AN AMERICAN NATIONAL STANDARD

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INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

AMS 7510/2A

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Superseding 7510/2

MAGNETS, RARE-EARTH/COBALT, PERMANENT
Samarium-Cobalt, 33/67 - 18 (143) 250

1. SCOPE:

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

1.2 Application: Primarily for components of electrical, electronic, and magnetic devices requiring an energy level of 18 MGOe (143 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 18 MGOe (143 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
APR - - 1994

3.4 Magnetic Characteristics: Hysteresis data, determined at 25°C ± 5, shall be as follows:

3.4.1	Required magnetizing field, H_S, minimum	15 kOe	1194 kA/m
3.4.2	Energy product level, $(BH)_m$, nominal	18 MGOe	143 kT•A/m
3.4.3.	Residual flux density (induction), B_r	8.3 - 8.8 kG	0.83 - 0.88 T
3.4.4	Induction coercive force, H_c	7.8 - 8.2 kOe	621 - 652 kA/m
3.4.5	Intrinsic coercive force, H_{ci}, minimum	16 kOe	1273 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 R/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 he 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^3
3.7.4	Resistivity at 25°C	50 µΩ•cm
3.7.5	Thermal Conductivity	0.025 $(cal•cm)/(°C•sec•cm^2)$
3.7.6	Thermal Expansion	
	Parallel to orientation	5 x 10^{-6} mm/mm/°C
	Perpendicular to orientation	13 x 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.