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NAVY DEPARTMENT

BUREAU OF ENGINEERING

Report of

Test on Instrument Lamps, Types VG2 and VG2-A.

General Electric Vapor Lamp Company
Exhibitor.

Number of Pages: Text - 4 Plates - 2

Authorization: BuEng. let. L5/NP14(2-27-Ds) of 27 March 1934

Date of test: November 1934 - February 1935.

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Bu.Eng. (5)

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AUTHORIZATION FOR TEST

1. This test was authorized by reference (a).

Reference: (a) BuEng let. L5/NP14(2-27-Ds) of 27 March 1934.

OBJECT OF TEST

2. The primary purpose of this test was to ascertain if the sample modified lamps, "Types VG2 and VG2-A", as manufactured and submitted by the General Electric Vapor Lamp Company, are superior to the VG2 and VG2-A lamps furnished by the General Electric Vapor Lamp Company on previous contracts. It was also desired to obtain data for use in writing specifications for future contracts.

ABSTRACT OF TEST

3. The sample lamps were set up at this Laboratory in two groups, five of each type being tested for shock integrity and five of each type for their ability to withstand continuous vibration while illuminated at rated voltage. Prior to these tests, five of each type, selected at random, were tested for current consumption at rated voltage, and for minimum voltage at which the lamps would glow.

CONCLUSIONS

(a) The subject lamps as manufactured and submitted by the General Electric Vapor Lamp Company represent a definite improvement over those previously furnished by the manufacturer.

(b) If modified in accordance with "COMMENTS", paragraph 23, and "RECOMMENDATIONS", paragraph (b), these lamps should prove superior to those now used in the Naval Service.

RECOMMENDATIONS

(a) It is recommended that the subject lamps be approved for instrument lighting in the Naval Service, provided the manufacturer corrects the defect, noted in paragraph 23 and meets all of the requirements as suggested below.

(b) It is further recommended that specifications for all future contracts include the following requirements.

(1) Electrodes to be at a specified height from the base, within a 1/32" plus or minus tolerance. This is necessary in order to obtain uniform dial illumination.

(2) Electrodes to be placed in a definite relation to the contact strips.

(3) Lead wires to be so soldered to the contact strips that there is little possibility of injury when inserting the lamp in the socket.

(4) No type VG2 or VG2-A lamps to be accepted unless they glow at 92 volts, A.C.-D.C., the usual 20% reduction in line voltage at which all Interior Communication equipment is required to function.

(5) The surface of the electrodes to glow evenly when the lamps are operated on 115 volts AC-DC.

DESCRIPTION OF MATERIAL UNDER TEST

4. Ten sample lamps each of types VG2 and VG2-A were submitted for test.

5. Both types of lamps are essentially of the same design, differing only in the gases used; type VG2 containing neon gas and type VG2-A containing argon gas.

6. The lamp has two hard nickel electrodes sealed in a glass bulb which is mounted in a special base of molded insulating material. Two strip type contacts are provided in the base of the lamp which also houses a fixed resistance unit, connected in series with the electrodes. The base is designed to fit into a Navy standard socket, BuEng Drwg. 9-S-4625L. Alt.1.

7. The lamps are identified by the colors of their bases, orange for the type VG2 and blue for type VG2-A.

METHOD OF TEST

8. First, five lamps of each type submitted were tested for current consumption at 115 volts.

9. Next, they were tested to ascertain the minimum voltage at which the lamps would glow.

10. Five lamps of each type submitted were then placed on a Bureau of Engineering shock stand and shocks, varying from 25 to 200 foot pounds, were applied until 800 blows has been given. Starting from 25 foot pounds, the force of the blow was increased 25 foot pounds every 100 blows. During this test all lamps were glowing at their rated voltage.

11. The remaining samples, five of each type, were then placed on a vibrating lamp-testing machine, shown on Plate 2, and subjected for 1000 hours to vibrations of 300 v.p.m. at an ampltiude of 0.062". During this test all lamps were glowing at their rated voltage.

12. For comparative purposes, five lamps of each type, furnished under previous contracts were selected at random and concurrently given every test to which the sample lamps were subjected.

13. The test was concluded with a general inspection of the lamps for uniformity of construction.

RESULTS OF TEST

14. Under shock, the bulb of one of the sample VG2-A lamps became loose in its base and was removed from the test after 96-25 foot-pound blows had been applied.

15. After 490 blows (90 at 125 foot-pounds), one of the sample VG2 lamps failed to glow and was also removed from the test.

16. The remaining lamps were in good condition after completion of the shock test.

17. Data showing Normal Current and Minimum Voltages.

	60 cycle Alternating Current				Direct Current (Battery Supply)			
	Previous Lamps		Special Lamps		Previous Lamps		Special Lamps	
	Current at 115 volts (Milliamperes)	Minimum Voltage	Current at 115 volts (Milliamperes)	Minimum Voltage	Current at 115 volts (Milliamperes)	Minimum Voltage	Current at 115 volts (Milliamperes)	Minimum Voltage
VG2(neon)								
1	1.86	56	1.84	59	1.20	77	2.00	79
2	1.59	54	1.95	56	1.40	74	1.70	81
3	1.38	57	2.35	57	1.35	77	2.10	76
4	1.72	55	2.30	56	1.10	75	1.60	79
5	1.62	53	2.40	56	1.10	73	1.90	78
Average	1.63	55.0	2.17	56.8	1.21	75.2	1.86	78.6
VG2-A(argon)								
1	1.26	85	3.30	73	1.80	90	1.80	98
2	2.70	83	2.70	68	1.20	114	2.00	93
3	1.96	76	2.60	74	2.20	98	1.90	96
4	1.02	71	2.90	69	1.00	93	2.10	94
5	2.32	85	2.70	66	1.60	106	1.90	95
Average	1.85	80.0	2.84	70.0	1.56	100.2	2.02	95.2

	Power Consumption	Power Consumption	Power Consumption	Power Consumption
VG2	0.187 V.A.	0.249 V.A.	0.139 watts	0.214 watts
VG2-A	0.213 V.A.	0.326 V.A.	0.179 watts	0.232 watts

COMMENTS

18. Although two of the sample lamps failed under shock, it is believed that the lamps are as rugged as those previously furnished the Naval Service.

19. No failures occurred during the period of the 1000 hour vibration test.

20. The sample VG2-A lamps submitted glow at a lower voltage than those purchased under previous contracts. This is considered an advantage.

21. Both samples consume more current and produce more light than those previously furnished.

22. Both types of lamps submitted appear to give greater illumination than those previously purchased. However, no attempt was made to measure the intensity of the light emitted by the sample lamps due to the small amount of light produced.

23. It has been noted from time to time that many failures occur due to the lead wires becoming dislodged from the contact strip. This is due to injury when inserting the lamp into the socket. This defect could be overcome by extending each contact strip partly across the bottom of the base, drilling a small hole for the lead wire and soldering securely.

24. The height of the electrodes of the samples submitted is more uniform than those previously furnished.

CONCLUSIONS

25. The subject lamps as manufactured and submitted by the General Electric Vapor Lamp Company represent a definite improvement over those previously furnished by the manufacturer.

26. If modified in accordance with COMMENTS, par. 23, and RECOMMENDATIONS, par.(b), these lamps should prove superior to those now used in the Naval Service.

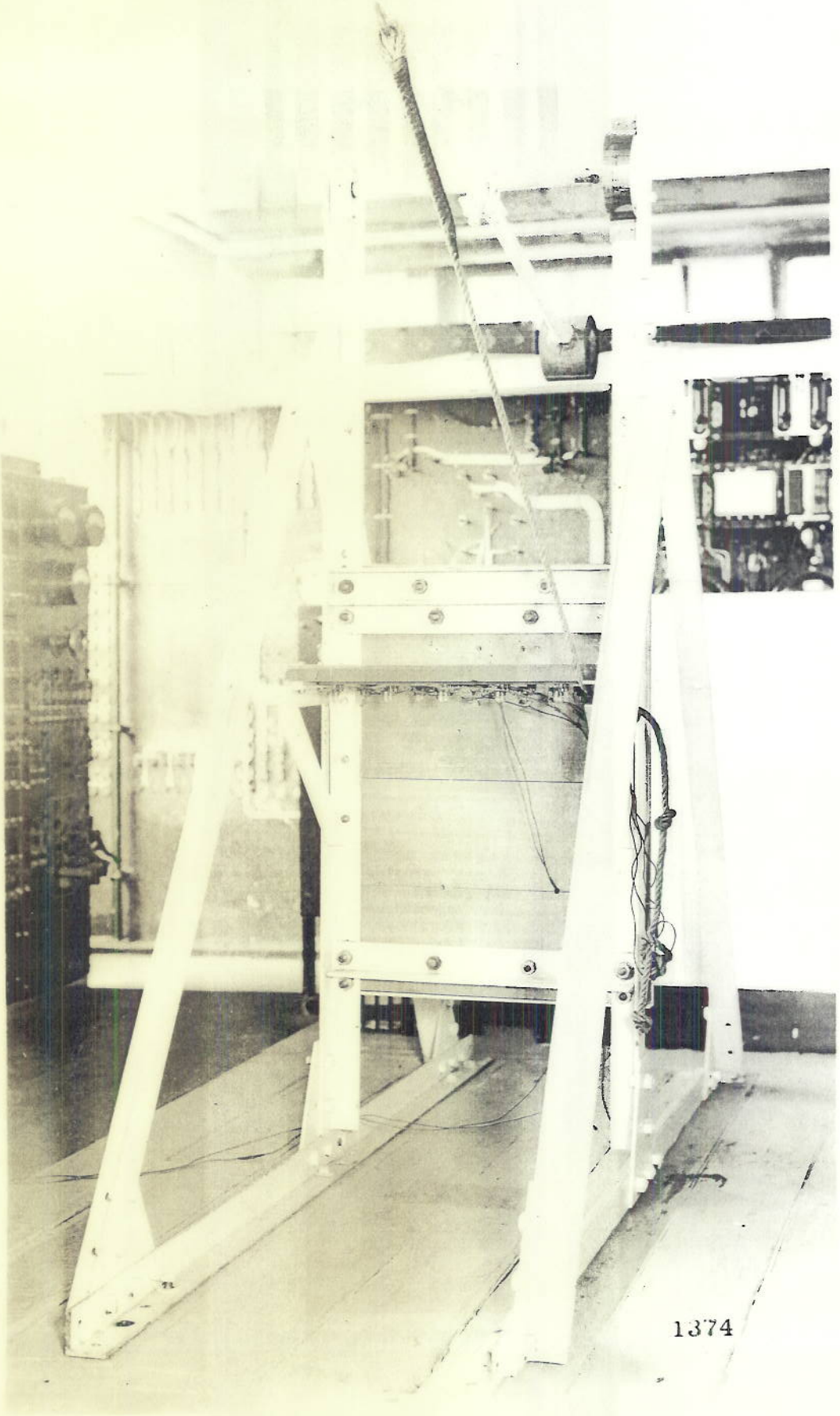

Plate 1

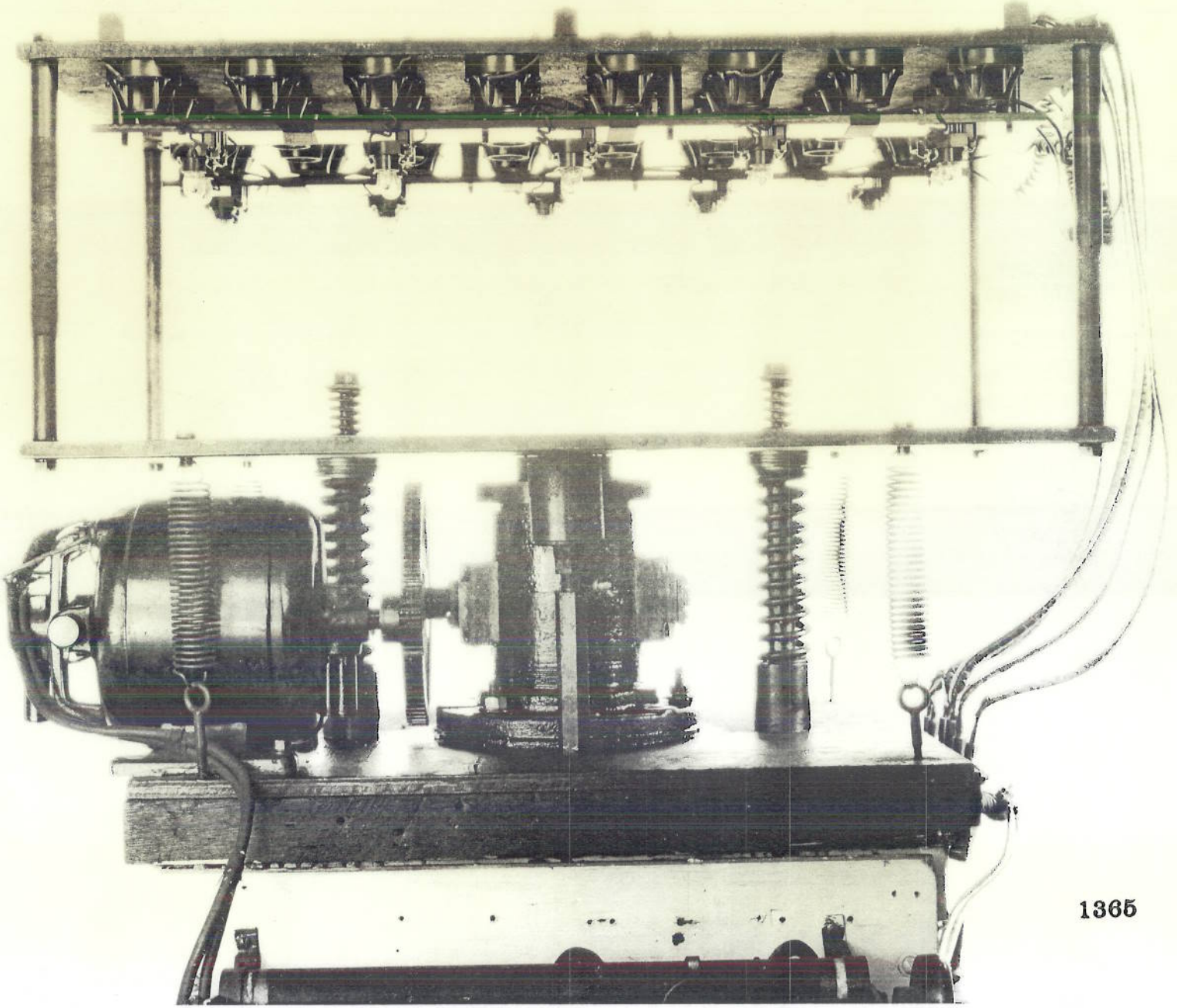

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Plate 2