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**THERMAL CONDUCTIVITY MEASUREMENTS  
OF EIGHT RUBBER-LIKE MATERIALS**

by

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to

Office of The Quartermaster General  
Department of The Army



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## I. INTRODUCTION

At the request of the Office of The Quartermaster General, reference File (MGRJ 095, letter dated March 17, 1953, thermal conductivity measurements were made on eight rubber-like materials to determine their insulation value.

## II. MATERIALS

<u>Sample No.</u>	<u>Size</u>	<u>Description</u>
1	Two 8x8x0.3 inch	Olive drab carolite
2	One 8x8x0.4 inch	Black arctic rubber
3	Two 8x8x0.2 inch	Light neoprene
4	One 8x8x0.5 inch	Green carolite
5	One 8x7.6x0.5 inch	Black arctic rubber
6	One 8x6.5x0.4 inch	Black arctic rubber (higher density)
7	One 8x8x0.8 inch	Gray PVC
8	One 8x8x0.9 inch	White PVC
*9	One 4x4x1.1 inch	Green Royalite (U.S. Rubber Co.)

\* Sample was not suitable in size for measurement of its thermal conductivity.

## III. TEST METHOD AND EQUIPMENT

The thermal conductivity of the specimens was measured in an 8-inch guarded hot-plate apparatus conforming with the requirements of Fed. Spec. 111-1-321b and of ASTM C177-45.

## IV. RESULTS

A summary of the test data is given in Table I and a plot of thermal conductivity versus mean temperature is shown in Fig. 1.

STATE OF TEXAS

County of \_\_\_\_\_

Know all men by these presents, that \_\_\_\_\_

of the County of \_\_\_\_\_ State of Texas

do hereby certify that \_\_\_\_\_

is the true and correct copy of \_\_\_\_\_

WITNESSETH

My hand and seal this \_\_\_\_\_ day of \_\_\_\_\_ 19\_\_\_\_

at \_\_\_\_\_

\_\_\_\_\_

Notary Public in and for the State of Texas  
My commission expires \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

In testimony whereof, I have hereunto set my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_ 19\_\_\_\_

\_\_\_\_\_

Notary Public in and for the State of Texas

My commission expires \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

NOTARY PUBLIC

My commission expires \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

TABLE 1

Specimen	Mean Temp. of Spec., F	Density as Tested lb/ft <sup>3</sup>	*Thickness as tested inch	Temp. gradient in spec. deg F/inch	Thermal Conductivity BTU/hrft <sup>2</sup> (deg F/inch)
1	66.6 29.2	5.4 5.7	0.326 .308	65.2 71.8	0.253 .231
2	66.1 29.3	7.6 7.9	.411 .392	49.2 50.6	.293 .270
3	66.1 29.2	8.6 9.1	.258 .243	77.8 83.4	.258 .244
4	66.4 28.9	15.1 15.1	.538 .531	39.2 36.9	.434 .424
5	66.7 29.0	18.2 18.4	.479 .474	48.0 43.1	.524 .514
6	66.7 29.1	25.0 24.9	.419 .419	50.9 48.4	.646 .627
7	67.8	4.8	.774	30.5	.266
8	67.4	4.2	.930	25.1	.262
9	-	5.6**	-	-	-

\* Thickness of specimens as tested, necessary to obtain good thermal contact with the test plates. The same total pressure (about 10 lbs on 64 sq.in.) was applied on each specimen during the tests at high and low mean temperatures. The different thicknesses observed were apparently due to dimensional changes with mean temperature.

\*\* Material was not tested but density was calculated.





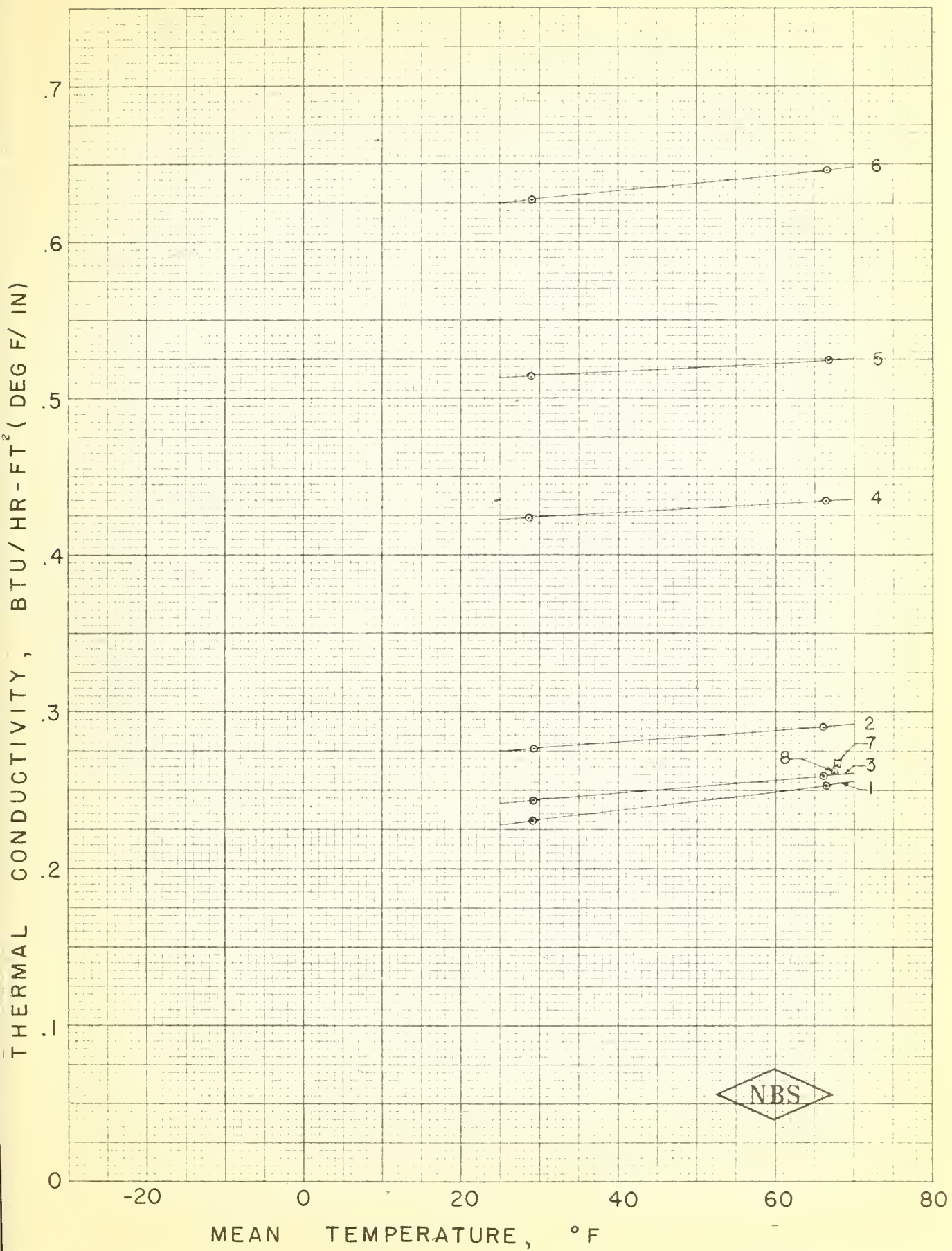


FIG. 1



**STAPLES**

