SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS7510/1 REV. B

Issued 1977-01
Revised 2006-09
Reaffirmed 2012-02

Superseding AMS7510/1A

Magnets, Rare-Earth/Cobalt, Permanent Samarium-Cobalt, 33/67 - 15 (119) 250

RATIONALE

AMS7510/1B has been reaffirmed to comply with the SAE five-year review policy.

1. SCOPE

1.1 Form

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

1.2 Application

This product has been used typically 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, but usage is not limited to such applications.

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.

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3.3 Condition

Shall be unmagnetized.

3.4 Magnetic Characteristics

Hysteresis data, determined at 25°C ± 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, Hc	6.8 - 7.2 kOe	541 - 573 kA/m
3.4.5	Intrinsic coercive force, H_{ci}, 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 he 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	5 ksi (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	50μΩ · cm
3.7.5	Thermal Conductivity	0.025 (cal·cm)/(°C·sec·cm^2)