MIL-R-7204B(USAF)
6 JULY 1970
SUPERSEDING
MIL-R-7204A(USAF)
30 April 1964

MILITARY SPECIFICATION

RECTIFIER, SILICON, TYPE B-9

1. SCOPE

* 1.1 This specification covers one type of portable, 400-ampere, 28-volt, direct current (DC) silicon rectifier, designated Type B-9.

2. APPLICABLE DOCUMENTS

* 2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATION

Federal

PPP-B-601	Boxes, Wood, Cleated-Plywood

Military

MIL-P-116	Preservation, Methods Of
MIL-P-6457	Power Supply, Metallic Rectifier Type, General Specification For

STANDARDS

Military

MIL-STD-129	Marking For Shipment And Storage

Air Force-Navy Aeronautical

AN2551	Cable Assembly, Power, Electrical, 28 Volt DC

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Preproduction. This specification makes provisions for preprduction testing.

* 3.2 General specification. The requirements of MIL-P-6457 apply as requirements of this specification with the exceptions and additions specified herein. When the two specifications conflict, this specification shall govern.

3.3 Design and construction.

3.3.1 Configuration. The rectifier shall be designed and constructed as a portable unit with a configuration as shown on Figure 1. Two rubber-tired wheels with a minimum diameter of 10 inches shall be provided. The load on each wheel shall not exceed its rated load limit.

3.3.1.1 Handle. A suitable handle shall be provided to enable personnel to maneuver the rectifier. The handle shall not interfere with the power cables or instruments.

3.3.1.2 Cable racks. Cable racks shall be provided for mounting the alternating- and direct-current power cables and shall be designed to permit complete portability of the rectifier.

* 3.3.1.3 Standard parts. AN or MIL standard parts shall be used where they suit the purpose and shall be identified by their part numbers. Commercial utility parts such as screws, bolts, nuts, et cetera, may be used provided they have suitable properties and are replaceable by the AN or MIL standard parts without alteration and provided the corresponding AN or MIL part numbers are referenced on the drawings and in the parts list. In applications for which no suitable corresponding AN or MIL part is in effect on the date of invitation for bids, commercial parts may be used provided written approval is obtained from the cognizant engineering activity. Use of nonapproved, nonstandard components will cause rejection of first article.

3.3.2 Electrical characteristics.

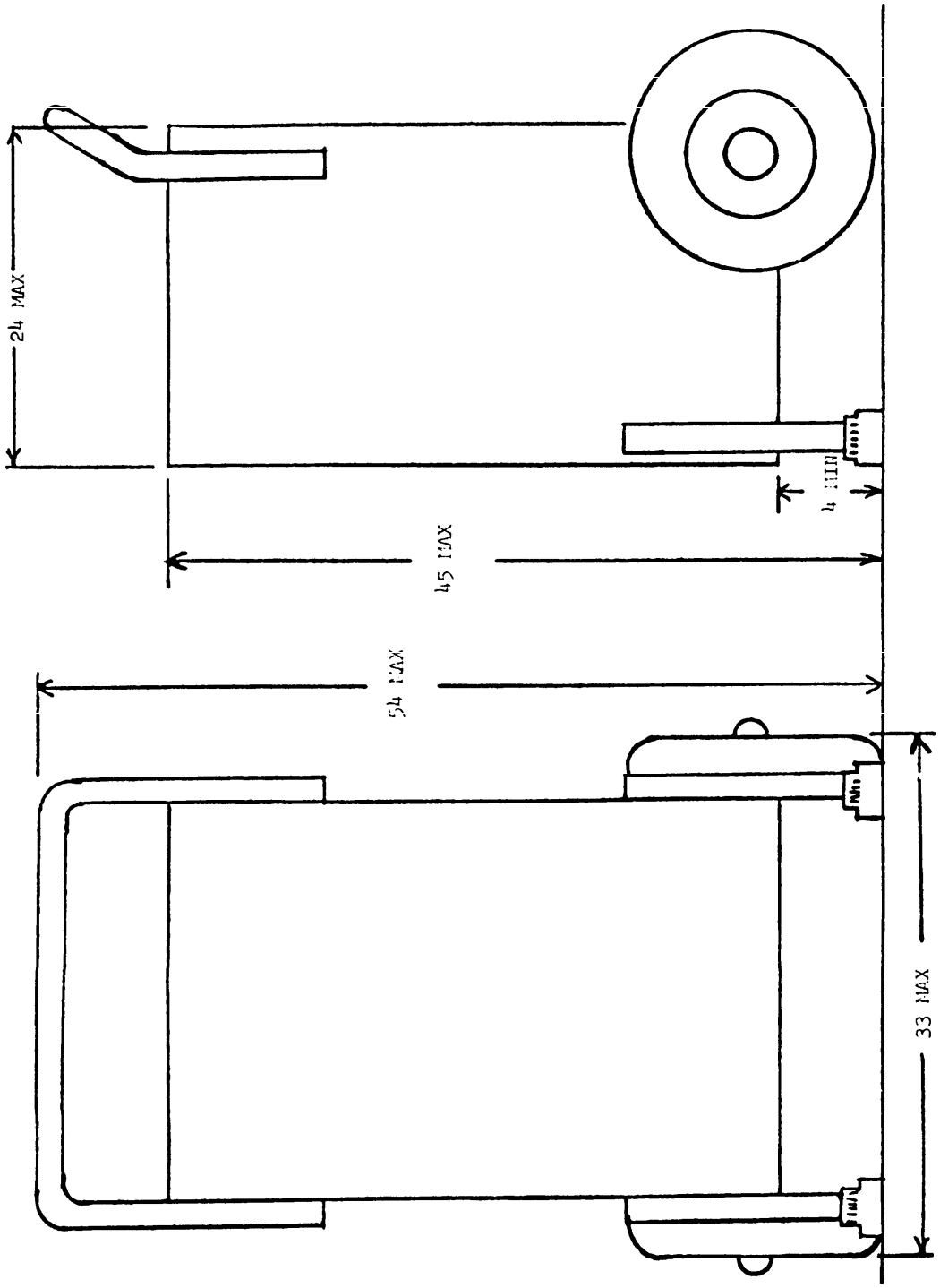
3.3.2.1 Input voltage. The rectifier shall be designed to operate from an input voltage of 220 volts, 3 phase, 60 cycles, and shall be reconnectable to operate from 440 volts, 60 cycles, 3 phase. All controlled circuits such as operating coils of starters, pushbuttons, and relays shall operate on 110 volts, or less. This may be accomplished by means of a small external control transformer that lowers the voltage for the control devices or by a separate winding on the power transformer.

3.3.2.2 Output rating. The continuous direct-current output rating of the rectifier shall be 400 amperes at 28 volts.

3.3.2.3 Efficiency. The efficiency of the rectifier shall be not less than 75 percent.

3.3.2.4 Regulation. With the input voltage remaining constant at the nominal rated value, the no-load voltage at the output terminals shall remain within the range of 28.0 to 30.5 volts. The output voltage shall vary not more than 2.5 volts as the load is changed from no load to full load.

* 3.3.2.5 Ripple voltage. The peak alternating-current ripple voltage superimposed on the direct-current voltage output shall not exceed 1.2 volts peak when determined for both polarities as specified in MIL-P-6457.



DIMENSIONS IN INCHES

FIGURE 1. Rectifier Configuration

3.3.2.6 Bleeder resistor. If the rectifier design requires a bleeder resistor, the resistor shall be installed in a manner to dissipate the generated heat by means of the air stream flowing through the unit.

* 3.3.2.7 Rectifiers. The rectifiers shall be silicon diodes and shall be connected for full-wave rectification. When the rectifier is operated continuously in an ambient temperature of 55° Centigrade (C) at full rated load, the temperature of the diodes shall not exceed 120°C.

* 3.3.2.8 Input circuit breaker. A 220/440 volt alternating current, time delay, magnetic-hydraulic circuit breaker shall be provided in the input circuit for overload and starting purposes. Without tripping, the circuit breaker shall meet the surge rating requirements of 4.6.8 of MIL-P-6457 and the intermittent duty requirements of 4.6.11 of MIL-P-6457. In addition, when an overload of 400 percent is applied, the circuit breaker shall trip before any damage is incurred by the unit.

3.4 Power cables.

* 3.4.1 Input cable. The rectifier shall be provided with a 4-wire, permanently attached input cable. The cable shall be type I as specified in MIL-P-6457. It shall be 100 feet long and shall have a maximum line voltage drop of 2 percent rated voltage at continuous rated load.

3.4.2 Output cables. The rectifier shall be provided with two AN2551D20 cable assemblies.

3.5 Meters. Commercial-type meters with a 2 percent accuracy shall be provided.

3.5.1 Ammeter. The scale range of the direct-current ammeter shall be 0 to 600 amperes.

3.5.2 Voltmeter. The scale range of the direct-current output voltmeter shall be 0 to 40 volts DC.

3.6 Dimensions. The dimensions of the rectifier shall be in accordance with Figure 1.

3.7 Weight. The total net weight of the rectifier, exclusive of external cables, shall not exceed 450 pounds.

4. QUALITY ASSURANCE PROVISIONS

* 4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

* 4.2 Test methods.

* 4.2.1 Silicon rectifier temperature rise. The rectifier shall be operated at rated load in ambient temperature of 55°C until thermal equilibrium is reached. Thermocouples shall be placed in at least three places in the silicon diodes to determine that the temperature of the diodes does not exceed 120°C. If desired, this test may be combined with the high temperature test specified in 4.6.15a of MIL-P-6457.

* 4.2.2 Input circuit breaker test. The rectifier shall be operated in an ambient temperature of 25°C with an input of 220 volts alternating current (AC) and then reconnected for 440 volt AC operatiion. It shall be shown that with each input voltage, when a 400 percent load is applied, that the input circuit breaker will trip before any damage is incurred by the unit. Immediately at the conclusion of this test, the rectifier shall meet the regulation and efficiency requirements as specified in 4.6.4 and 4.6.5 of MIL-P-6457. If desired, this test may be combined with the operational test specified in 4.6.3 of MIL-P-6457.

5. PREPARATION FOR DELIVERY

* 5.1 Preservation and packaging. Preservation and packaging shall be Level A or C as specified (see 6.2).

* 5.1.1 Level A. Each rectifier shall be preserved and packaged Method IIa of MIL-P-116. Each rectifier shall be packed in a wood, cleated-plywood unit container conforming to PPP-B-601, type shall be as specified in 5.2.

* 5.1.2 Level C. Each rectifier shall be preserved and packaged in a manner which will afford adequate protection against deterioration and physical damage during shipment from the supply source to the first receiving activity for immediate use. This level may conform to the supplier's commercial practice when such meets the requirements of this level.

* 5.2 Packing. Packing shall be Level A, B or C as specified (see 6.2).

* 5.2.1 Level A. The unit container specified in 5.1.1 shall be the shipping container and shall conform to PPP-B-601, overseas type. Containers shall be of minimum cube and tare consistent with the protection required. Container closure and strapping shall be in accordance with the appendix to PPP-B-601.

* 5.2.2 Level B. Level B shall be the same as Level A except containers shall conform to domestic type.

* 5.2.3 Level C. Each rectifier shall be packed in a manner which affords adequate protection against damage during direct shipment from the supply source to the first receiving activity for immediate use. This level may conform to the supplier's commercial practice when such meets the requirements of this level.

* 5.3 Marking. In addition to any special marking required by the contract or order, containers shall be marked in accordance with the requirements of MIL-STD-129.

6. NOTES

* 6.1 Intended use. The Type B-9 silicon rectifier is intended for use on the ground to supply electrical energy to aircraft with 28-volt DC electrical systems.

6.2 Ordering data. Procurement documents should specify the following:

a. Title, number, and date of this specification.

b. Selection of applicable levels of preservation, packaging, and packing (see 5.1 and 5.2).

* 6.3 The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Custodian:
Air Force - 82

Review Activity:
Air Force - 82

Preparing Activity:
Air Force - 82

Project No. 6130-F090

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 22-R255

INSTRUCTIONS: This sheet is to be filled out by personnel, either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.

SPECIFICATION

ORGANIZATION

CITY AND STATE | CONTRACT NUMBER

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

   A. GIVE PARAGRAPH NUMBER AND WORDING.

   B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

   ☐ YES ☐ NO *(If "yes", in what way?)*

4. REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)*

SUBMITTED BY *(Printed or typed name and activity - Optional)* | DATE

DD FORM 1 JAN 66 1426

REPLACES EDITION OF 1 OCT 64 WHICH MAY BE USED.

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