REPORT NO. R-1729

DATE April 30, 1941

SUBJECT

Test on Insulating Material No. 408

Submitted by Stupakoff Ceramic and Manufacturing Company

FR-1729

BY

NAVAL RESEARCH LABORATORY

BELLEVUE, D. C.

U. S. GOVERNMENT PRINTING OFFICE 4—74500

Report No. R-1729
of Test on Insulating Material No. 408
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NRL Report No. R-1729

April 30, 1941.

NAVY DEPARTMENT

Report of

Test on Insulating Material No. 408

Submitted by

Stupakoff Ceramic and Manufacturing Company

NAVAL RESEARCH LABORATORY
ANACOSTIA STATION
WASHINGTON, D. C.

Number of Pages: Text - 2 Tables - 2

Authorization: Bureau of Ships letter S67/61 (3-22-DR6) of 8 April 1941.

Date of Test: 3 April 1941.

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APPENDICES

AUTHORIZATION

1. This problem was authorized by Bureau of Ships letter, reference (a). References (b) and (c) are also pertinent.

References: (a) Bureau of Ships letter S67/61 (3-22-DR6) of 8 April 1941.
(b) Specifications RE 13A 317F.
(c) NRL report R-1693 of 10 February 1941.

OBJECT OF TEST

2. The object of the test was to determine whether the five samples of type 408 insulating material submitted by the Stupakoff Ceramic and Manufacturing Company comply with specifications, reference (b) for grade F or G insulating material.

ABSTRACT OF TEST

3. The samples were tested for loss factor, and moisture absorption, as required in reference (b).

DESCRIPTION OF MATERIAL UNDER TEST

4. Five samples of type 408 insulating material, numbered 327 to 331, inclusive, and measuring approximately 6" square and approximately 1/4" in thickness were tested.

METHOD OF TEST

5. The dry loss factor was determined by measuring the samples as they were received after having been dried in an oven for one hour at 100°C. The samples were then soaked in distilled water for 96 hours after which their surfaces were wiped dry and the wet loss factor determined as per paragraph 6-1 of reference (b). The measurements were made at a frequency of 300 kcs. in accordance with appendix of reference (c).

6. Moisture absorption tests were carried out on newly fractured pieces as detailed in paragraph 6 of reference (b) where the newly fractured surface was approximately 50% of the unfractured surface of each sample. The samples were first cleaned in ether and dried in an oven at 120°C. for 24 hours and accurately weighed. They were then immersed in distilled water at room temperature for 100 hours during which time the water was boiled for a period of one hour, during the 1st, 25th, 49th and 73rd hours. At the end of the 100-hour period the samples were removed from the water, carefully dried with filter paper, and weighed immediately.

CONCLUSIONS

It is concluded that Stupakoff Insulating Material No. 408 complied with specifications, reference (b) as regards moisture absorption test, and also as grade G insulating material with respect to the loss factor test.

RECOMMENDATIONS

It is recommended that the insulating material No. 408 submitted by the Stupakoff Ceramic and Manufacturing Company be approved as grade G insulating material as regards its electrical properties.

DATA RECORDED DURING TEST

7. Data recorded during the test are given in the appended tables numbered I and II.

PROBABLE ERROR IN RESULTS

8. The probable error in the determination of the loss factor is approximately 5%. The additional error of 2% in the measurement of the loss factor was caused by the very irregular and wavy character of the test plates. The error in the determination of the weight for the moisture and absorption test is not more than .00125%.

RESULTS OF TEST

9. The results of tests are given in Tables numbered I and II and indicate that all test samples are of grade G insulating material. Tests also indicate that the maximum deviation in the power factor between similar samples is not greater than about 25%.

CONCLUSIONS

It is concluded that Stupakoff Insulating Material No. 408 complied with specifications, reference (b) as regards moisture absorption test, and also as grade G insulating material with respect to the loss factor test.

TABLE 1

Dielectric Properties

Sample No.	Dielectric Constant		Power Factor %		Loss Factor %		Grade
	Dry	Wet	Dry	Wet	Dry	Wet	
327	5.46	5.74	0.121	0.134	0.660	0.770	G
8	5.39	5.69	.129	.146	.695	.831	G
9	5.27	5.56	.139	.141	.734	.784	G
30	5.47	5.48	.147	.159	.805	.872	G
331	5.45	5.56	.138	.141	.754	.784	G

Where the Loss Factor must not exceed 1% to qualify for grade G insulating material

TABLE II

Moisture Absorption

Sample No.	Weighting		Gain %
	Dry	Wet	
327	43.5151	43.5203	0.012
328	40.4132	40.4173	.010
329	45.6888	45.6915	.005

Where the gain in per cent must not exceed 0.1%