

NAVY DEPARTMENT  
BUREAU OF ENGINEERING

REPORT OF TEST

on

BUZZER, TYPE A-3

Submitted by

Navy Yard, Portsmouth, N. H.

NAVAL RESEARCH LABORATORY  
ANACOSTIA STATION  
Washington, D. C.

Number of Pages:                      Text - 5                      Plates - 2.

Authorization:                      Bu. Eng. Ltr. S65-4/L5(7-22-Ds)  
of 24 July 1937.

Date of Test:                      August 1937.

Tested by:

\_\_\_\_\_  
J. R. Coomes,  
Sr. Eng. Aide.

APPROVED FOR PUBLIC  
RELEASE - DISTRIBUTION  
UNLIMITED

Prepared by:

\_\_\_\_\_  
W. B. Roberts,  
Pr. Eng. Aide,  
Chief of Section.

Reviewed by:

\_\_\_\_\_  
R. A. Gano,  
Lieutenant, U. S. N.

Approved by:

\_\_\_\_\_  
H. M. Cooley,  
Captain, U. S. N.,  
Director.

Distribution:

Bu. Eng. (5).

mts

## TABLE OF CONTENTS

<u>SUBJECT</u>	<u>PAGE</u>
1. Authorization for Test	1
2. Object of Test.	1
3. Abstract of Test.	1
(a) Conclusions.	1-a
(b) Recommendations.	1-b
4. Description of Material under Test.	2
5. Method of Test.	2
6. Results of Test.	3
7. Conclusions.	5

## APPENDICES

Photograph of sample buzzer.	Plate 1.
Photograph of sample buzzer, case cover removed.	Plate 2.

AUTHORIZATION FOR TEST.

1. This test was authorized by reference (a) and other references pertinent to this problem are listed as references (b) and (c).

Reference: (a) Bu.Eng.Ltr. S65-4/L5(7-22-Ds) of 24 July 1937.  
(b) Specifications SGS(65)-103a, Buzzers Interior Communication, dated 1 June 1936.  
(c) Portsmouth Drwg, 29583-ALT. O., Bureau File No. 11-T-1196-L.

OBJECT OF TEST.

2. The object of this test was to determine conformance of the subject buzzer with the specifications, reference (b), and its suitability for Naval use.

ABSTRACT OF TEST.

3. The subject buzzer was set up at this Laboratory in suitable test circuits where its performance was carefully observed while under test for conformance with the specifications. All tests were made in the order specified and were concluded with an inspection of the sample buzzer to ascertain whether it was in accordance with the specifications in the matter of materials, design and workmanship.

CONCLUSIONS.

(a). The subject buzzer complies with the requirements of the specifications, reference (b), except for those noted by an asterisk under "test values", paragraph 16.

RECOMMENDATIONS.

(a) It is recommended that this type of buzzer be approved for Naval use, subject to the correction of the minor deficiencies noted in this report.

(b) It is further recommended that a condenser be incorporated to prevent the radiation of radio frequency energy. This is a requirement under the latest specifications for bells and would seem to be equally important in the case of buzzers.

#### DESCRIPTION OF MATERIAL UNDER TEST.

4. This buzzer, shown by Plates 1 and 2, was manufactured and submitted for test by the Navy Yard, Portsmouth, New Hampshire, as a Navy Type A3-115 volt, D.C. buzzer, Portsmouth Drwg. No.29583, Bureau File No. 11-T-1196-L.

5. The buzzer is of the vibrating type and embodies a set of adjustable contacts for interrupting the current. It employs a single form wound coil located on a laminated core of "U" shape. The armature is of flat steel and completes the magnetic circuit. The noise is produced by the striking of the armature against the pole pieces when the coil is energized and against the limiting screw when deenergized. The entire mechanism and a phenolic terminal block are mounted on bosses equipped with steel inserts located in the bottom of the aluminum alloy case.

6. The case cover is of cast HE metal and has three (3) concentric grooves which contact a 3/16 inch square rubber gasket partly recessed in the rim of the case. Steel inserts are provided in the rim of the case for the brass cover-securing screws.

7. The case is provided with four (4) mounting lugs and two (2) bosses tapped for 3/4 inch (IPS) terminal tubes.

8. The unit weighs 2 lbs. 14 oz., is 5.5 inches in diameter and 2.5 inches in depth. It is finished in gray on the outside and black on the inside.

#### METHOD OF TEST.

9. The buzzer, as received, was first tested for power consumption, sound output, and pitch of note when energized at its rated voltage.

10. It was next tested for shock integrity by placing it on a Bureau of Engineering standard shock machine and given the required number of 250 foot pound blows while energized and deenergized and mounted in the positions required under subparagraph F-2g(3).

11. Following, the buzzer was tested for endurance consisting of an operation cycle of "one minute on" and "one minute off" for an uninterrupted period of 1400 cycles. This test was conducted in two periods, the first 700 cycles at an ambient temperature of 70° C. and the second 700 cycles at 0° C. During these periods the temperature rise of the winding was obtained, using the resistance method.

12. Then followed tests for operation of the buzzer at 10 percent under voltage and 10 percent over voltage, (103.5V.-126.5V.) when inclined 45° from the vertical in all planes.

13. The buzzer was then subjected to a dielectric test of 1500 volts, A.C. 60 cycles, applied continuously for a period of one minute, followed by an insulation test, using a 1000 volt megger.

14. The unit was then tested for watertightness by immersing it in water to a depth of 3 feet for a period of 12 hours, followed by a dielectric test of 500 volts, A.C. 60 cycles, applied continuously for a period of one minute, and an insulation test, using a 500 volt megger.

15. An inspection of the buzzer, as to its conformance with the specifications in the matter of materials, design and workmanship, concluded the test.

#### RESULTS OF TEST.

16. The test results obtained when the buzzer was tested in the specified order for type approval, were as follows:

<u>Requirements</u>	<u>Test Values</u>
Voltage: 115 Volts.	115 Volts.
Current: Direct.	Direct.
Amperes: Not over 5 watts.	*5.8 watts.
Sound pressure output: Not less than 35 decibels.	44 decibels, measured 18 feet from the buzzer and on the axis thereof in a sound proof room.
Pitch of note: 60 to 500 CPS.	76 CPS, 38 current impulses per second by oscillograph.
Endurance: Shall be capable of operating under the conditions required under subparagraph F-2h(1) and F-2h(2).	Satisfactory operation throughout the required tests.
Temperature rise: Shall not exceed 30° C, at an ambient temperature of 70° C., during the endurance test periods.	21.4° C. rise, using the resistance method.
Shock integrity: Shall withstand 20 shocks of 250 foot pounds each under the conditions specified in subparagraph F-2g(3).	Satisfactory results under the specified tests.
Inclination: Shall operate in any plane 45 degrees from the vertical at 10% under and 10% over rated voltage.	Satisfactory results under the specified tests.

Dielectric: Shall withstand 1500 V.A.C. 60 cycles, preceding the immersion test, and 500 V.A.C. 60 cycles, following.	No breakdown under the specified tests.
Insulation resistance: Shall be not less than 10 megohms preceding the immersion test, and 1 megohm following.	Before- - - - -60 megohms. After- - - - -50 megohms.
Nameplates: Shall be in accordance with Specification 17N1.	*None furnished, raised and stamped lettering substituted.
Terminal block: Shall be of phenolic material equipped with 9-S-1841-L terminal lugs.	Phenolic block equipped with terminal lugs.
Contacts: Shall be of tungsten.	Tungsten contacts.
Weight: Shall not exceed 12 oz.	*2 lbs. 14 oz.
Case and cover material: Case-- aluminum. Cover--BE.	Case- - - - - aluminum. Cover - - - - - BE.

\* Denotes failure to comply with the specifications.

NOTE: The salt spray test, required under subparagraph F-2e(1), of reference (b), was omitted, as the subject buzzer is being shipped to the U.S.S. Wilmington, under NRL Memorandum Invoice No. 26, in compliance with request on Portsmouth Invoice No. 16517X, covering shipment of sample buzzer to the Bureau of Engineering.

CONCLUSIONS:

17. The subject buzzer complies with the requirements of the specifications, reference (b), except for those noted by an asterisk under "test value", paragraph 16.

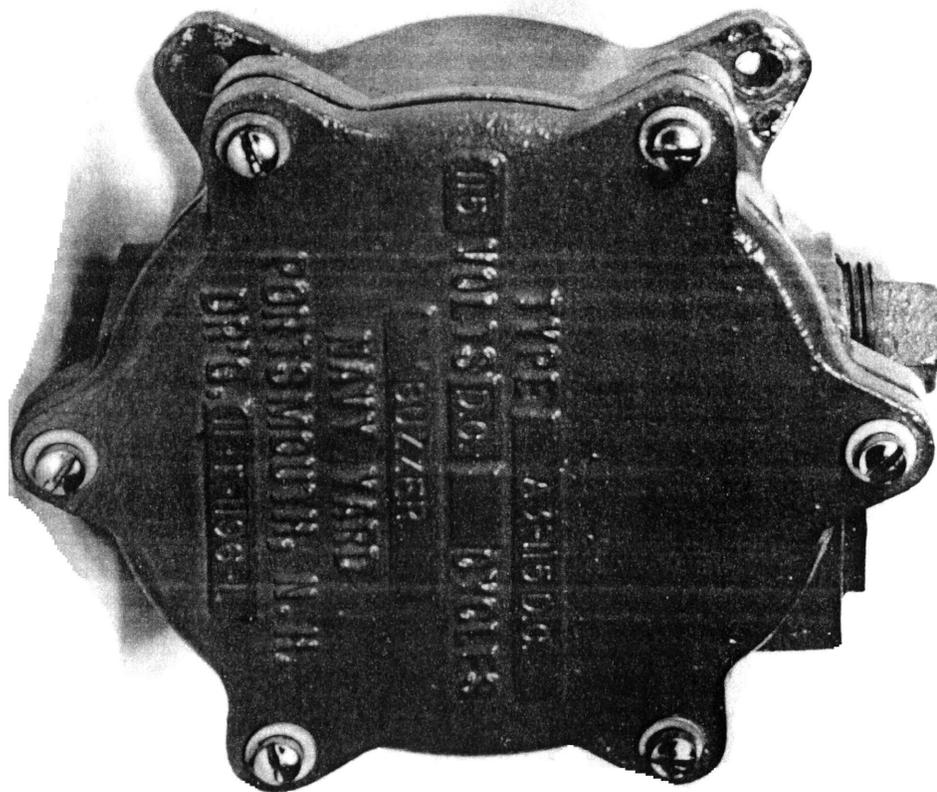


Plate 1

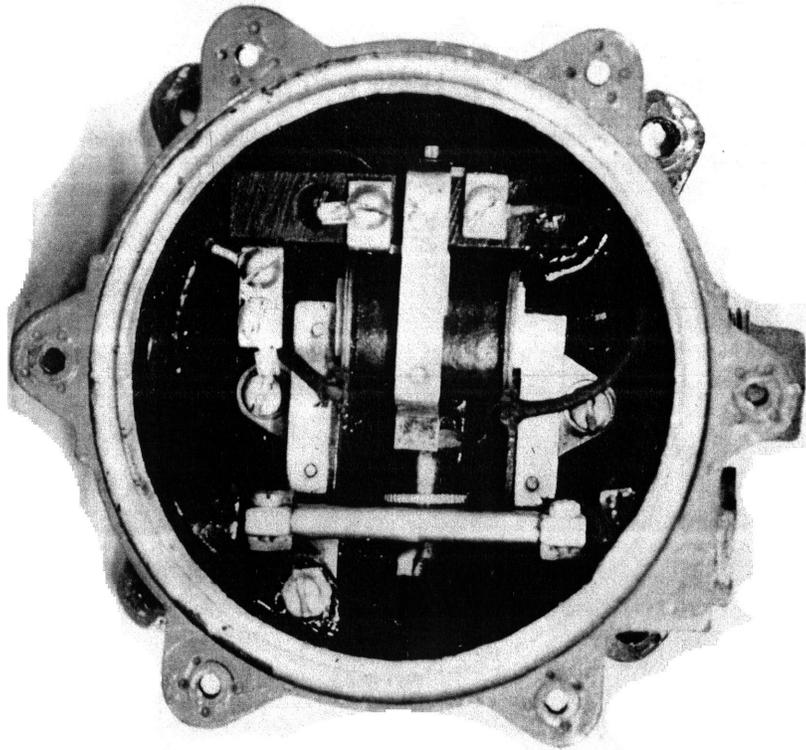
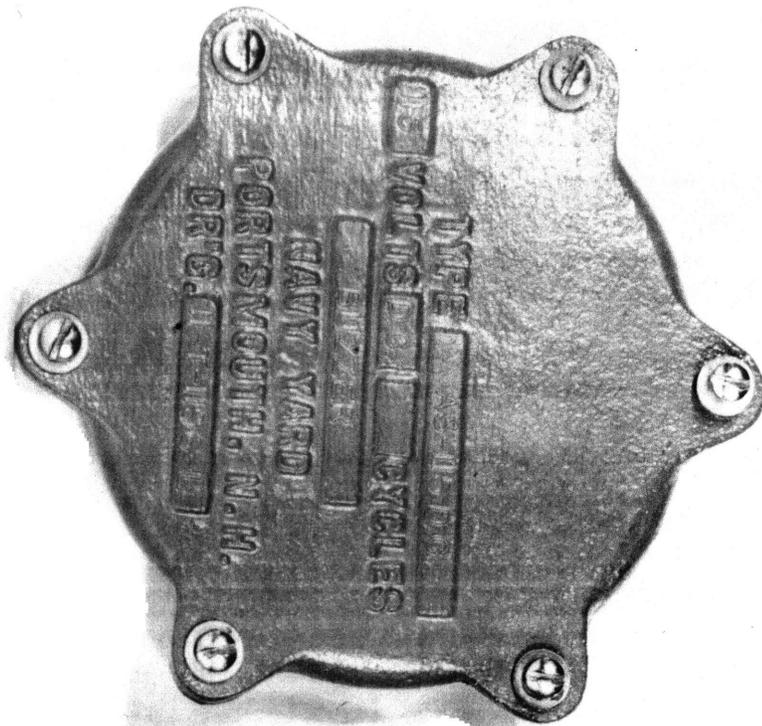


Plate 2