MIL-R-52351A(EL)
15 February 1968
Superseding
MIL-R-52351(MO)
2 March 1964

MILITARY SPECIFICATION
REFLECTOR, LIGHT, PARABOLIC, 30-INCH DIAMETER
FOR
AN/TVS-3

1. SCOPE

1.1 This specification covers one type of 30-inch diameter parabolic reflector.

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.

SPECIFICATIONS

MILITARY

MIL-P-2610	- Polish, Metal, Liquid, Mirror, Searchlight, Nonfreezing Type
MIL-E-17555	- Electronic and Electrical Equipment and Associated Repair Parts, Preparation for Delivery of
MIL-L-55574	- Lamp, Xenon, Short-Arc, 10/15/20 KW

FSC 5855

STANDARDS

MILITARY

MIL-STD-105	- Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-130	- Identification Marking of U. S. Military Property
MIL-STD-810	- Environmental Test Methods for Aerospace and Ground Equipment

DRAWINGS

ECOM

SC-C-599446	- 30-Inch-Diameter Parabolic Reflector

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

2.2 Other publications. - The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated the issue in effect on date of invitation for bids or request for proposal shall apply.

ILLUMINATING ENGINEERING SOCIETY

Illuminating Engineering, Vol LVII, No. 3, March 1962

(Application for copies should be addressed to the Illuminating Engineering Society, 345 East 47th Street, New York, N.Y. 10017.)

Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal Agencies.

3. REQUIREMENTS

3.1 Description. - The reflector shall be of general uniform thickness. Irregularities in thickness due to roughness of the back or convex surface.

3.2 First Article Model. - The supplier shall furnish two reflectors within the time frame specified in the contract or purchase order to prove, prior to starting production, that his production methods will produce reflectors that comply with the requirements of this specification. Examination and tests shall be those specified herein. Any changes or deviations from the first article model shall be subject to the approval of the contracting officer. Approval of the first article model by the activity concerned shall not relieve the supplier of his obligation to furnish reflectors conforming to this specification.

3.3 Initial production reflector. - Two initial production reflectors, selected at random by the Government, from the first 10 reflectors being produced from production tooling, shall be inspected as specified in 4.4 to determine conformance to the requirements of this specification. Acceptance of the initial production reflectors shall not exclude the remaining reflectors from inspection and acceptance levels specified in section 4.

3.4 Drawings. - The drawings forming a part of this specification are engineering design drawings. The contractor is responsible for preparing his own shop drawings. Where tolerances prescribed could cumulatively result in improper fit, assembly, and operation of the reflectors. No deviation from the prescribed dimensions or tolerances is permissible without prior approval of the contracting officer.

3.5 Fabrication. - The reflectors shall be fabricated in accordance with drawing SC-D-599446 and as specified herein. Material shall be as specified in the applicable drawing. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification.

3.6 Finish. - The concave reflective surface shall be finished to produce an optically efficient first surface reflector. Reflectors having scratches that are so fine that they show a smooth edge and no structure between the edges when examined with a 10 power magnifier will be acceptable. The reflective surface shall be corrosion resistant and shall resist tranish or oxidation from contact with corrosion-inducing atmosphere, salt spray, and the radiation generated by the light source of the searchlight.

3.7 Temperature. - The reflector shall show no distortion which will appreciably alter the efficiency of a reflected beam of light under-service conditions more than 5 percent in any characteristic within a temperature range from minus 65° F to plus 350° F. Normal optical characteristics shall be taken as those found at 75° F plus or minus 5° F. The reflector shall withstand any forces induced internally through storage at any temperature from minus 80° F to 350° F without damage or permanent distortion of the reflector.

3.8 Sphere of Confusion. - The sphere of confusion of the reflector shall be not greater than that specified in the applicable drawing when tested in accordance with 4.6.1.

3.9 Spectral reflectivity. - Spectral reflectivity of the reflector shall be in accordance with the applicable drawing when tested in accordance with 4.6.2.

3.10 Measurements. -When the reflector is rough on the convex surface , the thickness dimension specified in the applicable drawing shall be the minimum measured thickness through the base of the depression, and the tolerance specified shall be on this measurement.

3.11 Identification Marking. - The reflectors shall be identified in accordance with Standard MIL-STD-130. The marking shall include the nominal size, rated focal length, and actual weight of thr reflector. The marking shall be vonfined within 2 inches of the reflector rim and shall be on the back surface of the reflector.

3.12 Vibration. - The reflector shall withstand rough usage as encountered when installed in a searchlight and transported cross country in a military vehicle.

3.13 Workmanship. - Reflector assemblies shall be uniform in quality and shall be free from chips, burrs, sharp edges, crazing, orange peel effects, or other defects that may adversely affect its intended function. All edges shall be rounded or chamfered.

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, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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 Classification of Inspection. - Inspection shall be classified as follows:

a. First Article Model Inspection (see 4.3).

b. Initial Production Inspection (see 4.4).

c. Quality Conformance Inspection (see 4.5).

d. Inspection Comparison Examination (see 4.7).

4.3. First Article Inspection.

4.3.1 Examination. - Each reflector shall be examined for defects in accordance with Table I.

TABLE I - EXAMINATIONS

MAJOR	REQUIREMENT PARAGRAPH
101. Components missing or not as specified	3.5
MINOR	
201. Waviness or roughness on reflective surface	3.1
202. Dimensions not as specified	3.4
203. Marking incorrect, missing or improper	3.11
204. Rough projections or sharp edges	3.13
205. Discoloration or scratches in reflective surface	3.6
206. Material not as specified	3.5

4.3.2 Tests. - Upon successful completion of the examination specified in 4.3.1 the first article models shall be subjected to the tests in Table II. Tests shall be conducted in the order listed. Failure of any test shall be cause for rejection.

TABLE II - FIRST ARTICLE MODEL TEST SCHEDULE

TEST	TEST PARAGRAPH	REQUIREMENT PARAGRAPH
Sphere of confusion	4.6.1	3.8
Spectral reflectivity	4.6.2	3.9
Temperature	4.6.3	3.7
Radiation Exposure	4.6.4	3.6
Salt-water corrosion	4.6.5	3.6
Staining	4.6.6	3.6
Vibration	4.6.7	3.12

4.4 Initial production inspection. - When specified (see 3.3) two initial production reflectors shall be selected at random by the Government from the first ten (10) reflectors being produced from production tooling, shall be examined as specified in Table I, and shall be tested as specified in Table II to determine conformance to the requirements of this specification. The inspection will be performed by the contractor under supervision of a representative of the contracting officer. Acceptance of the initial production reflectors shall not exclude the remaining reflectors from the quality conformance inspection and acceptance provisions specified in section 4.

4.4.1 Inspection failure . - Failure of an initial production reflector o meet any requirement specified herein during and as a result of the examination and tests specified in 4.4 shall be cause for rejection of the initial production reflectors and shall be cause for refusal by the Government to continue acceptance of production reflectors until evidence has been provided by the supplier that corrective action has been taken to eliminate the deficiencies. Correction of such deficiencies shall be accomplished by the supplier at no cost to the Government on reflectors previously accepted and produced under the contract. Any deficiencies found as a result of the initial production inspection will be considered prima facie evidence that all reflectors accepted prior to the completion of initial production inspection are similarly deficient unless evidence to the contrary is furnished by the supplier and such evidence is acceptable to the contracting officer.

4.5. Quality Conformance Inspection

4.5.1 Examination. - Each reflector shall be examined in accordance with Table I. Presence of one or more defects shall be cause for rejection.

4.5.2 Tests .

4.5.2.1 Group A. - Each reflector shall be tested in accordance with Table III. Failure of any test shall be cause for rejection.

TABLE III GROUP "A" TEST SCHEDULE

TEST	TEST PARAGRAPH	REQUIREMENT PARAGRAPH
Sphere of Confusion	4.6.1	3.8

4.5.2.2 Group B. - Group B tests shall be conducted on reflectors selected from units which have passed the examination and tests in 4.5.1 and 4.5.2. Sampling shall be in accordance with MIL-STD-105; AQL 2.5 percent defective, inspection level S-3. Tests shall be conducted in accordance with Table IV. Failure of any test shall be cause for rejection.

TABLE IV GROUP "B" TEST SCHEDULE

TEST	TEST PARAGRAPH	REQUIREMENT PARAGRAPH
Spectral Reflectivity	4.6.2	3.9

4.5.2.3 Group C. - This inspection shall consist of the tests specified in Table V and shall be performed on sample units that have been subjected to and met groups A and B inspection. Sample units shall be selected in accordance with 4.5.2.3.1.

The latching mechanisms, provided on the front operating panel to

3.12 Chassis latching mechanism - 7

4.5.2.3.1 Sampling for Inspection. - One sample reflector shall be selected at ramdon for all inspections in Table V from each 50 reflectors produced or every 60 days, whichever occurs first. The first samples selected shall be at the start of the contract from the first quality conformance inspection production lot.

TABLE V GROUP "C" TEST SCHEDULE

TEST	TEST PARAGRAPH	REQUIREMENT PARAGRAPH
Temperature	4.6.8	3.7
Radiation exposure	4.6.4	3.6
Salt-water corrosion	4.6.5	3.6
Straining	4.6.6	3.6

4.5.2.3.2 Noncompliance. - The contractor shall immediately report in writing each group C failure occurrence, including details of the failure and characteristics affected. The contractor shall immediately investigate the cause of failure and further report the results of investigation and details of the proposed corrective action on (i) the process and materials, as applicable, and (ii) all units of product which were manufactured under the same conditions and which the Government considers subject to the same failure. Reports shall be forwarded to the responsible technical activity designated in the contract through the Quality Assurance Representative. After corrective action has been taken, additional sample units shall be subjected to group C inspection (all inspections,or the inspections which the sample failed, at the option of the Government) and groups A and B inspection may be reinstituted; however, final acceptance and shipment will be withheld until the group C reinspection results have shown that the corrective action was effective.

4.5.3 Reinspection of Conforming Group B and Group C Sample Units. Unless otherwise specified, sample units which have been subjected to and passed both group B and group C inspection may be accepted on contract or order provided all damage is repaired and the sample units are resubjected to and pass Group A inspection.

4.6 Test Procedure. - Unless otherwise specified all tests shall be performed at plus 70 degrees F, plus or minus 5 degrees F. Light measurements and ambient temperatures during testing shall be recorded using recording instruments having not less than 1.0 percent accuracy. All meters used during test shall have been calibrated within 60 days of start of testing and thereafter as required but at intervals not to exceed 90 days.

4.6.1 Sphere of confusion. - The zero-length searchlight photometry system illustrated in "Illuminating Engineering", Vol LVII, No. 3, March 1962 or equivalent system approved by the contracting officer, shall be used throughout this test. The test facility consists of a goniometer to position and rotate the test reflector and a collimator mirror to accept and focus the reflector beam, For a sphere-of-confusion measurement, a point source of light is placed at the focal point of the reflector. This light beam, after being reflected and collimated, is accepted by an integrating sphere positioned at the focal point of the collimator mirror. The aperture of the integrating sphere is adjusted to an opening which by previous calibration corresponds to intercepting 100 percent light output of the reflector. The light output from the integrating sphere is measured by a light cell and recorded as the 100 percent light output of the reflector. At this point, the integrating sphere aperture is adjusted to an opening which also by previous calibration corresponds to the aperture necessary to fulfill a sphere of confusion of 0.070 inches at the reflector. The light output (energy) collected by the sphere is again measured, and the percent of energy transmission derived from the ratio of the two measurements constitutes the sphere of confusion in terms of percent of energy transmission. A sphere of confusion less than 90 percent shall constitute failure of this test.

4.6.2 Spectral reflectivity. - The spectral reflectivity shall be measured with a Beckman Model DU Spectrophotometer or an equivalent instrument approved by the contracting officer. Reflectivity measurements shall be made on samples from the circular portion removed to form the center hole. Reflectivity measurements shall be made at wavelengths of 550 and 1,000 millimicrons plus or minus 20 millimicrons. Values less than 76 percent at 500 millimicrons or less than 86.5 percent at 1,000 millimicrons shall constitute failure of this test.

4.6.3 Temperature. - The reflector shall be subjected to five temperature cycles, each consisting of the following with humidity uncontrolled.

a. Store the reflector at minus 80 degrees F for 2 hours.

b. Within 1 hour, raise the temperature to 350 degrees F.

c. Maintain temperature of 350 degrees F for 2 hours.

d. Within 2 hours, reduce the temperature to minus 80 degrees F.

Upon completion of the fifth cycle, the reflector shall be removed from the test chamber and permitted to return to room temperature. The reflector shall then be tested as specified in 4.6.1 and 4.6.2. Any evidence of damage or any reflector not meeting the tests specified in 4.5.1 and 4.6.2 shall constitute failure of this test.

4.6.4 Radiation exposure . - The reflector shall be exposed to the radiation from a 20 KW xenon lamp conforming to MIL-L-55574 located with the brightest spot of the arc at the focal point of the reflector and operating at the 20 KW power level, for a period of 100 hours. After 100 hours of operation, the reflector shall be tested as specified in 4.6.1 and 4.6.2. Evidence of permanent damage or deterioration of the reflective surface shall constitute failure of this test.

4.6.5 Salt-water corrosion. - The entire reflecting surface shall be polished with a polish conforming to MIL-P-2610 and the reflector shall be submitted to a salt spray of 20 percent salt and distilled water for 100 hours. Upon completion of 100 hours exposure, polish the reflective surface with a polishing compound conforming to MIL-P-2610. Evidence of corrosion or permanent damage or deterioration of the reflective surface shall constitute failure of this test.

4.6.6. Staining. - The reflector shall be thoroughly polished on the reflective surface with polish conforming to MIL-P-2610 and subjected to 1 hour in concentrated washed and dried hydrogen sulfide gas (H_2S). At the end of this period, the reflector shall be removed, and any stains appearing on the reflective surface shall be completely removed with a polish conforming to MIL-P-2610. Thus cleaned, the reflector shall be tested as specified in 4.6.1 and 4.6.2. Failure to meet the requirements specified in 3.6 shall constitute failure of this test.

4.7 Inspection comparison examination and tests. - The Government may select reflectors at any time during the contract production period and subject the reflectors to the examination and tests specified in 4.3 to reveal any manufacturing deficiencies and to evaluate design and workmanship for conformance to prescribed requirements. The tests will be performed by the Government at a site selected by the Government. Reflectors selected for comparison examination and tests will not include reflectors previously selected and tested in accordance with 4.4. Failure of any reflector when examined and tested as specified shall be cause for refusal by the Government to continue acceptance of reflectors until objective evidence has been provided by the contractor that corrective action has been taken to eliminate the deficiency.

4.8 Inspection of preparation for delivery. - Preservation, packaging, packing, and marking as specified in 5.1 shall be inspected as specified in MIL-E-17555. Failure to pass any portion of the inspection shall constitute failure of the test.

5. PREPARATION FOR DELIVERY

5.1 Preservation, packagin, packing and marking. -Reflector shall be preserved packaged, packed and marked in accordance with MIL-E-17555 for level A or C packaging as specified (see 6.2) and level A, B, or C packing as specified (see 6.2).

6. NOTES

6.1 Intended Use. - The reflectors are intended for use with the 30-Inch-Diameter, General-Purpose, 20 KW Xenon, Infrared Searchlight, AN/TVS-3.

6.2 Ordering Data. - Procurement documents should specify the following:

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

b. Level of preservation, packaging, packing, or marking other than that required by 5.1.

6.3 Supersession Data. - This specification includes the requirements of MIL-R-52351(MO), dated 2 March 1964.

CUSTODIAN	PREPARING ACTIVITY
ARMY - EL	ARMY - EL
REVIEWING ACTIVITY	USER ACTIVITY
ARMY - MI, AT, WC	ARMY - MD, MU, ME

Project 5855-A008

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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 MIL-R-52351A(EL) REFLECTOR, LIGHT, PARABOLIC, 30-INCH DIAMETER FOR AN/TVS-3

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

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