be unmagnetized.

REAFFIRMED

1994

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3.4 Magnetic Characteristics: Hysteresis data, determined at  $25^{\circ}\text{C} \pm 5$ , shall be as follows:

3.4.1	Required magnetizing field, $H_S$ , minimum	20 kOe	1592 kA/m
3.4.2	Energy product level, $(BH)_m$ , nominal	15 MGOe	119 kT·A/m
3.4.3.	Residual flux density (induction), $B_r$	7.8 - 8.2 kG	0.78 - 0.82 T
3.4.4	Induction coercive force, $H_c$	6.8 - 7.2 kOe	541 - 573 kA/m
3.4.5	Intrinsic coercive force, $H_{c_i}$ , minimum	15 kOe	1194 kA/m

3.5 Permanent Magnet Performance as a Function of Temperature: Shall be as follows:

3.5.1 Reversible coefficient, nominal, when  $B/H = 1.0$ :

25° to 100°C	0.040% per degree C
25° to 250°C	0.048% per degree C

3.5.2 Irreversible loss after exposure to temperature noted, nominal:

100°C, when $B/H = 1.0$	0.8%
100°C, when $B/H = 0.25$	1.8%
250°C, when $B/H = 1.0$	3.0%
250°C, when $B/H = 0.25$	10.0%

3.6 Individual Magnetic Component Evaluation: Shall be as specified on the applicable drawing or product specification.

3.7 Physical, Thermal, and Electrical Properties: Nominal properties shall be as follows:

3.7.1	Tensile Strength	5000 psi (34.5 MPa)
3.7.2	Hardness	500 HV/10/30
3.7.3	Density	8.2 g/cm <sup>3</sup>
3.7.4	Resistivity, at 25°C	50μ · cm
3.7.5	Thermal Conductivity	0.025 (cal·cm)/(°C·sec·cm <sup>2</sup> )
3.7.6	Thermal Expansion	
	Parallel to orientation	$5 \times 10^{-6}$ mm/mm/°C
	Perpendicular to orientation	$13 \times 10^{-6}$ mm/mm/°C

4. QUALITY ASSURANCE PROVISIONS: See AMS 7510.
5. PREPARATION FOR DELIVERY: See AMS 7510.
6. ACKNOWLEDGMENT: See AMS 7510.
7. REJECTIONS: See AMS 7510.
8. NOTES: See AMS 7510.

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