26 January 1938

NRL Report No. B-1422

FR-1422

NAVY DEPARTMENT

BUREAU OF ENGINEERING

Report of Test

on

Spotlight, Incandescent

Manufactured by

S and M Lamp Company
118 W. 36 Street
Los Angeles, California

and

Submitted Via

Cunningham & Lawrence
Washington, D.C.

NAVAL RESEARCH LABORATORY
ANACOSTIA STATION
WASHINGTON, D.C.

Number of Pages: Text - 4 Plates - 2

Authorization: BuEng. ltr. JJ17-S-14-(8-16-Ds) of 18 Sept. 1937.

Date of Test: November and December 1937.

Prepared by: _____
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Reviewed by: _____
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Approved by: _____
H. M. Cooley, Captain, U.S.N., Director.

Distribution:
BuEng. (5)

bmb

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APPENDICES

AUTHORIZATION FOR TEST

1. This test was authorized by reference (a) and another reference pertinent to this problem is listed as reference (b).

Reference: (a) BuEng. ltr. JJ17-S-14(8-16-Ds) of 18 Sept. 1937.
(b) Specifications 17-S-14(INT) of 15 July 1937.

OBJECT OF TEST

2. The object of this test was to determine how closely the subject spotlight complied with the specifications, reference (b), its suitability for naval use, and to obtain data for the development of specifications.

ABSTRACT OF TEST

3. The sample spotlight, following focal adjustment, was tested in the order outlined under the specifications. Although not required under the specifications, a salt spray test, conducted as outlined under paragraph 9, was made to determine its resistance to corrosion and for specification development purposes.

Conclusions

(a) This sample spotlight, except for failure to comply with the maximum allowable beam diameter of 45 feet at 1650 feet, complies with the major requirements of the specifications. However, there are several minor deficiencies which are noted under paragraph 12 of this report.

(b) It is noted that the bolts serving as spindles do not form satisfactory locking devices. Although they may be loosened to permit the barrel to be elevated or depressed, one or the other frequently tightens and interferes with further movement. In operation, it is desirable to maintain some friction in the bearings, particularly when, as in this case, the barrel is not balanced. A better method would be to provide one or more split bearings having wing nuts for tightening.

(c) This spotlight is rugged in design, of first class workmanship, and incorporates a satisfactory focusing adjustment. In addition, it can be rotated through 360° in the horiz ontal plane and depressed or elevated in excess of 90°.

Recommendations

(a) It is recommended that this type of spotlight, intended for power-boats, be considered for naval use, providing the beam diameter is satisfactory and the deficiencies, noted under paragraph 12, are corrected.

(b) It is also recommended that the specifications be amended to define the projected light beam for purposes of beam width measurement. It is suggested that any part of the projected light which has a foot candle value of less than 10 percent of the maximum, be not considered part of the beam. By this method the projected beam of this spotlight would be 129 feet at a distance of 1650 feet, instead of the larger value given under test values.

(c) It is further recommended that the salt spray test, conducted as specified under SGS(65)-103a, of 1 June 1936, be included in future specifications.

DESCRIPTION OF MATERIAL UNDER TEST

4. This spotlight is manufactured by the S and M Lamp Company, Los Angeles, California. A full description of the sample is given by the manufacturer's bulletin, enclosed herewith as Plate 2.

5. The spotlight is designed for a 12 volt 100 CP double contact lamp. For test purposes, a 50 CP, 6-8 volt lamp was substituted as a 12 volt lamp is not acceptable under the present specifications.

METHOD OF TEST

6. The intensity and diameter of the projected beam were measured in a totally dark room when the lamp was supplied with current at a potential of 6 volts. The instrument used was a "Weston Photronic" illuminometer, Model 603.

7. The reflector was then removed and immersed in a 20 percent saline solution at 40° C for a period of 24 hours after which it was washed and placed in a compartment where the temperature was raised from 40° C to 80° C, then cooled to 40° C each hour for 5 consecutive hours. These tests were followed by dark room measurements for light intensity in order to determine their effect upon the reflecting surface.

8. The assembled light was next subjected to a stream of fresh water, 1 inch in diameter, under a head of approximately 25 feet, from a distance of 10 feet for a period of 5 minutes, in order to determine its splash-proofness.

9. The sample was then placed in a salt spraying machine and subjected, under ultra-violet light, to a 20 percent hot (57° C) salt spray for a period of 3 minutes, followed by a hot (57° C) air blast for a period of 3 minutes. This cycle was repeated for 100 consecutive hours in order to determine its resistance to corrosion.

10. An inspection of the sample for quality of workmanship and suitability of materials concluded the tests.

RESULTS OF TEST

11. Requirements	Test Values
Beam diameter at 550 yards, Par.E-11: Not more than 45 feet in diameter at 550 yards.	* 169.8 feet diameter computed from dark room measurements.
Light intensity at 32 feet at center of beam.	38.1 foot candles. (Dark room measurements.)
Mirror deterioration: Shall be such that a minimum of 28 foot candles is obtained following the immersion and heat tests specified under Par. F-2a.	No change.

Requirements	Test Values
Splash-proofness: Par. F-2c	No leaks occurred.
Salt spray test: Not required.	No corrosion was detected on any of the parts. However, the black paint came off in some places.

* Denotes failure to comply with the specifications.

12. Under inspection of the spotlight for conformance with the specifications, in the matter of design, materials, dimensions and workmanship, the following deficiencies were noted:

(a) The maximum overall height allowed is exceeded by 1 inch, and the maximum barrel diameter is exceeded by 1/2 inch.

(b) The spotlight is finished in a black paint while polished natural metal is required. Following the salt spray test, this paint had lost its adhering property and flaked off in some places.

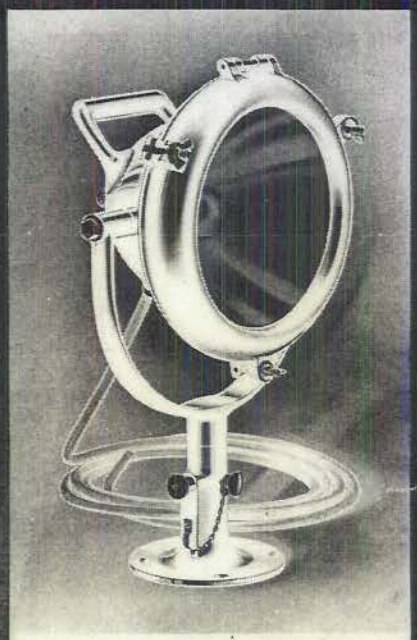
(c) The barrel locking device requires the use of a tool.

(d) The nameplate is not in accordance with the specifications.

(e) The spotlight is equipped with 10 feet of two conductor (2583 cir. mils) waterproof cord and a packing gland. The outside diameter of the cable is approximately 0"43. The present specifications do not require it to be wired, but do require a packing gland for type DCP1-1/2 cable.

Plate 1

No. 939 MARINE SEARCH-LITE
For Power Lifeboats



No. 939

● The No. 939 Search-Lite was designed to meet the specifications of the United States Bureau of Marine Inspection and Navigation, and the British Board of Trade.

The No. 939 has been officially approved by the U. S. Bureau of Marine Inspection and Navigation, for use on Power Life Boats.

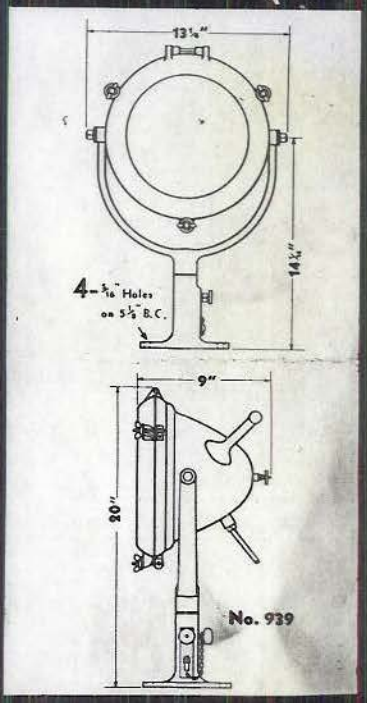
This approval speaks for itself, as to the construction and performance of this new-type Marine Search-Lite.

The No. 939 is fully adjustable in all directions, and can be easily removed from the special base for stowing. It can not be removed accidentally. In case of emergency, the No. 939 is slipped into the base in a split-second.

The heavy port-hole-type door provides maximum accessibility for lamp replacements.

External focusing device is easily operated.

The No. 939 is fully weatherproof, in every respect, and is a masterpiece in the art of Marine Search-Lite construction.



SPECIFICATIONS

REFLECTOR	Spun Brass, highly polished and Chromium plated. 8¼" inside diameter.
BODY	Spun Brass, with cast brass door frame.
DOOR	Cast Brass, machined to size. (Door pivots on heavy "floating" hinge pin, and is seated on machined door frame, with two water-proof gaskets.)
DOOR CLAMPS	Brass, with thumb nuts.
HANDLE	Cast Brass, securely attached to body.
YOKE	Cast Brass, with swivel stud (all one piece).
BASE	Cast Brass, with spring-controlled locking plunger and set-screw. (Plunger eliminates accidental removal of Search-Lite from base, but permits rapid intentional removal and replacement.)
CORD	10 ft. of two-conductor, 16 ga., 60% rubber jacket, water-proof cord.
ENTRANCE FITTING	Weather-proof, packing gland type.
LAMP	Mazda, 12 Volt, 80 Watt, 100 Candlepower, Double Contact.
SOCKET	Heavy duty, with direct contacts.
FOCUSING DEVICE	External, permitting easy adjustment of beam spread.
LENS	Heavy shatter-proof, held in place by special water-proof compound, supplemented by brass retaining spring.
BEAM PROJECTION	6,500 feet.
BEAM CANDLEPOWER	335,000.
WEIGHT	Net—26 pounds. Shipping—47 pounds.

S & M LAMP CO. LOS ANGELES

"SINCE 1909"

Marine Division

PLATE 2

PRINTED IN U. S. A. NOVEMBER 1ST, 1936