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Bu.Eng.Problem IC-125

NAVY DEPARTMENT
BUREAU OF ENGINEERING

Report of Test

on

Buzzer, Navy Type B-2

Submitted by Holtzer-Cabot Electric Company,
Boston, Mass.

FR 1316

NAVAL RESEARCH LABORATORY
ANACOSTIA STATION
WASHINGTON DC

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Date of Test: August and September 1936.
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AUTHORIZATION FOR TEST

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

Reference: (a) BuEng ltr. S-8445(8-7-Ds) of 10 Aug. 1936.
(b) NRL ltr. S65-4/L5 of 6 May 1936 to BuEng, covering test on horn prior to modification for Naval use.
(c) Specifications SGS(65)-103a - Buzzers - Interior Communication, of 1 June 1936.

OBJECT OF TEST

2. The object in conducting this test was to determine whether the buzzer complied with the specifications, reference (c), and its suitability for the Naval Service.

ABSTRACT OF TEST

3. The subject buzzer was set up at this Laboratory and carefully tested for conformance with the specifications, reference (c). The usual inspection, relative to quality of workmanship and materials, and suitability of design, concluded the test.

CONCLUSIONS

(a) The subject buzzer complies with the specifications in their entirety, except in weight, which is exceeded by 2 pounds.

(b) Under inspection of the buzzer at the conclusion of the test relative to materials and workmanship, it was noted that the lead wires to terminal block are covered with spaghetti and steel screws and lock washers, used internally, are unprotected against corrosion. As to workmanship, it is considered to be first class in every respect.

(c) It is noted that the diaphragm is coated with a maroon color, rubber base material. The diaphragm gasket is cemented to both the diaphragm and case cover with the same material. As these parts are rarely removed, its use appears desirable from the standpoint of watertight integrity.

(d) It is also noted that no steel inserts are provided in the case cover for the diaphragm securing screws and that the drain holes are smaller than the usual 1/8-inch diameter.

RECOMMENDATIONS

(a) In the event the Bureau waives the weight requirement, which is exceeded by 2 pounds, it is recommended that the buzzer be given type approval for Naval use, subject to correction of defects noted under CONCLUSIONS of this report.

DESCRIPTION OF MATERIAL UNDER TEST

4. The buzzer, submitted for type approval and shown by photographs, Plates 1 and 2, is manufactured by Holtzer-Cabot Electric Company, Boston, Mass.

5. It is of the contactless vibratory type consisting of a laminated "U" shaped magnet on which rests on one of its poles a single form winding designed for 115 volts, A.C., 60 cycles.

6. The armature consists of a flat piece of iron riveted to a flat steel spring and secured to an iron bracket mounted to the core assembly with 2 fillister head steel screws equipped with lock washers. An elongated hole in the armature mounting bracket permits regulation of the air gap between the armature and pole pieces.

7. The sound is produced when an iron button, united to the armature, strikes the diaphragm.

8. The buzzer mechanism is supported by an iron bracket secured to a steel mounting plate with 3 fillister head steel machine screws provided with lock washers. The mounting plate is in the form of a disc having a hole in its center to permit the armature button to strike the diaphragm. An elongated hole in the assembly bracket permits adjustment of the distance between the striker and the diaphragm.

9. The cadmium plated steel diaphragm is provided with a flat rubber gasket and secured to the cast aluminum case cover with the use of a spacing ring between it and the mounting plate. The mounting plate is provided with a reinforcing ring and its 6 steel fillister head machine screws thread into the case cover, securing it and clamping the diaphragm.

10. The case is of cast aluminum alloy having 2 bosses tapped for 3/4" standard terminal tubes and 4 mounting lugs having clearance holes for 1/4" bolts. Five projecting ears having threaded steel inserts are provided on the rim of the case. The case cover is also of cast aluminum alloy and has a formed aluminum projector spun into the cover. Three concentric grooves are provided in the surface which contacts the 1/4" square rubber gasket partly recessed into the rim of the case. Compression of the gasket is limited by the projecting heads of the steel inserts.

11. The interior of the case is painted with a priming coat of zinc chromate followed by one or more of aluminum paint and finished with black insulating varnish. The exterior is painted gray over the base coats.

12. A terminal block of phenolic material equipped with 9-S-1841-L lugs is located on the bracket securing the core assembly.

METHOD OF TEST

13. The buzzer was first tested for power consumption, power factor and sound output in decibels at rated voltage and frequency.

14. It was then placed on a Bureau of Engineering shock stand and given 20 shocks of 250 foot pounds each while mounted in the positions required by specifications, reference (c).

15. Then followed the usual test for endurance by operating it 1400 cycles of one minute of operation every alternate minute. The first 700 cycles were conducted at an ambient temperature of 70°C and the second 700 cycles at 0°C. The temperature rise of the winding was determined during this test by the resistance method.

16. It was next tested for its operating characteristics when energized at 10% under rated voltage (103.5 V.) at 65 cycles, and 10% over voltage (126.5 V.) at 55 cycles. Under these conditions, the buzzer was tested for operation when inclined 45° from the vertical in all planes.

17. The insulation resistance was determined by a 1,000 volt megger prior to a dielectric test of 1500 V. A.C., 60 cycles, applied for one minute between all current-carrying parts and ground.

18. Upon completion of all tests, the buzzer was placed in water to a depth of 3 feet for a period of twelve hours to determine its watertightness.

19. An inspection of the buzzer to determine whether the materials, design, and workmanship complied with the specifications concluded the test.

RESULTS OF TEST

20. The test results obtained follow:

<u>Requirements</u>	<u>Test Values</u>
Voltage: 115 volts	115 volts
Current: Alternating	Alternating
Frequency: 60 cycles	60 cycles
Watts: Not over 15	9.8 watts
Power Factor: Not less than 30%	31.2%
Amperes: Not specified	0.27 amperes
Temperature rise: Not more than 30°C at ambient temperature of 70°C.	15.77°C rise by resistance method
Sound output: Shall be not less than 75 db under conditions specified under par. E-5.	79 db measured 18 feet from the buzzer and on the axis thereof in a soundproof room, using General Radio noise meter, Type 559.
Pitch of Note: 60 to 500c.p.s.	120 c.p.s. at 60 cycle input.
Inclination: Shall operate satisfactorily in any plane 45° from vertical at 10% over and 10% under normal voltage.	Satisfactory operation under conditions specified.

Requirements

Test Values

Voltage and frequency variation: Shall operate satisfactorily at 103.5 volts at 65 cycles and 126.5 volts at 55 cycles.	Satisfactory operation under con- ditions specified.
Endurance: Shall operate 700 cycles of one minute, every alternate minute, at ambient temperature of 70°C and 700 cycles at 0°C.	Satisfactory operation under con- ditions specified.
Shock integrity: Shall withstand 20 shocks of 250 foot pounds each under conditions specified under par. F-2g(3).	Buzzer withstood the required test.
Dielectric: Shall withstand 1500 V. A.C., 60 cycles, applied between all current-carrying parts and ground for 1 minute and 500 volts, A.C., 60 cy- cles, following the immersion test.	Complied with.
Insulation resistance: Shall be not less than 10 megohms between any electrical point and ground following the dielec- tric test and 1 megohm following the immersion test.	200 megohms following dielectric test by 1000 V. megger. 100 megohms following immersion test by 1000 V. megger.
Watertight integrity: No leaks shall occur when placed in water to a depth of 3 feet for a period of 12 hours.	Complied with.
Total Weight: Shall not exceed 5 lbs.	*7 pounds.
Windings: Shall be of double silk or cot- ton covered enameled copper wire.	Complied with. (Double silk enameled)
Terminal block and terminals: Shall be of phenolic material equipped with 9-S-1841-L lugs.	Complied with.
Nameplate: Corrosion resisting steel.	Nameplate of corrosion resisting steel, etched lettering.
Painting: One priming coat of zinc chrom- ate paint followed with 2 coats of alum- inum paint prior to finishing coat.	Complied with.
Tap bolts in aluminum alloy: Bolts to be threaded into screwed-in steel bushings.	*Complied with except for diaphragm securing screws.
Diaphragm material: Not specified.	Steel, cadmium plated, finished in maroon 0.025 thickness, 5.50 di- ameter.

Requirements

Dimensions: Not specified.

Test Values

Height - - 7#25

Maximum diameter - 8#25

*Denotes failure to comply with the specifications.

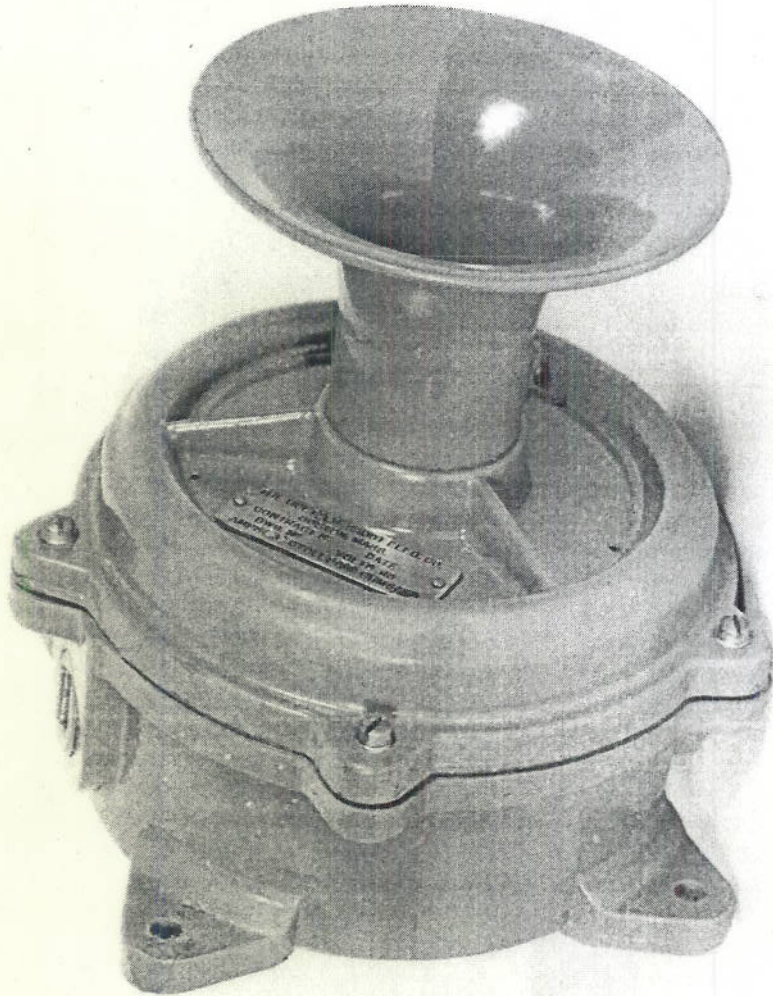
CONCLUSIONS

21. The subject buzzer complies with the specifications in their entirety, except in weight, which is exceeded by 2 pounds.

22. Under inspection of the buzzer at the conclusion of the test relative to materials and workmanship, it was noted that the lead wires to terminal block are covered with spaghetti and steel screws and lock washers, used internally, are unprotected against corrosion. As to workmanship, it is considered to be first class in every respect.

23. It is noted that the diaphragm is coated with a maroon color, rubber base material. The diaphragm gasket is cemented to both the diaphragm and case cover with the same material. As these parts are rarely removed, its use appears desirable from the standpoint of watertight integrity.

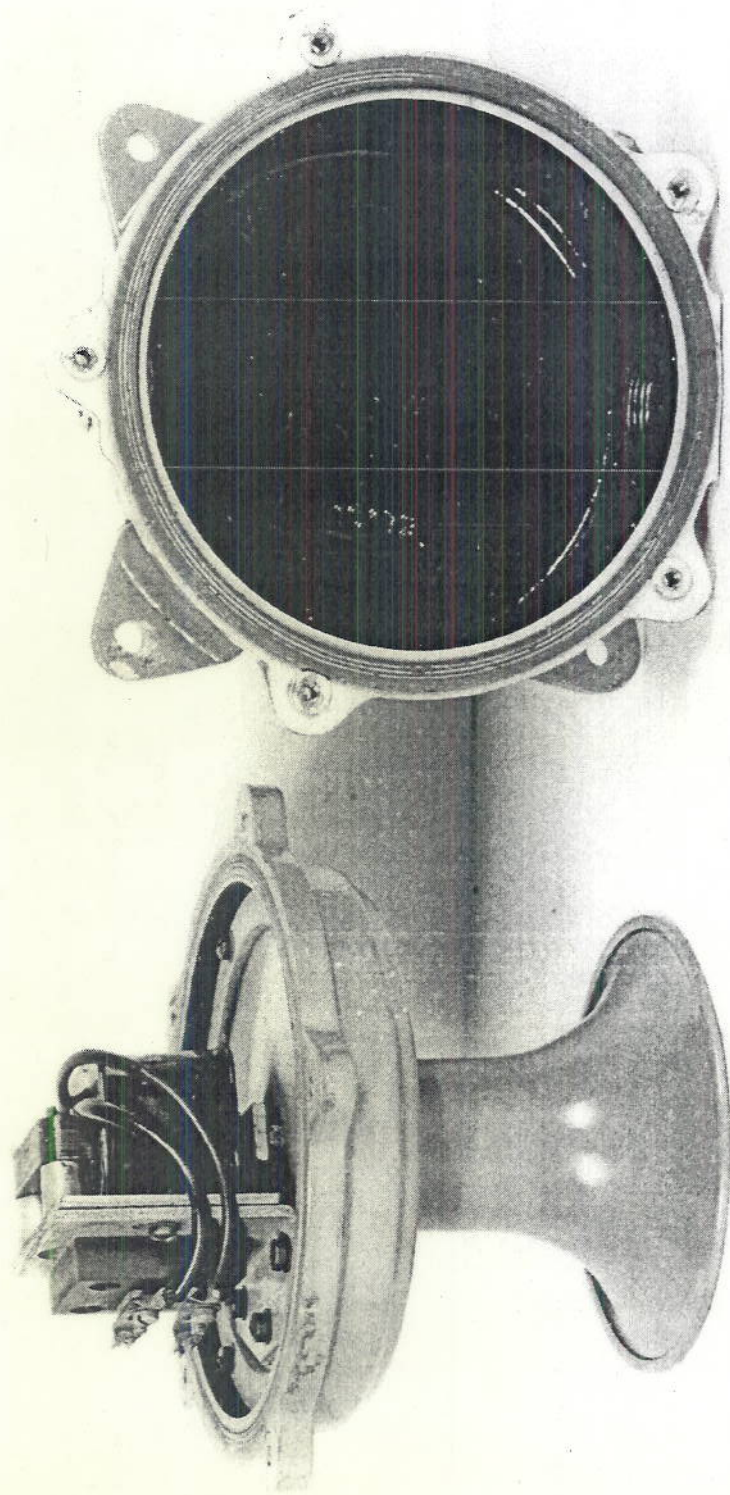
24. It is also noted that no steel inserts are provided in the case cover for the diaphragm securing screws and that the drain holes are smaller than the usual 1/8-inch diameter.



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Plate 1



1772

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