PLAINTIFF'S EXHIBIT
K-1129

MINUTES
of the
GOVERNMENT TECHNICAL & RESEARCH COMMITTEE MEETING
Afternoon Joint Session
Washington, D. C. May 21, 1963

In addition to those attending the morning Marine and Land Sessions, the following were present:

John M. Dorsey	U. S. Coast Guard
D. E. McDaniel	U.S. Coast Guard
R. C. Hale	U. S. Coast Guard
S. A. Heider	Federal Housing Admin.

The meeting was called to order by W. E. Miller

ECONOMIC THICKNESS (LOW TEMPERATURE STUDY)

C. E. Ernst reported that the Low Temperature Study for a companion volume to the Manual of Economic Thickness of Insulation on Surfaces at Elevated Temperatures, has been completed; the calculations made and the volume prepared in a preliminary form which he displayed. He discussed briefly the data and the calculations necessitated by the temperature range covered.

As in the other manual, for a specific case the installed cost of insulation and other fixed and operating costs are combined in a single "D" factor from which economic thickness is derived using pipe size, thermal conductivity and the difference between operating and ambient temperatures.

For low temperatures, the insulation thickness required to prevent condensation is usually important and may be a governing factor, where it is greater than the economic thickness. It was not found feasible to combine tables showing both thicknesses, but instructions and charts for the thicknesses to prevent condensation will be available along with the book.

It is anticipated that the book may be available in the next three or four months.

FEDERAL SPECIFICATION HH-I-551c "Insulation Block, Pipe Covering and Boards, Thermal (Cellular Glass)" - Issued March 5, 1963

Discussion was led by V. L. Miller, who explained that although the Interim Specification HH-I-00551b was issued over a year ago and most of the questions resolved, the present Revision "C" still contained some points for discussion and resolution.

Particular attention was called to Paragraph 3.13 Fire Hazard Classification which applies to all classes in Types II and III. The manufacturer has pointed out that Type II Class 3 material has the glass fabric applied with hot asphalt. For its major use (underground lines), this is an advantage and no hazard whatever. However, it probably could not be said to conform to paragraph 3.13 although the test method UL 723 cannot be applied directly to pipe insulation sections.

It was agreed that positive solution would involve re-writing 3.13 to delete reference to Types II and III and limit it to Class 2 and 4 of Type II with a statement that Class 4 be used when the fire hazard values were required in the job specification.

FIRE TESTS (INCOMBUSTIBLE INSULATIONS)

1. Definitions - Mr. King stated the desireability of agreement on a definition of non-combustibility and cited the NFPA definition in Standard #220 as a possible form.

2. Basic Requirements - Mr. Hale of the Coast Guard discussed the "heated tube" method as the basis of their definition and stated that for marine construction, particularly for passenger vessels, their requirements must conform to certain international agreements. The basic principle involved is that the ship design shall be such that a fire starting in a given area (of limited size) shall be contained within that area and not spread to others.

3. The FHA representative stated their interest in duct systems utilized for heating. There is current test work on evaluation of fire tests on both circular and rectangular forms with results indicating little correlation with other Fire Hazard Test methods.

The meeting was adjourned about 3:15 P.M.

K. M. Ritchie

MINUTES
of the
GOVERNMENT TECHNICAL & RESEARCH COMMITTEE MEETING
Land Session
NATIONAL INSULATION MANUFACTURERS ASSOCIATION
Washington, D. C. May 21, 1963

The meeting was called to order by W. E. Miller, the Washington Chairman of the NIMA Committee, who appointed K. M. Ritchie as Chairman protem for this session with the following in attendance:

Shigeki Hiratsuka	Office, Chief of Engineers, Dept. of Army
A. L. Graul	Bureau of Yards & Docks
J. S. King	U. S. Veterans Administration
R. J. Felix	Eng. Div. H.Q., U. S. Air Force
L. H. Mills	Public Bldgs. Service - GSA
F. A. Govan	National Academy of Science - BRAB
W. E. Miller	Pittsburgh Corning Corp.
K. M. Ritchie	Baldwin-Ehret-Hill, Inc.
P. L. Losse	The Eagle-Picher Company
C. E. Ernst	Johns-Manville Sales Corp.
Walter Gubar	Gustin-Bacon Mfg. Company
J. F. Lynch	Johns-Manville Sales Corp.
R. L. Strickland	Gustin-Bacon Mfg. Company
V. L. Miller	Pittsburgh Corning Corp.
W. T. Irwin	Pittsburgh Plate Glass Co.

I. "Thermal Insulation for Mechanical Systems" Section 692 of Mechanical Specifications prepared by the Veterans Administration. Mr. J. S. King supplied copies of the latest revision of this for comment.

He noted that because of its importance in hospital construction, the Fire Resistance, and particularly Smoke Development Requirements of insulation was given a prominent place. Many of the details of application and finishing conformed to the Washington Contractors' Association "Specification for Non-Conducting Covering."

Comparison of the thickness specified for pipe insulation with those in the new BRAB Report #45 to the Federal Construction Council (see Subject III) showed some differences which can be eliminated if K-factor is taken into account.

Mr. King requested suggestions for improvement of the draft circulated.

II. Proposed Revision - Federal Specification HH-I-523A "Insulation Block, Pipe Insulation, Thermal Calcium Silicate (For temperatures up to 1200 F)." Points discussed.

1. Elimination of calcium silicate cement was agreed to, but raised the question of fitting insulation. It was pointed out that other cements are available for this purpose.

2. The government people expressed a preference for fabricated fitting covers and inquired as to availability. It was reported that such covers can usually be fabricated by contractors, although availability and economics may vary appreciably in different areas of the country. Manufacturers of calcium silicate pipe insulation do not offer fabricated covers as a standard item, although at least one offers pre-cut pieces for on-the-job assembly.

3. Inclusion of classes based on surface coverings, was favored in principle by the government representatives.

   Discussion of the listing and specifying the various jackets, indicated a need for a separate "jacket" specification which might be referenced in the various material specifications for the specific jackets needed. This would include all pertinent properties and specifications.

3. For the proposed HH-I-523 revision in the meantime the list of jackets in the current draft needs review and some amplification.

   A. L. Graul requested that Section 6 on intended use, be expanded with information on specific uses of jackets; e.g., for indoor and outdoor use, fire protection, vapor-barrier protection, etc.

4. Paragraph 3.1.2 on "Cement" is to be deleted.

5. Physical Requirements - Table I

   F. Govan and A. L. Graul stated that the maximum values for density and thermal conductivity were unnecessarily high, in view of data recently assembled from manufacturers. It was pointed out that the values were limits, and not design or average performance values. These values are to be reviewed by NIMA. A similar question as to the maximum allowable linear shrinkage (2%) is also to be reviewed.

6. The minimum weight of canvas (1.8 oz.) for Class 2 was questioned. This should be reviewed by NIMA, along with Class I, since this weight of canvas serves little or no purpose after installation and is often covered with other material.

7. Paragraph 3.3.4 on Bands. It was requested that this be expanded to include aluminum and stainless steel bands, in addition to steel, and Section 6 should explain their choice.

8. Fire Hazard Classification Test. It was pointed out that available methods can be used only on flat specimens and not on jacketed pipe insulation sections, and that test results on components cannot be translated directly into results on assemblies.

   It was requested that ASTM E-84 be referenced instead of UL 723, although there are differences in procedure which may affect results on specific materials.

   This whole subject should be reviewed further by NIMA and a recommendation made.

III. Performamence Characteristics of Thermal Insulating Materials. F.A. Goven was requested to report on this BRAB assignment from the Federal Construction Council. He stated that they had prepared and sent to interested Federal Agnecies a sheet listing 26 materials with trade names and properties. Owing to legal complexities, this list will not be available to industry.

However, the BRAB Report #45 has been issued as "Thickness Charts and Material Characteristics for Pipe Insulations" and is available from the

Publishing Office, National Academy of Science
2101 Constitution Avenue, Washington 25, D. C.
Publication # 1084 - $2.00 per copy

This contains thicknesses for various pipe temperatures based on "economic thickness" adapted to the specialized cost considerations existing in government installations. It also lists eight significant characteristics of materials selected from a list of 40 or more, as follows:

Thermal Conductivity	Thermal Shrinkage
Density	Temperature Range
Compressive Strength	Combustibility
Flexural Strength	Compatibility (with finishes etc.)

Mr. Govan requested NIMA comment on the choice of data and material in Report #45.

IV. Proposed Revision - Federal Specification HH-I-500a "Insulating Cements"

Due to lack of time, this was not discussed fully. It was stated the omission of physical property tables, instead of which ASTM material specifications were referenced, gave insufficient information for selecting a particular type. A further review and recommendation should be made by NIMA.

The meeting was adjourned for lunch to meet afterwards in joint session with the Marine group.

K. M. Ritchie

MINUTES
of the
GOVERNMENT TECHNICAL & RESEARCH COMMITTEE MEETING
Marine Session
NATIONAL INSULATION MANUFACTURERS ASSOCIATION
Washington, D. C. May 21, 1963

The meeting was called to order by Bert Tower with the following in attendance:

C. J. Hendrickson	M. H. Detrick Company
W. P. Sinclair	Pittsburgh Corning Corp.
Ray Foote	Maritime Commission
John Ford	Coast Guard
Harold Browning	Bureau of Ships - Code 709
V. L. Miller	Pittsburgh Corning Corp.
A. L. Munkres	Bureau of Ships - Code 648
A. E. Kincaid	Owens-Corning Fiberglas Corp.
J. H. Chilcote	Bureau of Ships - Code 634C4
Bert Tower	Johns-Manville Sales Corp.
John Sams	Gustin-Bacon Mfg. Company

Maritime Basic Specifications For Cargo Ship Construction - Final Draft 2/27/63, Revised Draft 3/15/63 - Section 75 - Discussed as follows: with possible revisions as shown -

NOTE: Comments by those identified - otherwise consider as general consensus.

R. Foote: Specification with possible changes will be used by design agents as a guide for cargo vessels which might include say 12 passengers or so and exclusive of tankers. Any requirements in excess of these specifications will be paid by owners - Maritime subsidizes 50 - 55% for Construction only -

Carl Cooney wrote these specifications after reviewing all previous and present specifications and also endeavored to project ahead.

The Maritime Commission requests from NIMA and from the individual manufacturers (with copies to NIMA) their comments. These comments should include full explanations

and reasoning. Comments without full clarification will not assist the Maritime Commission in evaluation - for the Maritime expects some 5000 comments.

The deadline date for replies is June 9, 1963. It is suggested that the manufacturers respond as soon as possible and that

Jack Barnhart write the Maritime Commission requesting an extension of time for NIMA and the manufacturers to reply. The following is the direction of the responses:

U. S. Department of Commerce
Maritime Commission
Attn: L. C. Hoffman
Chief Division of Engineering
Office of Ship Construction
Washington 25, D. C.

Show on Subject Matter in Letter
"Basic Specifications for Cargo Ship
Construction - Section 75"

It is further suggested that Jack Barnhart also mention in his letter to the Maritime Commission that NIMA anticipated the presence of Maritime personnel to discuss Section 12 Basic Specifications, Air Conditioning, Heating and Ventilation. That it was to Government and Industry regret that no one was present from Maritime to discuss this important specification.

RE: SECTION 75

Par. 1 line 10 Delete word "Insulation"
line 11 Change to read surface temperature of pipe may vary
line 26 Comments requested on temperatures
line 33 Delete word "Diesel" and change to "Engine"
line 35 Delete word "Diesel" and change to "Engine"

Par. 2 - It was suggested that lines 9, 10 and 11 be rewritten

NOTE: Maritime thickness generally thicker than Navy.

The 125° temperature referred to is the temperature of the pipe, not the lagging.

Par. 2 line 28 Comments requested
line 35 Delete "or Fibrous Glass"
line 36 Clarify 350° F - question 370°F?

Par. 2 Page 3 line 5 Delete "or Fibrous Glass"
Page 3 line 6 Clarify 999° F Temp - two types

NOTE: It was suggested that Federal Specifications be used whenever possible in lieu of Military Specs. Question if there should be a new Section for 1000° or above.

Par. 4 Insulating Cements - Comments requested

NOTE: HH-I-00500 is being revised - Comments regarding including in this spec.

Par. 4 Maritime is endeavoring to develop costs on piping on a R & D project. It was stated the economic thickness manual only refers to flat surfaces.

Par. 4 - Table A - line 12 Consider inserting Fibrous Glass - All manufacturers are requested to review and comment on thickness and sizes.

The Table A Note should also pertain to Table A-1

Par. 7 - Table B - line 24 & 25 Suggest rewrite to include 85% magnesia and to also include "in accordance with manufacturers recommendations" deleting "as approved"

Par. 8 line 8 It was suggested that this cover single and double layer expansions. Clarification is requested as to what constitutes an "approved expansion joint"

Par. 8 Clarify where single and where double used.

Par. 13 - Lagging - line 8 Suggest include the one coat type of Insulating & Finishing Cement.

75 - 12 Table D A review of this Table is requested as it was felt it was not consistant.

NOTE: Metal lagging is not being used in practically all areas

Re: Section 12 - It is requested that a future meeting be arranged by the Chairman possibly the later part of June and to write John Brackett of Maritime.

Comments are requested on 1) Heated Tube Test, 2) What is a Fire Test and 3) Should the test be for materials applied?

The morning was primarily spent discussing Section 75. There was little time to Discuss Section 12.

In conclusion was desire to remind the members that they are to respond to the Maritime directly re Section 75, sending copy to NIMA.

Respectfully submitted

C. J. Hendrickson