

NATIONAL AEROSPACE STANDARD

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC., 1725 DE SALES STREET, N. W., WASHINGTON, D. C. 20036

SPECIFICATION

RECTIFIERS, SELENIUM, FOR MAGNETIC AMPLIFIERS

1. SCOPE AND CLASSIFICATION

1.1 Scope - This specification covers rectifiers for magnetic amplifier applications. Only the general requirements for rectifiers are included herein and therefore complementary information is required in the procurement of a particular rectifier. The electrical characteristics specified in table V are based on 400 cycles per second operation.

1.1.1 Ordering Information - The following is a list of the various categories of complementary information which must be supplied in the form of detail specifications or drawings to define a particular rectifier:

- a. Applicable grade and class
- b. Electrical ratings (e.g., voltage rating, forward current)
- c. Electrical characteristics and tests (e.g., Max. F.V.D., -Max. Reverse Current)
- d. Physical requirements (e.g., size, weight, mounting dimensions)
- e. Applicable source inspection tests (if required)
- f. Packaging instructions (if applicable)
- g. Any additional tests and requirements
- h. Applicable exceptions from any requirements contained herein.

1.2 Classification - Rectifiers shall be furnished in the specified combination of the following classes and grades.

1.2.1 Class - Rectifiers are classified in accordance with their ability to withstand ambient temperature ranges as follows:

② LIST OF CURRENT SHEETS

NO.	REV.	NO.	REV.
1	2	8	2
2	2	9	2
3	2	10	2
4	2	11	2
5	2	12	2
6	2	13	2
7	2	14	2
		15	2

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TITLE

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Table I - Class

Class	Ambient Temperature Range (at sea level)
A	-55 to +71°C
B	-55 to +100°C
C	-55 to +125°C
D	-55 to +150°C

Ambient temperature rating refers to rectifiers in free air and ambient temperature is defined as the temperature of the air that directly cools the rectifier.

- 1.2.2 Grade - Rectifiers are graded in accordance with their ability to withstand environmental conditions as follows:

- a. Grade 1 rectifiers are capable of operating satisfactorily when exposed to the adverse atmospheric conditions specified in paragraphs 4.5.8, 4.5.9 and 4.5.12.
- b. Grade 2 rectifiers are capable of operating satisfactorily in locations protected from these conditions.

2. APPLICABLE SPECIFICATIONS, STANDARDS, DRAWINGS, AND PUBLICATIONS

- 2.1 The following specifications, standards and publications, of the issue in effect on date of invitation for bids, form a part of this specification:

SPECIFICATIONS

FEDERAL

QQ-P-416 - Plating, Cadmium (Electro deposited)

QQ-Z-325 - Zinc Plating (Electro deposited)

MILITARY

JAN-I-10 - Insulating materials, Ceramic Radio, Class L

MIL-A-8625 - Anodic Aluminum and Aluminum Alloy Coating

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SPECIFICATIONS

MILITARY

- MIL-P-14 - Plastic - Materials, molding, and plastic - Parts, Molded; Thermosetting
- MIL-P-79 - Plastic - Materials, Laminated, Thermosetting Rods and Tubes
- MIL-P-997 - Plastic - Material, Laminated, Thermosetting, Electrical Insulating: Sheets, Glass Cloth, Silicone Resin
- MIL-P-3115 - Plastic - Material, Laminated, Thermosetting, Sheets, Paper Base, Phenolic-Resin
- MIL-S-7742 - Screw threads, Standard, Aeronautical
- MIL-P-15037 - Plastic - Material, Laminated Thermosetting, Sheets, Glass-Cloth, Melamine-Resin
- MIL-P-15047 - Plastic - Material, Laminated Thermosetting, Sheets, Nylon Fabric Base, Phenolic-Resin

STANDARDS

MILITARY

- MIL-STD-202 - Test Methods for Electronic and Electrical Components Parts

3. REQUIREMENTS

3.1 Definitions

- 3.1.1 Rectifier Cell - A rectifier cell is an elementary rectifying device having one positive electrode, one negative electrode, and one rectifying junction.
- 3.1.2 Rectifying Element - A rectifying element is a circuit element which conducts current effectively in one direction only. One or more metallic rectifier cells or metallic rectifier stacks which are connected in parallel, in series, or both, to operate as one circuit element is a rectifying element.

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APPROVAL DATE March 1955 REVISION ① 1 April 1963 ② 15 Oct. 1968

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- 3.1.3 Metallic Rectifier Stack - A metallic rectifier stack is a single structure of one or more metallic rectifier cells. A metallic rectifier stack may consist of one or more rectifying elements or part of a rectifying element.
- 3.1.4 Forward Direction - Forward direction is the direction of lesser resistance to conventional current flow through a rectifier cell or cells; i.e., from the negative electrode to the positive electrode.
- 3.1.5 Forward Current - Forward current is the average current that flows through a rectifier cell or cells in the forward direction.
 - 3.1.5.1 Rated Forward Current - The rated forward current is the forward current that can be carried continuously for the specific conditions given in the specification.
- 3.1.6 Forward Voltage Drop - Forward voltage drop is the average drop which results from the flow of current through a rectifier cell or cells.
- 3.1.7 Reverse Direction - Reverse direction is the direction of greater resistance to conventional current flow through a rectifier cell or cells; i.e., from the positive electrode to the negative electrode.
- 3.1.8 Reverse Current - Reverse current is the average current which flows through a rectifier cell or cells in the reverse direction. Unless specified as in phase or quadrature current, the total current is meant.
- 3.1.9 In Phase Reverse Current - In phase reverse current is the average portion of the total reverse current which is in phase with the applied voltage.
- 3.1.10 Quadrature Reverse Current - Quadrature reverse current is the average portion of the total reverse current which leads the applied voltage by 90 electrical degrees.
- 3.1.11 Reverse Voltage - The reverse voltage is the r.m.s. voltage which is applied to a metallic rectifier cell or cells and load in series.
- 3.2 Materials - The following are the applicable general requirements for materials. (Note: Since it is usually impractical to determine from examination of a rectifier if the materials meet some of the following requirements, it is expected that the vendor will certify to the purchaser that his product meets all applicable requirements.)
 - 3.2.1 Flammable and Explosive Materials - Rectifier construction shall incorporate the smallest practicable amount of flammable and explosive materials consistent with good aircraft practice.
 - 3.2.2 Ceramic - Ceramic materials shall be in accordance with Specification JAN-I-10. All exposed surfaces shall be glazed.

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- 3.2.3 Plastic - Plastic materials used in external surfaces of rectifiers shall meet the following requirements as applicable.
 - 3.2.3.1 Laminated - Laminated sheets shall be in accordance with Specification MIL-P-997, MIL-P-3115, MIL-P-15037, or MIL-P-15047. Laminated tubes shall be in accordance with Specification MIL-P-79.
 - 3.2.3.2 Molded - Molded thermosetting materials shall conform to Specification MIL-P-14.
- 3.2.4 Hardware - All mounting studs, bolts, nuts, and washers shall be made of one of the following materials:
 - a Aluminum anodized per specification MIL-8625 Type I.
 - b Ferrous metal cadmium plated per Federal Specification QQ-P-416 Type II class C.
 - c Ferrous metal zinc plated per Federal Specification QQ-Z-325 Type II class 3.
- 3.2.5 Fungus-resistant materials - As far as practicable, all external non-metallic parts of rectifiers shall be fungus resistant.
- 3.3 Design and Construction - The following are the applicable general requirements for design and construction:
 - 3.3.1 Terminals - Unless otherwise specified in the detail specification or drawing solder lugs may be of any shape and shall be hot solder dipped or tin-lead plated. In either case the tin content shall be between 40 and 70 percent. Solder-lug terminals shall be capable of accepting a wire of such diameter as to safely carry rated load.
 - 3.3.2 Threaded Parts - All external threaded parts shall be in accordance with MIL-S-7742 unless otherwise specified.
- 3.4 Marking -
 - 3.4.1 Identification Marking - Rectifiers shall be marked with the grade, class, date code, manufacturer's name or symbol and part number. The marking shall be legible after the completion of all the required tests. It is not practicable to mark some rectifiers because of their size. When such rectifiers are furnished, the unit packages shall be clearly marked with the information specified.

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