

TABLE OF CONTENTS

<u>Subject</u>	<u>Page</u>
Authorization for Test	1
Object of Test	1
Abstract of Test	1
(a) Conclusions	1a
(b) Recommendations	1b
Description of Material under Test	2
Method of Test	2
Results of Test	2
Conclusions	6

APPENDICES

Photostat of acoustical analysis of sample horns	Plate 1
Photograph of assembled horn	2
Photograph of horn, removed from case	3

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AUTHORIZATION FOR TEST

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

Reference: (a) BuShips let. S65-4 (DYS-3) of 8 November 1940.
(b) Specification 17S11c of 1 May 1940.
(c) Benjamin Electric Mfg. Co. Drwg. 191501.

OBJECT OF TEST

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

ABSTRACT OF TEST

3. The sample horns were set up at this Laboratory in suitable test circuits where their performance was carefully observed for compliance with the specifications. An inspection of the sample to determine compliance in the matter of materials, design, and workmanship, concluded the test.

Conclusions

(a) The subject horns, manufactured by Benjamin Electric Manufacturing Company, Des Plaines, Illinois, as Navy type H-5a, fully comply with the specifications, reference (b).

Recommendations

(a) It is recommended that the subject horns be approved for Naval use.

DESCRIPTION OF MATERIAL UNDER TEST

4. The two sample horns, submitted by Benjamin Electric Manufacturing Company, are identical in design and operate from a supply of 24 volts direct potential. Contacts, shunted by a 0.25 microfarad condenser, are employed for interrupting the circuit.

5. The mechanism is enclosed in a water-tight cast bronze case having a boss tapped for a 3/4-inch (IPS) terminal tube and two (2) mounting lugs cast integral with the case.

6. Further details are shown by drawing, reference (c), and photographs, Plates 2 and 3.

METHOD OF TEST

7. The sample horns, following tests to determine their electrical and acoustical characteristics at rated voltage, were subjected to further tests in the following order:

- (a) Inclination
- (b) Endurance and temperature rise
- (c) Shock
- (d) Vibration
- (e) Dielectric
- (f) Insulation resistance
- (g) Watertightness
- (h) Salt spray

8. The tests were concluded with a careful examination of the samples to determine compliance with the specifications, pertaining to design, quality of workmanship and materials, and any defects resulting from the tests.

RESULTS OF TEST

9. The test results obtained were as follows:

<u>Requirements</u>	<u>Test Values</u>	
	<u>No. 1</u>	<u>No. 2</u>
Voltage: 24 volts	24	24
Current: Direct	Direct	Direct
Amperes: Not specified.	0.62 ampere	0.61 ampere
Watts: Shall not exceed 50 watts.	14.88 watts	14.64 watts
Sound pressure output: Shall be not less than 85 decibels at 18 feet in a soundproof room.	Complied. 93 db total noise	Complied. 96 db total noise

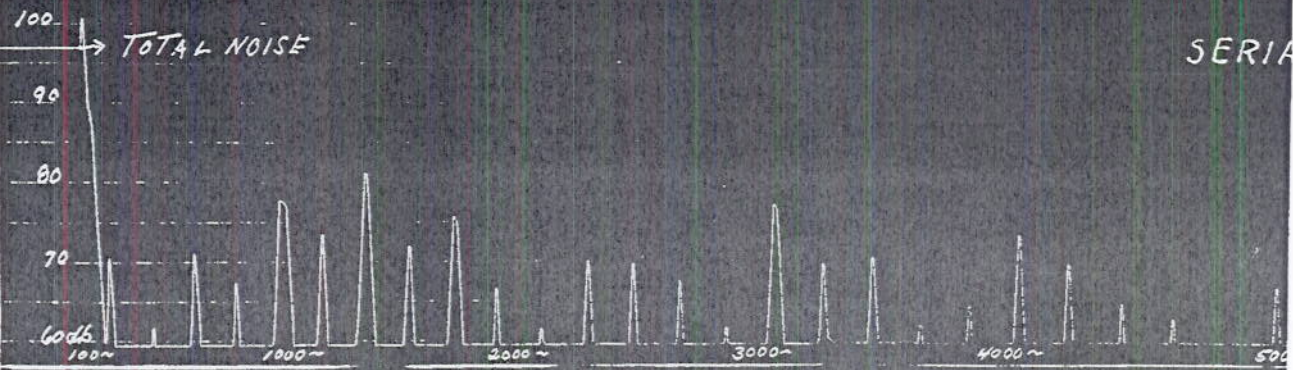
<u>Requirements</u>	<u>Test Values</u>	
	<u>No. 1</u>	<u>No. 2</u>
Pitch of note: 100 to 600 c.p.s.	Complied. See Plate 1.	Complied. See Plate 1.
Inclination: Shall operate in any position when supplied with rated voltage \pm 10 per cent.	Complied.	Complied.
Endurance test: Shall operate 9,000 cycles of "one second on" and "one second off," the first 4500 cycles at 60° C and the second at 0° C ambient temperatures.	Complied.	Complied.
Temperature rise: Maximum temperature shall not exceed 115° C during the endurance test. (55° C rise at 60° C ambient temperature.)	Complied. 33.2° C above 60° C ambient.	Complied. 47.7° C above 60° C ambient.
Shock test: Shall withstand 20 shocks of 250 foot pounds each as specified in paragraph F-2g.	Complied.	Complied.
Vibration test: Shall be mounted on a standard Navy 3-foot pound vibration machine and subjected to six tests of 30 minutes each at 100, 150, 200, 250, 300, and 350 shocks per minute.	Complied.	Complied.
Dielectric test: Shall withstand 500 volts, 60 cycles, for one minute between electrical circuits and between electrical circuits and ground.	Complied.	Complied.
Insulation resistance: Shall be not less than 1 megohm at not less than 500 volts, d.c.	Complied. 100 megohms by 500 volt megger.	Complied. 100 megohms by 500 volt megger.
Watertight integrity: Shall be submerged under 3 feet of standard sea water for a period of 3 hours without the entry of water into the case.	Complied.	Complied.
Salt spray test: Shall be subjected, under ultra-violet light, to a 20 per cent salt spray at 55° C for a period of 3 minutes, followed by an air blast at 55° C for 3 minutes, the cycle being repeated continuously for 100 hours.	Complied.	Complied.

<u>Requirements</u>	<u>Test Values</u>	
	<u>No. 1</u>	<u>No. 2</u>
Weight: Shall not exceed 8 pounds.	Complied. 6 pounds, 8 ounces.	Complied. 6 pounds, 8 ounces.
Nameplate: Shall be in accordance with N.D. Specification 42N2.	Complied. Copper-nickel alloy.	Complied. Copper-nickel alloy.
Dissimilar metals: Contact of dissimilar metals, except steel, with aluminum alloys shall be avoided as much as practicable in the assembly of parts. Where contact cannot be avoided, an approved spar varnish or other approved material shall be used between the faying surfaces.	Complied.	Complied.
Protection of exterior surfaces: Exterior surfaces of all equipment, except nameplates, diaphragms, gongs, and strikers, shall be finished with two coats of gray paint specifically approved by the bureau concerned.	Complied.	Complied.
Clearances: Clearances between any two electrical circuits or between any electrical circuit and ground, where not separated by at least 1/16-inch of approved insulating material, shall be not less than 1/8-inch, unless otherwise approved.	Complied.	Complied.
Wiring: All wiring shall be in accordance with the requirements of N. D. Specification 15C1, unless otherwise approved.	Complied.	Complied.
Coil windings: May be either single or double silk or cotton covered enameled copper wire.	Complied. Single silk enameled copper wire.	Complied. Single silk enameled copper wire.
Protective covering for coils: Shall be nonhygroscopic, not glued or cemented to the coils, but shall be overlapped and cemented in the lap.	Complied.	Complied.
Waterproofing of coils: All coils shall be impregnated with an approved synthetic resinous material or other suitable and approved waterproofing and insulating compound.	Complied.	Complied.

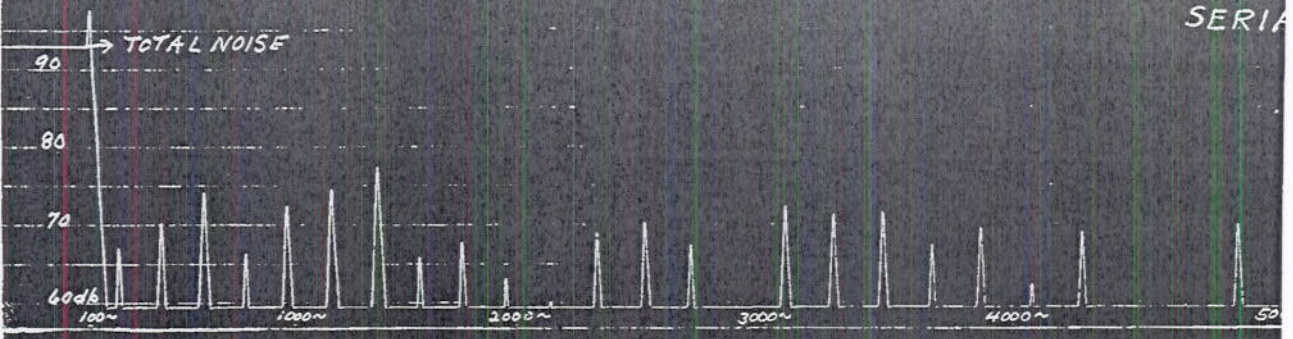
<u>Requirements</u>	<u>Test Values</u>	
	<u>No. 1</u>	<u>No. 2</u>
Magnetic circuits: Shall be of laminated punchings of the best available grade for the purpose and shall be protected against corrosion.	Complied.	Complied.
Terminal block: Shall be of approved material and type, and readily accessible.	Complied.	Complied.
Terminal lugs: Shall be in accordance with Bureau of Ships Drawing 9-S-1841-L, unless otherwise specified by the Bureau concerned.	Complied.	Complied.
Supply leads: Shall enter through the casing attached to the mounting bulkhead and not through any removable part.	Complied.	Complied.
Terminal wiring: Shall be lead in through a boss drilled and tapped for a Navy standard terminal tube. The case shall be provided with two bosses, one located at the top and the other at the bottom of the case, unless otherwise approved by the Bureau concerned.	Complied.	Complied.
Springs: All springs which form a part of the electrical circuit shall be of beryllium copper, phosphor bronze, or their approved equivalent.	Complied. Beryllium copper.	Complied. Beryllium copper.
Contacts: All contacts for making and breaking an electrical circuit shall be of tungsten.	Complied.	Complied.
Agreement with test plans: Blueprint plans of sufficient detail to show all essential components of the equipment to be tested shall be furnished, and shall check with the equipment.	Complied.	Complied.

CONCLUSIONS

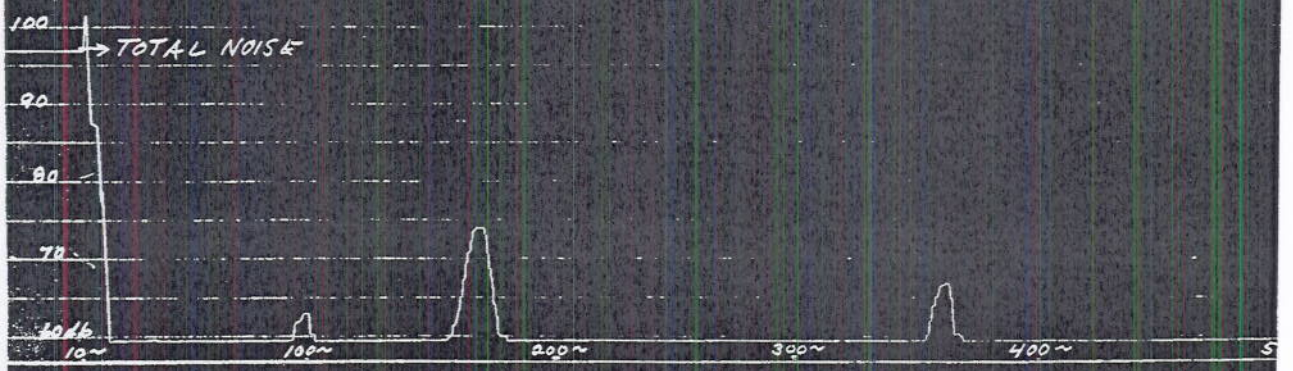
10. The subject horns, manufactured by Benjamin Electric Manufacturing Company, Des Plaines, Illinois, as Navy type H-5a, fully comply with the specifications, reference (b).



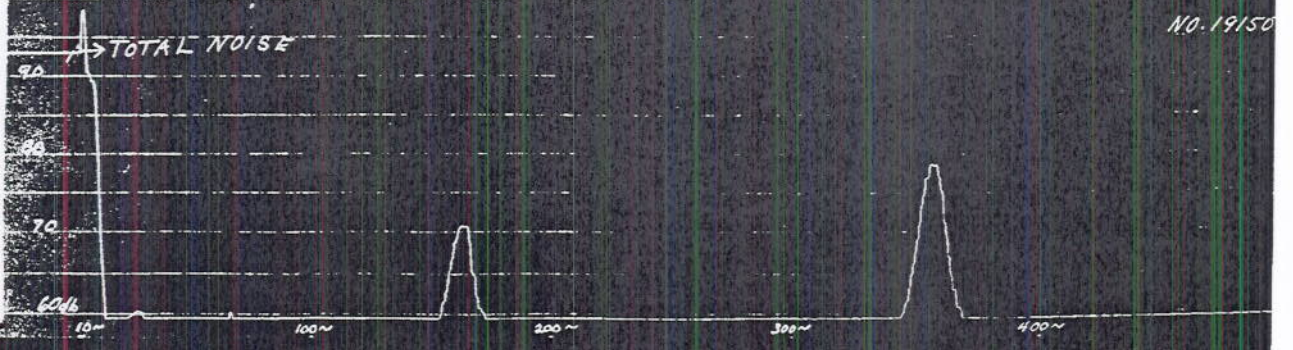
SERIA



SERIA



NO. 191



BENJAMIN EL
TYPE H5A
NO. 19150

SERIAL 2

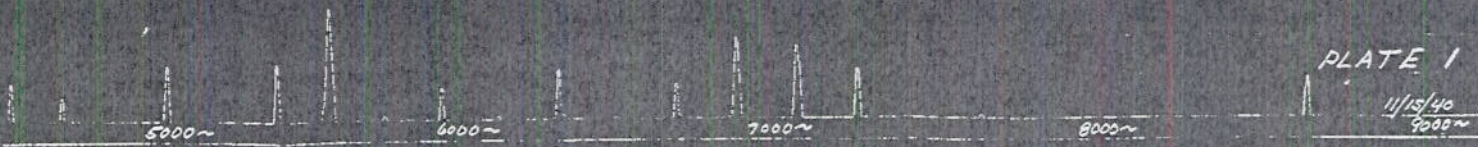


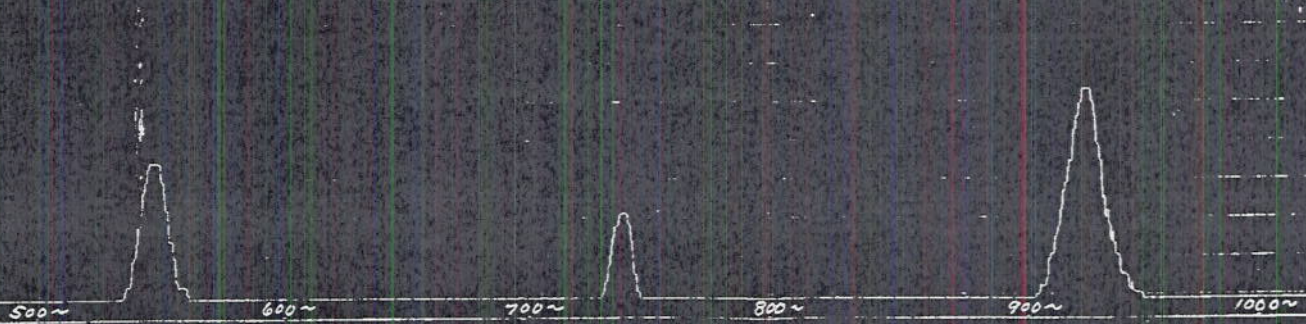
PLATE 1

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SERIAL 1



NO. 191501 SERIAL 2.



BENJAMIN ELECTRIC CO.
TYPE H5A-24V. HORN
NO. 191501 SERIAL 1.



PLATE 1

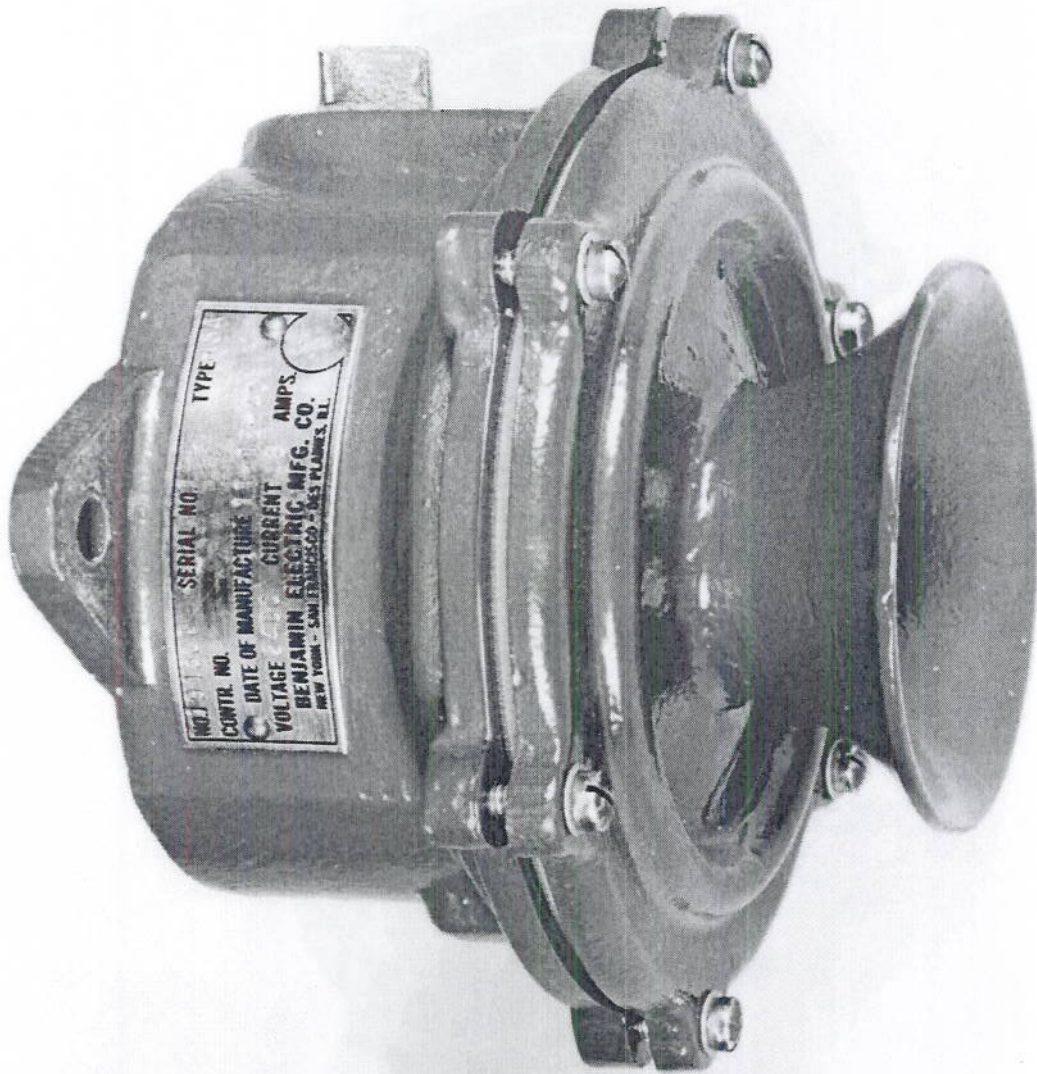


Plate 2

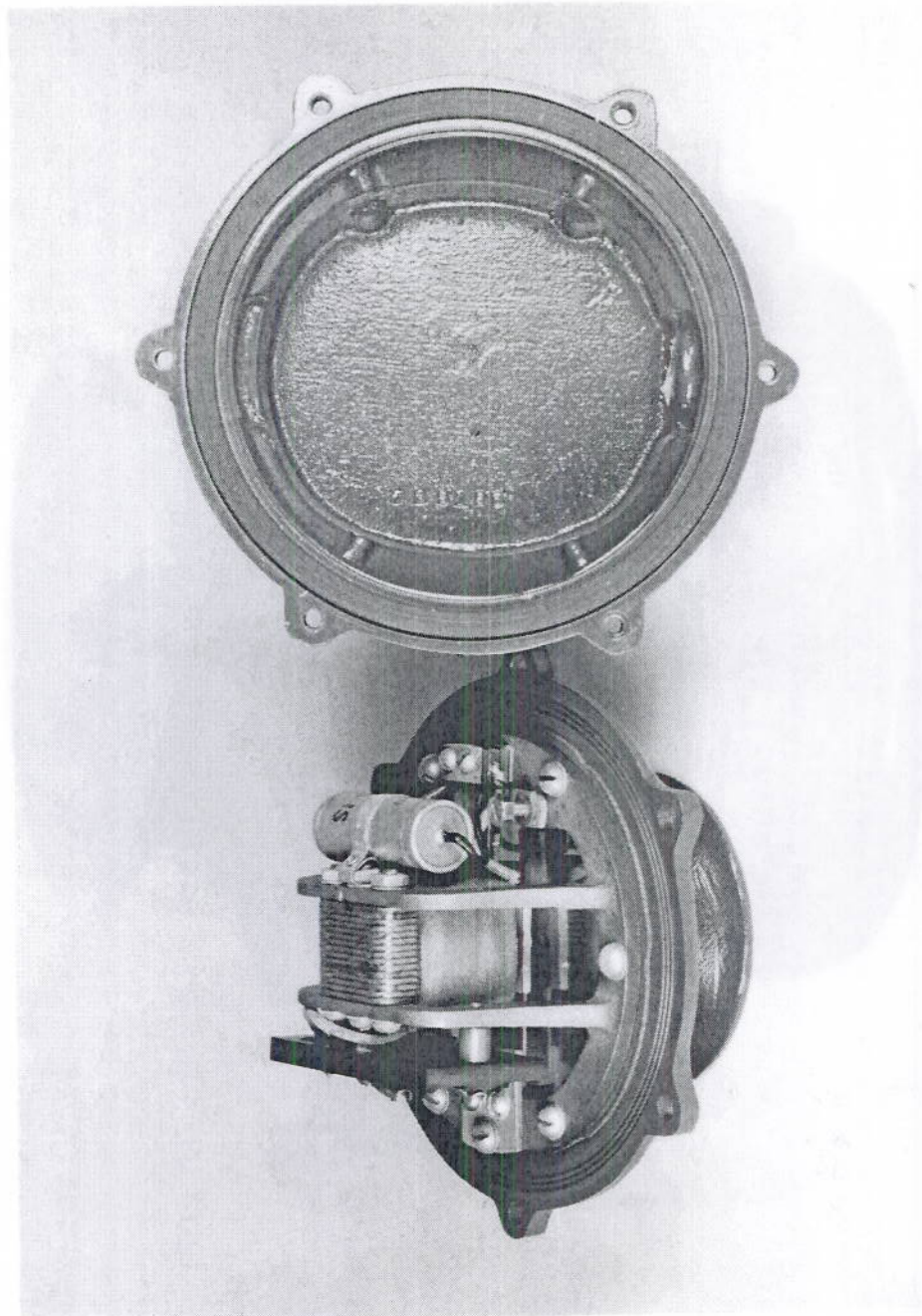


Plate 3