PLAINTIFF'S EXHIBIT 178

MINUTES
of the
TECHNICAL & RESEARCH COMMITTEE MEETING
NATIONAL INSULATION MANUFACTURERS ASSOCIATION
Washington, D. C. February 21, 1963

Molded Section

Chairman V. L. Miller called the meeting to order with the following in attendance:

V. L. Miller	Pittsburgh Corning Corp.
D. A. Davis	The Ruberoid Company
H. P. Hoopes	Fibreboard Paper Products Corp.
A. E. Kincaid	Owens-Corning Fiberglas Corp.
R. McKee	Baldwin-Ehret-Hill, Inc.
E. F. Ott, Jr.	Keasbey & Mattison Co.
W. R. Seipt	Keasbey & Mattison Co.
W. P. Sinclair	Pittsburgh Corning Corp.
B. Tower	Johns-Manville Sales Corp.
B. Wingerter	Johns-Manville Sales Corp.
J. M. Barnhart	NIMA

RECOMMENDED PRACTICE FOR DETERMINING O.D.'S OF THERMAL INSULATION FOR COPPER TUBES

The Table as proposed by Mr. H. P. Hoopes pertaining to this subject was accepted by the Committee. The Table will be given to ASTM Sub-committee T-VIII for their use. A copy of the Table is as follows:

Recommended Practice for Determining Nesting Sizes of Preformed Thermal Insulation for Copper Tubes

Insulation Outer Size

Size	O.D. (in.)	Nominal Thickness 1	1-1/2	2	2-1/2	3	3-1/2	4
3/8	0.500	2	3	4	5	6	-	-
1/2	0.625	2-1/2	3	4	5	6	-	-
3/4	0.875	2-1/2	3-1/2	4-1/2	6	7	8	9
1	1.125	2-1/2	3-1/2	4-1/2	6	7	8	9
1-1/4	1.375	3	4	5	6	7	8	9
1-1/2	1.625	3	4	5	6	7	8	9
2	2.125	3-1/2	4-1/2	6	7	8	9	10
2-1/2	2.625	4	5	6	7	8	9	10
3	3.125	4-1/2	6	7	8	9	10	11
3-1/2	3.625	5	6	7	8	9	10	11
4	4.125	6	7	8	9	10	11	12
5	5.125	7	8	9	10	11	12	14
6	6.125	8	9	10	11	12	14	15

"K" VALUES FOR ASHRAE GUIDE

The "k" values for the ASHRAE Guide were approved as per Table dated 10/6/62 with the following changes:

1. Change Diatomaceous Silica accepted maximum temperature for use from 1900 F to 2000 F.

2. Add "Laminated Asbestos Paper, 40 Laminations per inch, 700 F, max. temp, 27-29 pcf"

Mean Temp	"k"
100 F	0.34
200 F	0.39
300 F	0.44
500 F	0.54

PROPOSED REVISIONS TO MIL-I-2781

This specification dated 15 February 1960 was reviewed and the following changes recommended. Mr. Barnhart is to write the Bureau of Ships as soon as possible relative to these suggested changes.

Par. 1.2 Change to read as follows:

Grade I - Temperatures up to 600 F
Class b- Compounded

Grade II - Temperatures up to 750 F
Class c - Fibrous
Class d - Compounded

Grade III - Temperatures up to 1200 F
Class e - Compounded
Type I - Light Density
Type II - Medium Density
Class f - Fibrous

Par. 2.2 - Under the list of ASTM Specifications, it is suggested that the latest revision be referred to rather than tieing each one to a specific date of issue.

ASTM C 421 - The title should be changed to "Weight Loss by Tumbling of Preformed Insulation, Method of Test For".

Include ASTM C 356 - "Linear Shrinkage of Preformed High Temperature Thermal Insulation Subject to Soaking Heat, Method of Test For".

Par. 3.1 - Delete "as long as it" and substitute "that".

Par. 3.2 - We are opposed to the complete deletion of QPL Testing Procedure and Acceptance Method. We would favor some modification of the old QPL qualifications.

Par. 3.2.1 - At the beginning of the first sentence insert "Thermal".

Par. 3.2.3 - Change "Pipe Covering" to 'Thermal Pipe Insulation".

Par. 3.3 - Table III - Physical Requirements

Change Table to read as per attachment "A".

Par. 4.2.2 & 4.2.3 - NIMA objects to the high level of testing required and would like to suggest that inspection level I and the acceptable quality level be 4.0. We feel ASTM C 390 should be used as a basis of sampling inasmuch as other ASTM Specifications are used as a basis for tests etc., in the specification. It is felt that with the type of product that is being dealt with too many samples are required in the specification.

Par. 4.2.3.1(a) thru (e) - It is suggested that this be amplified to emphasize that a test failure occurs if the average of the sample exceeds the specified limit. For example, add "The average density of the sample exceeds the specified maximum value."

Par. 4.2.3.1(c) - Change title to "Weight Loss by Tumbling".

Insert new Par. 4.2.4 - "Action in Case of Failure" A rejected lot may be resubmitted for inspection only after the manufacturer, after being informed for the reasons for rejection, has so reworked the entire lot as to remove or correct all nonconforming material.

Par. 4.3.4 - Change title to "Weight Loss by Tumbling".

Par. 4.3.6 - Change to read as follows: "----for the respective grade for 6 hours for loss of weight and linear shrinkage. ------and tested to determine loss of weight and, linear shrinkage."

Par. 4.4 - Change to read as follows "---- Examination of packing and marking not covered by referenced specifications shall conform to the same number of packages containing the samples selected under Par. 4.2.2."

With respect to the packaging requirements Mr. D. Wingerter is to circulate to the Committee recommendations to changes in packaging requirements for comment. Mr. B. Tower is to follow up the various government agencies on packing.

PROPOSED REVISIONS TO MIL-I-2819

This specification, dated 23 October, 1961, was reviewed and the following changes recommended. Mr. Barnhart is to write to the Bureau of Ships as soon as possible relative to these suggested changes.

Par. 1.2 - Change to read as follows:

Class 1 - Temperatures up to 600 F
Class 2 - Temperatures up to 1200 F
Class 3 - Temperatures up to 1500 F
Class 4 - Temperatures up to 2000 F

Par. 3.3 Table I - Physical Requirements

Change Table to read as per attachment "B".

The same comments pertaining to MIL-I-2781 will apply to MIL-I-2819.

STANDARD FACINGS FOR PIPE INSULATION

This subject which originated from the Board of Directors, was discussed. The Committee agreed that the list of standard facings should be suggested by commodity managers. The properties could then be ascertained by the Technical Committee.

NIMA STANDARDS

The Committee discussed the draft of the Proposed NIMA Standard, Inorganic Thermal Insulation. It was suggested that tht title be changed to NIMA, Typical Product Properties, Inorganic Thermal Insulation, and that typical or average values for properties be used for physical requirements. Another draft, incorporating the Committee's suggestions will be circulated. It was suggested that each Committee member talk to his NIMA Board of Directors member on this subject.

CALCIUM SILICATE IN NUCLEAR REACTORS

Mr. Barnhart's letter of January 17, 1963, on this subject was discussed.

The Committee felt that no expenditure should be made by NIMA on this proposed project at this time. The primary subject is to determine what they problem is and where is information available, i.e., what is required of insulating products. Mr. B. Tower is to contact Germantown ZEC to ascertain whether they can provide NIMA with the basic infomation on relationship between atomic energy and thermal insulation.

Mr. H. P. Hoopes will send copies of tests that his company had made on insulation materials exposed to nuclear radiation to members of the T & R Committee.

PROPOSED REVISION TO HH-I-523

Written comments on the proposed revision to this specification are to be sent to the NIMA office not later than March 15, 1963.

BRAB'S LISTING OF INSULATION BY TRADE NAMES WITH PERTINENT PHYSICAL PROPERTIES

The questionnaires that were received from NIMA members on this subject were compiled and forwarded to BRAB for their use.

A copy of the compilation will be sent to the T & R Committee for their perusal.

THICKNESS TO PREVENT SURFACE CONDENSATION & HEAT FLOW CALCULATIONS FOR ASHRAE GUIDE

These write ups were given to ASHRAE and will be printed in the GUIDE at an early date.

ADJOURNMENT

There being no further business, the meeting was adjourned.

Respectfully submitted

J. M. Barnhart

Attachment "A"

Table III - Physical Requirements

	Test Paragraph	Grade I Class b	Grade II Class c	Grade II Class d	Grade III Class e Type I	Grade III Class e Type II	Grade III Class f
Density (average), lbs/cu ft, max.	4.3.2	13.00	15.00	13.00	13.00	20.00	20.00
Thermal conductivity (average) Btu/hr sq ft (F/in.) max., at mean temperature of	4.3.3						
200 F		0.40	0.40	0.40			
300 F		0.45	0.45	0.45			
400 F		0.50	0.50	0.50			
500 F					0.60	0.66	0.60
600 F					0.65	0.71	0.65
7 00 F					0.70	0.76	0.70
Weight loss by tumbling: Loss in weight (average), percent max.	4.3.4						
After first 10 minutes		40	-	40	40	55	-
After second 10 minutes		70	-	70	70	80	-
Modulus of rupture (average), lbs/sq in, min.	4.3.5	1	1	1	1	2	1
Changes under soaking heat, 6 hrs at F	4.3.6	600	750	750	1200	1200	1200
Loss in weight (average) percent, max.		18.00	6.00	12.00	12.00	16.00	6.00
Linear Shrinkage (average) percent, max.		2.00	1.00	2.00	2.00	2.00	1.00

1 - Not less than three times density (lbs/cu ft) of the sample tested

2 - not less than two and one-half times density (lbs/cu ft) of the sample tested

Table I - Physical Requirements

	Class 1	Class 2	Class 3	Class 4
Density (average), lbs/cu ft, max	14.00	14.00	20.00	26.00
Compressive Strength (average), at no more than 10 percent deformation, psi, min.	50.0	50.0	50.0	50.0
Weight Loss by Tumbling, Loss in weight (average) percent, max.				
After first 10 minutes	40	40	55	55
After second 10 minutes	70	70	80	80
Modulus of Rupture (average), psi, min.	1	1	2	2
Changes under soaking heat, 6 hrs at F	600	1200	1500	2000
Loss in weight (average) percent, max.	18.00	12.00	16.00	10.00
Linear Shringake (average) percent, max.	2.0	2.0	2.0	3.0
Thermal Conductivity (average), Btu/hr sq ft (F/in.) max., at mean temperature of				
200 F	0.40			
300 F	0.45			
400 F	0.50			
500 F		0.60	0.66	0.72
600 F		0.65	0.71	
700 F		0.70	0.76	
750 F				0.79
1000 F				0.86

1 - Not less than three times density (lb/cu ft) of the sample tested
2 - Not less than two and one-half times density (lb/cu ft) of the sample tested