

IN THE IOWA DISTRICT COURT FOR POLK COUNTY

HARRY C. LEOPOLD and
LUCILLE K. LEOPOLD,

Plaintiffs,

vs.

OWENS-ILLINOIS, INC., et al.,

Defendants.

LAW NO. CL 64-37528

ANSWERS TO PLAINTIFFS'
INTERROGATORIES BY DEFENDANT
COMBUSTION ENGINEERING, INC.

COMES NOW the Defendant, Combustion Engineering, Inc., and
submits the following answers to Plaintiffs' Interrogatories.

HANSEN, McCLINTOCK & RILEY

BY

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RONALD A. RILEY

BY

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PROOF OF SERVICE
The undersigned certifies that the foregoing instrument was served
upon all parties to the above cause by depositing a copy thereof in the
United States Mail, postage prepaid, in envelopes addressed to each of
the attorneys of record listed hereon on the 12 day of
November, 1984

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PRELIMINARY STATEMENT

This Defendant, Combustion Engineering, Inc., first began to manufacture asbestos-containing insulation products on June 5, 1963 and discontinued the manufacture of all such products in 1972. Therefore, answers to these Interrogatories will be restricted to the aforesaid period of time, unless otherwise specifically noted.

1. Please state the name, address and job title of each person who has supplied information used in answering these interrogatories.

ANSWER

Frank T. Christenson, former Assistant to Manager
Industrial Sales
C-E Refractories
Combustion Engineering, Inc.
P.O. Box 828
Valley Forge, Pennsylvania

Richard D. O'Connor, Director
Valley Forge Services
Valley Forge, Pennsylvania

2. Please state whether or not you are a corporation; if so, please state your correct corporate name, the state of your incorporation, the address of your principal place of business and whether or not you have ever held a Certificate of Authority to do business in the State of Iowa.

ANSWER

Combustion Engineering, Inc., a Delaware corporation
900 Long Ridge Road
Stamford, Connecticut

This Defendant is qualified to do business in the state of Iowa.

3. Has defendant at any time engaged in the manufacture of products containing asbestos fibers?

ANSWER

Yes.

4. Has defendant at any time engaged in the mining of material containing asbestos fibers?

ANSWER

No.

Has defendant at any time engaged in the marketing and sale of products containing asbestos fibers?

ANSWER

Yes.

6. If the answer to one or more of the last three questions is affirmative, please state as to each affirmative answer the following:

- a. The trade or brand name of each such product mined, manufactured and/or marketed.
- b. The dates each of such products were placed on the market.
- c. The dates each of such products were withdrawn from the market, if ever.
- d. A description of the physical (the chemical) composition of each such product including the type of asbestos contained in each such product.
- e. A description of the physical appearance of each such product.
- f. A detailed description of the intended uses of each such products.
- g. The name of the manufacturer of each such product.

ANSWER

For answer to a. through g. see Exhibit "A" attached hereto.

ANSWER (Con't.)

7. Does defendant claim that any patent would cover any product listed above in interrogatory No. 6?

ANSWER

No.

8. If so, for each such product, please state:

- a. The number of each patent.
- b. The date same was issued.
- c. The number of each patent application that is pending.

ANSWER

Not applicable.

9. Have any of the products listed above in Interrogatory No. 6 been altered in chemical composition since first being marketed?

ANSWER: Formulas of the products previously manufactured by this Defendant are incomplete. However, any changes in formulas that were made, were made for the purpose of removing asbestos from the products.

10. If so, please state:

- a. The trade name of each such product.
- b. The date each such product was altered.
- c. The nature of the alteration.
- d. The reason for the alteration.

ANSWER

See Answer to Interrogatory No. 9.

11. What is the name, address and the job title of each individual who participated in the design and preparation of manufacturing specifications for each such product?

ANSWER

To the best of this Defendant's knowledge, the following persons may have had something to do with the design and preparation of the manufacturing specification: Horace M. Clark (now deceased); Alva S. Arwine, formerly Vice President of C-E Refractories (now deceased); Robert Nelson, formerly President, C-E Minerals, Valley Forge, Pennsylvania (now retired).

12. Do any written memoranda, specifications, blueprints or other written materials of any kind or character relating to the design and preparation of said products now exist?

ANSWER

To the best of this Defendant's knowledge, the only extant written material referable to tests are some quality control records.

13. If so, please state:

- a. List each such written material or documents.
- b. Who presently has possession or each such document.
- c. Where is it located.

ANSWER

- a. Quality control records.
- b. and c. Mr. Alfred Momme, Valley Forge, Pennsylvania.

14. Prior to releasing the products listed in Interrogatory No. 6 to the public for sale, were any tests conducted on same to determine potential health hazards involved in the use of materials contained therein?

ANSWER

No.

15. If so, please state:

- a. The name, address and job classification of each individual who conducted such tests.
- b. The results of such said tests.

ANSWER

Not applicable.

16. Do any documents of any kind or character exist relating to the testing of said products?

ANSWER

Not applicable.

17. If so, please state:

- a. List each such document.
- b. Who presently has possession of each such document, and where is it located.

ANSWER

Not applicable.

18. Did defendant make and changes in the products as a result of such tests?

ANSWER

Not applicable.

19. If so, please state:

- a. The nature of the change made.
- b. The name, address and job classification, of each person in charge of making a change.

ANSWER

Not applicable.

20. After releasing said products to the public, were any tests conducted thereon to determine potential health hazards involved in the use of materials contained therein?

ANSWER

No.

21. If so, please state:

- a. The name, address and job classification of each person conducting said tests.
- b. The results of said tests.

ANSWER

Not applicable.

22. Does any document of any kind or character relating to the testing of the said products exist?

ANSWER

Not applicable.

23. If so, please state:

- a. List each such written material or document.
- b. Who presently has possession of each such document, and where is it located.

ANSWER

Not applicable.

24. Did defendant make any changes in the product as a result of such tests.

ANSWER

Not applicable.

25. If so, please state:

- a. The nature of the changes made.
- b. The name, address and job classification of each person responsible for making such a change.

ANSWER

Not applicable.

26. Has defendant at any time published and/or distributed any brochures, pamphlets or other written materials of any kind or character that contain any warnings concerning the possibility of injury resulting from the use of the products listed in Interrogatory No. 6?

ANSWER: Yes. This Defendant placed warning labels on all the packaging of asbestos-containing products beginning in 1969.

27. If so, please state:

- a. The wording of each such warning.
- b. A description of each such printed material.
- c. The method used to distribute the warning to persons who are likely to use the products.
- d. The date each such warnings were issued.
- e. The name, address and job classification of each person who presently has possession of the above described documents.

ANSWER

- a. See Exhibit "B" attached hereto.
- b. See Exhibit "B" attached hereto.
- c. The warning labels were affixed to the packaging on all of this Defendant's asbestos-containing products.
- d. 1969. (exact date unknown).
- e. The only extant copy of the warning label is currently in the possession of Robert B. Preston, 1100 Huntington Building, Cleveland, Ohio 44115, one of the attorneys for this Defendant. A copy is attached as Exhibit "B".

28. Have you received notice that any other person was claiming injury as a result of using asbestos products manufactured and/or sold by your company (both prior to and subsequent to the filing of this action)?

ANSWER

Yes.

29. If so, please state:

- a. The name and address of each claimant.
- b. The date of notice of each claim.
- c. A description of the claim, if any.
- d. The type of injuries allegedly sustained.
- e. The name and address of each attorney who represents individuals making such claims.
- f. The style and court number of each claim currently pending.
- g. The resolution of each claim that has been settled or taken to judgment.

ANSWER

Defendant objects to this Interrogatory on the grounds that the information sought is entirely irrelevant to any of the issues in this case. This Defendant is or has been a named Defendant in numerous lawsuits around the country, all of which have multiple defendants. The claims of the plaintiffs vary markedly and the alleged injuries vary considerably from case to case. Preparation of the information requested would be extremely burdensome and harassing to this Defendant in view of its possible relevancy to this case. Defendant further objects that the information sought is not calculated to lead to the discovery of admissible evidence.

30. Do you have any records indicating that any products containing asbestos fibers were sold during the years indicated for each company below:

1959 - 1960	R. E. Cobley Company
1960 - 1968	Parker Fallis Insulation Co., Inc.
1960 - 1962	Kansas City Insulation Co., Inc.
1961 - 1983	Iowa Asbestos Co.
1962 - 1968	Asbestos & Magnesia Materials, Inc.
1962 - 1970	Universal Insulation Co.
1964 - 1965	Central Asbestos & Supply Company of Des Moines
1965 - 1967	L & L Insulation & Supply Co.
1966 - 1977	United Insulation Co.
1967 - 1968	Construction Specialties Co. Corp.
1967 - 1968	Hickory Insulation Co.
1967 - 1968	Hays Insulation Co.
1968 - 1969	Industrial Insulation, Ltd.
1969 - 1970	Brand Insulation, Inc.
1969 - 1970	MacArthur Co.
1976 - 1977	Ludeman Insulations, Inc.

ANSWER

Defendant has searched its records for the State of Iowa and finds no sales to the companies listed. With respect to Kansas City Insulation Co., Inc., there are no sales in Kansas or Iowa.

31. Are your asbestos products marketed and sold by companies other than your own?

ANSWER

This Defendant no longer manufactures or sells asbestos-containing materials and has not done so for many years.

32. If so, please list the name and address of each such company.

ANSWER

Not applicable.

33. Please list each individual who has acted in a medical advisory capacity to your company for the past 50 years and the current address and job title of each such individual.

ANSWER

During the time that this Defendant manufactured asbestos-containing insulation products, the only physicians employed by it were employed to conduct routine physical examinations and to handle emergencies. These physicians rendered no advice relative to asbestos.

34. Does defendant have in its possession any books, pamphlets, memoranda or written materials or any kind or character that would indicate that asbestos fibers, when inhaled, can be hazardous to the health of human beings?

ANSWER

See Answer to Interrogatory No. 35.

35. If so, please state for each such publication:

- a. The name of each such publication, document or written material.
- b. The date each such document, memoranda or written material was published and the name of the publisher and author.
- c. The name, job title and address of each person who currently has possession of such documents.

ANSWER

This Defendant has for a number of years maintained a corporate library which may contain material dealing with the subject. A number of publications involving occupational health generally have been received over the years. Specific articles containing information with respect to asbestos products would be difficult to ascertain; however, some of the articles would include:

Occupational Health, May R. Mayers, M.D., The Williams & Wilkins Company, Baltimore, Maryland 1969, pages 48-50, 58, 294-296; Industrial Environmental Health, Lester V. Cralley, Lewis J. Cralley, George D. Clayton, and John A. Jurgiel, Academic Press New York and London, 1972, pages 4-9, 94, 292, 313, 344; Accident Prevention Manual for Industrial Operations, National Safety Council, Chicago, Illinois, 1974, pages 1030, 1045, 1128; Fundamentals of Industrial Hygiene, Julian B. Oleshifski and Frank E. McElray, National Safety Council, Chicago, Illinois, 1971, pages 112, 751-861; Occupational Cancer, U.S. Department of Labor, July, 1975, Vol. 3, No. 7; Asbestos Airborne Danger, U.S. Department of Labor, 1972; TLV's ACGIH including 1976; Job Safety and Health, U.S. Department of Labor, pages 13-14, March, 1976; OSHA Federal Register, Title 29 Labor, Part 1910, Subpart G-Occupational Health and Environmental Control, 1910.93a - Asbestos; Industrial Hygiene Progress Reports, Environmental Sciences Laboratory, Mt. Sinai School of Medicine, New York; Occupational Safety and Health Reporter, BNA, Washington, D.C.

36. Has defendant undertaken to investigate the occurrence alleged in plaintiff's complaint?

ANSWER

No.

37. If so, please state:

- a. The name, address and job title of the person participating in each such investigation.
- b. List each written record pertaining to such investigation and its location and custodian.
- c. Has defendant obtained statements from any witnesses?
- d. If so, please list each witness who has given a statement and the name, address and job title of each person having custody of any such statement.

ANSWER

Not applicable.

38. Has defendant at any time been a member of any "trade organization" or "association" composed of other manufacturers, miners, and/or sellers of asbestos products?

ANSWER

No.

39. If so, please state:

- a. The name and address of each such association or organization.
- b. The dates during which defendant was a member.
- c. The names of any publications published by or written by such association or organization.

ANSWER

Not applicable.

40. Please identify by location and product produced, each plant in which products listed in your answers to Interrogatory No. 6 have been manufactured and/or mined and the dates said plants have been in operation.

ANSWER

This Defendant has manufactured products at the following plants during the following dates: Port Kennedy, PA - June 5, 1963 to 1972; Aurora, IL - April 3, 1968 to 1972; St. Louis, MO - March 27, 1969 to 1972. For a breakdown of the location where the various products were produced see Exhibit "A" attached hereto.

41. Please list the name and address of each business entity from whom you have received raw asbestos and that dates and amounts received.

ANSWER

To the best of this Defendant's knowledge, the following companies supplied this Defendant with raw asbestos during the time that it manufactured asbestos-containing products from mid-1963 through 1972: Johns-Manville Corporation; Carey-Canadian Mines, Ltd.; Empire Ace Manufacturing Co.; Chicago Fire Brick Co.; George A. Rowley Co., Inc.; Asbestos Corporation and Asbestos Spray Corporation. Defendant has no complete records of the amounts and dates of such purchases.

42. Have sales materials been prepared by defendant or its agent for purposes of marketing or advertising defendant's asbestos products?

ANSWER

See Answer to Interrogatory No. 43.

43. If so, please state:

- a. The name and address of each person or entity who prepared same.
- b. The name, address and job title of each person who presently has possession of same.
- c. The date same was prepared.
- d. The media used to disseminate the sales material.

ANSWER

Although this Defendant never advertised its asbestos-containing insulation products, it nevertheless had some informational material that it provided to distributors from time to time. Although this Defendant does not have a complete duplicate of such material, what it does have is attached hereto as Exhibit "C". To the best of this Defendant's knowledge, the information contained in this material was prepared by Donald Peterson, former Administrative Assistant to the Vice President of Sales. He is no longer employed by this Defendant. In addition, a portion of this material was, to the best of this Defendant's knowledge, prepared by Kenneth Cohn, formerly Office Manager (Sales Department). He is no longer employed by this Defendant.

44. Does defendant contend that the plaintiff, Harry C. Leopold, improperly used its products?

ANSWER: We have not been provided with any information indicating that the Plaintiff used any products manufactured or sold by this Defendant.

45. If so, please set out in detail in what respect said products were improperly used.

ANSWER

See Answer to Interrogatory No. 44.

46. Does defendant have policies of insurance that might cover the claim that has been made by plaintiff herein?

ANSWER

Yes.

47. If so, please list the name of each insurance carrier who may have coverage, the amount of such coverage, and the dates of each such policy.

ANSWER

During the time that this Defendant manufactured asbestos-containing insulation products, it had liability insurance with The Travelers Insurance Company, Hartford, Connecticut -- primary liability policy \$500,000, umbrella policy \$5,000,000 -- plus various layers of excess insurance all subject to varying deductibles depending upon the year of coverage and subject to the terms, limitations and conditions of the respective policies.

48. Does defendant expect to call expert witnesses at the trial of this case?

ANSWER

No determination has been made at the present time as to those expert witnesses who may be called to testify at the trial of this matter.

49. If so, please state:

- a. The name, address and job classification of each such expert witness.
- b. The testimony expected to be given by each such expert witness.

ANSWER

See Answer to Interrogatory No. 48.

50. On what date did defendant first become aware that inhalation of asbestos fibers by human beings could cause adverse health consequences?

ANSWER

1969 (exact date unknown).

51. Does defendant contend that asbestos products can be manufactured so as to eliminate all potential health hazards to workers installing same?

ANSWER: This Defendant does not have sufficient scientific and medical information from which to answer this Interrogatory and therefore objects to the same.

52. If so, please explain.

ANSWER

See Answer and objection to Interrogatory No. 51.

53. Please describe in detail the type of packages in which defendant has sold asbestos material, listing the dates each type of package was used, a physical description thereof, and a description of any printed material or trademarks that appeared thereon.

ANSWER

This Defendant has no specific information referable to the packaging that each of its asbestos-containing insulation products came in other than what is shown on Exhibit "A". There was a warning label on the packaging of each product beginning in 1969.

Handwritten signature/initials

54. Please state in which state or states of the United States or what foreign country your business is incorporated.

ANSWER

See Answer to Interrogatory No. 2.

55. Did you receive or give any warning, instructions, or information as to the dangers of asbestos inhalation when you purchased, sold, shipped and delivered each order of asbestos products to or from any other defendant? If so, for each shipment, state:

- a. Describe in detail each such warning, instruction or information given or received.
- b. State whether such warning, instruction or information was oral or written.
- c. If oral, identify the substance of the warning, instruction or information given and the date and name of the person to whom given or from whom received by other defendants.

ANSWER

Not applicable.

56. Has defendant conducted or had conducted for it any investigation, study, test, review or analysis (hereinafter referred to as "study") concerning asbestos-related diseases, asbestosis, pulmonary diseases and/or the safety aspects concerning use of defendant's product? If so, identify each such study by:

- a. The date each study was conducted.
- b. The person authorizing the study.
- c. The person in charge of the study.
- d. The people participating in the study.
- e. The title and subject of the study.
- f. The results of each study.
- g. If statistical analyses were made, state the results and describe the date and assumptions upon which they were based.
- h. If in writing, either attach a copy of the study, or identify it by date, title, identification number, present location and custodian.

ANSWER

No.

57. If any employee or officer of defendant has testified at trial or by deposition in such litigation, or before any Congressional Committee or administrative agency concerning asbestos exposure, pulmonary or asbestos-related diseases or industrial hygiene relating to asbestos use, state:

- a. The name, address and title of each person who testified.
- b. The date, location and forum of such testimony.
- c. Whether defendant has a copy of such testimony.
- d. Whether defendant will voluntarily produce such testimony.

ANSWER

No employee of this Defendant has given testimony in trial nor before any congressional committee or administrative agency concerning asbestos exposure, etc. There have been a number of depositions taken in the numerous asbestos lawsuits this Defendant has been involved in. This Defendant objects to this Interrogatory on the grounds that the information sought is not relevant to any issue in this case and objects to having to search its records for all depositions that have possibly been taken in past years in other asbestos litigation. To require Defendant to do this would be most burdensome, harassing and expensive.

58. At the time of the development of each asbestos product listed in Answer No. 6 did you attempt to determine whether the product complied with the then applicable safety standards, safety orders, regulations, laws, rules and design requirements of any city, county, state or the Federal Government of the United States?

- a. If the answer is in the negative, please state the reasons for not conducting such an analysis and identify the name of the person deciding not to conduct the analysis.
- b. If the answer is in the affirmative, identify those safety standards, safety orders, regulations, laws, rules or other ordinances which you claim you considered.

ANSWER

To the best of this Defendant's knowledge, there were no applicable safety standards, safety orders or regulations in effect during the time that this Defendant manufactured asbestos-containing insulation products.

59. Did defendant ever recommend to purchasers or users of the asbestos products listed in your Answer No. 6 that respirators, protective masks and/or protective clothing be worn with the product? If so, state:

- a. The date or dates when such recommendation was made to each purchaser.
- b. The date or dates when each such recommendation was made to each user.
- c. Who made the recommendation?
- d. Who received the recommendation?
- e. If oral, the manner and substance of the recommendation.
- f. If written, identify the document by title, date, file designation and author of each such recommendation and the location and present custodian of each such recommendation.

ANSWER

Yes. For answer to a. through f. see Answers to Interrogatory Nos. 26 and 27.

60. Has your company had as part of its processing, distribution and sales of asbestos materials and products a system of inspections?

- a. If the answer is in the negative, please state the facts of not having such a system, and give the name, present address and telephone number of the person responsible on behalf of your company for making such a decision.
- b. If the answer is in the affirmative, state:
 - (i) when the system was initiated;
 - (ii) who was responsible for initiating and overseeing the system;
 - (iii) describe the system used;
 - (iv) if there are any documents describing the inspection system, identify each such document.

ANSWER

This Defendant does not know what is meant by "system of inspection". However, during the manufacturing process, quality control testing was done.

61. Is it possible to distinguish the asbestos products listed by you in Answer No. 6 from those manufactured by a competitor?

- a. If the answer is "yes," please describe how you contend your product can be distinguished and identify the products by trade and generic name.
- b. If there are products which cannot be, in your opinion, distinguished from products of a similar kind manufactured by a competitor, please state the name of such product, who manufactures it, as well as the trade name of the product manufactured by your competitor.

ANSWER

The products manufactured by this Defendant were distinguishable by their packaging. However, Defendant does not know all of the products manufactured by others and therefore cannot answer this Interrogatory with any degree of specificity other than as aforesaid.

62. State whether you had knowledge of any deaths or cases of lung disease or lung impairment among your employees which are or may be attributable to the inhalation of asbestos dust or fibers. If so, please give the number, the name and address of such persons, together with the dates of treatment and the names and addresses of the doctors who administered treatment to such persons and reports of occupational disease furnished Industrial Commission of the states and attach copies of the latter.

ANSWER

Defendant objects to Interrogatory No. 62 on the grounds that it is entirely irrelevant to any of the issues involved in this case. Without waiving the aforesaid objection, this Defendant should state that the first workers compensation claim filed against it based upon an allegation of harm from asbestos-containing products was filed in October 1973 after this Defendant had ceased to manufacture such products.

63. Do you have any statistical data showing the number of your employees who have been exposed to asbestos dust and fibers for more than ten years who have asbestos-related lung disease or lung impairment? If so, identify the date and provide the figures.

ANSWER

No, this Defendant was not in the business of manufacturing asbestos-containing insulation products for 10 years.

64. Have you contributed any funds to research concerning asbestos and its relation to lung, abdominal, heart and larynx disease? If so, please state for each year the amount of money contributed, when and to whom, attaching any report or reports from each individual or organization to whom your funds were contributed.

ANSWER

No.

65. Would any respirators or other breathing devices prevent inhalation of the asbestos dust and fibers in your product? If so, state:

- a. When the respirator sold.
- b. Give the detailed description of such respirator or other breathing device.
- c. The basis of your claim that said respirator or other breathing device will prevent the inhalation of such dust and fibers.
- d. Identify any tests performed by date, title, author and number.

ANSWER

This Defendant does not have sufficient scientific and medical information from which to answer this Interrogatory and therefore objects to the same.

66. Have you, at any time, used the services of an industrial health organization? If so, state:

- a. The name of the organization.
- b. The dates such services were used.
- c. The name of the persons in your company and in the health organization who negotiated the agreement or understanding.
- d. Whether any reports or documents concerning the services were prepared and, if so, identify the documents by name, date, title, file number and present location.

ANSWER

No.

67. Do you maintain a library or file of pathological findings, slides, x-rays and related material concerning asbestos induced injuries, disability or impairment? If so, state:

- a. The date such file was first organized.
- b. All past and present custodians of the file.
- c. Where the file is presently located.
- d. Identify the material included in the file.

ANSWER:

No.

SEERY & DOLLAR

By



Frank Watson, Jr.
516 Equitable Building
Des Moines, Iowa 50309
Telephone: 515-243-3236

and

By: Thomas H. Hart, III and
Ronald L. Motley
Blatt & Fales, P.A.
Box 365
Barnwell, SC 29812
Telephone: (803) 259-3525

ATTORNEYS FOR PLAINTIFFS

AFFIDAVIT

STATE OF Penn. } ss
COUNTY OF Montgomery }

I, Richard D. O'Connor, being first duly sworn hereby state that I am the Director of Valley Forge Services, Combustion Engineering, Inc., the Defendant named in the foregoing Answers to Interrogatories; that I have read the foregoing Answers to Interrogatories and state the same are true and correct as I verily believe.

Richard D. O'Connor
RICHARD D. O'CONNOR

Subscribed and sworn to before me this 5th day of
November, 1986.

Earl O. DiJenno, Jr.
NOTARY PUBLIC IN AND FOR THE STATE
OF Penn.

EARL O. DIJENNO, JR., Notary Public
Plymouth Twp., Montgomery Co.
My Commission Expires Nov. 20, 1988

ADVANTAGES OF PYROSCAT (Continued)

Lighter Weight.... Pyroscat weighs less than 55 lbs./cu. ft. in place, compared to approximately 150 lbs./cu. ft. for conventional concrete fireproofing. Excess dead weight is eliminated. As usually sprayed or trowelled in a protective sheath, Pyroscat weighs about 1/10 as much as formed concrete - at equivalent thickness per running foot.

Spray, Cast or Trowel.... Pyroscat is specially formulated to permit installation by spray, trowel and casting techniques, depending on local job conditions. No other fireproofing material is as versatile from an application standpoint. Employs conventional supporting materials and placement. Only the one fireproofing material is required - no need for subsequent finishing layers nor heavy mastic coatings.

Durable and Weather-Resistant.... Pyroscat develops great strength from its selected high-temperature aggregates and hydraulic-setting binders. It withstands continued cycles of saturated freeze-and-thaw weathering tests.

SUMMARY OF PHYSICAL PROPERTIES:

Coverage (Trowelled)	1.1 cu. ft. /50 lb. bag
Material Required (Trowel Application)	45 lbs. per cu. ft.
Air-Cured Weight (After Hydration and Drying)	54.5 lbs. per cu. ft.
Compressive Strength - Air-Cured	1650 psi
Compressive Strength After Firing at 1500°F.	1.5%
Lineal Shrinkage - Air Cured	Less than 1%
Lineal Shrinkage After Firing at 1500°F.	1.5%
Density After Firing at 1500°F.	49.1 lbs. per cu. ft.
Fusion Temperature	2200 F
Thermal Conductivity (k) at 1000°F. Mean Temp.	1.50 Btu
Setting Time	4 to 6 hours
Mixing Water:	
For Spray & Trowel Consistency	3-1/2 Gal. water/50 lb. bag
For Casting Consistency	5 Gal. water/50 lb. bag

Curing:

Pyroscat is a cementitious material and should be kept moist during the curing period of 72 hours or longer.

REFRACTORY & INSULATION CORPORATION
625 ILLINOIS AVE.
AURORA, ILLINOIS

PORT KENNEDY
PENNSYLVANIA

EXHIBIT "A"

<u>INSULATING BLOCK</u>	<u>C-E START</u>	<u>ESTIMATED STOP</u>	<u>PERCENT AND TYPE OF ASBESTOS</u>	<u>CONTAINER</u>
(m) #12 Insulating Block (R)	1963	1966	4.5(A)	Cardboard Carton
(m) #19 Insulating Block (R)	1963	1966	4.6(A)	Cardboard Carton
(m) Griptex* Mineral Wool Block (D)	1964	1972	2.0(C)	Cardboard Carton
(m) Kaiser M. Block (D)	Unknown	1971	2.0(C)	Cardboard Carton

INSULATING CEMENTS

(m) Stic-tite* (R)	1963	6/27/72	38.6-42.2(C)	50 lb bags
(D)	1964	8/30/72		
(m) Super Stic-tite (R)	1964	6/27/72	9.89-10(C)	50 lb bags
(D)	1964	8/30/72		
(m) Super Finish stic-tite (R)	1963	6/27/72	11.5-13.1(C)	50 lb bags
(m) Super Finish (R)	8/10/65	1/10/68	14.2(C)	40 lb bags
(m) Super 711(D)	1964	6/27/72	13.7(C)	50 lb bags
(m) Kaiser Mineral Wool Cement (D)	1964	1971	13.7(C)	50 lb bags
(m) Utility Thermal Finish Cement (D)	1964	2/28/72	4.75(C)	50 lb bags
(m) Casing Cement (D)	1964	1969	4.9(C)	50 lb bags
(m) MHD Finishing Cement (D)	1964	1968	68.03(C)	50 lb bags
(m) Pyroscat* Fireproofing Cement (D)	1964	6/8/72	3.0(C)	50 lb bags
(m) Hilite Insulating Cement (D)	1964	1968	9.1(C)	50 lb bags
(m) A-1199 Insulating Cement (R)	1963	1966	43.4(C)	50 lb bags
(m) SDK 50 (R)	1963	1966	0.4(A)	50 lb bags
(m) Buck Stay Cement A-1360 (R)	1965	1966	0.8(A)	50 lb bags
(m) Castablock* (R)	1965	1/19/66	1.2(A)	50 lb bags
(m) Stirrup Cement (R)	1965	1966	42.7(C)	50 lb bags
(m) Calcrete 30 (D)	1964	1970	7.8(C)	50 lb bags

MISCELLANEOUS PRODUCTS

(d) Asbestos Rope (D)	1964	1965	100.0(C)	tied 100 ft coils - 1/2 to 3" in diamete
(d) Permiseal (D) (fibers in emulsion)	1964	1975	Approx. 3.0(C)	5 & 54 gallon steel containers
(d) Weatherkote (R) (fibers in emulsion) (Thermal Kote since 1976)	1963	1977	Approx. 3.0(C)	5, 30 & 55 gallon steel containers

<u>MISCELLANEOUS PRODUCTS</u>	<u>C-E START</u>	<u>ESTIMATED STOP</u>	<u>PERCENT AND TYPE OF ASBESTOS</u>	<u>CONTAINER</u>
(d) Duriseal (D) (fibers in emulsion)	1964	1973	Approx. 3.0(C)	5, 30 & 55 gallon steel containers
(d) Thermal Coat (D) (fibers in emulsion)	1964	1964	Approx. 3.0(C)	5, 30 & 55 gallon steel containers
(d) Air Check (R) (fibers in emulsion)	1963	1971	Approx. 3.0(C)	5, 30 & 55 gallon steel containers
(m) Block Stick (R)	1963	6/28/72	22.0(C)	6 gallon steel containers
(m) Gunisul	1963	1966	Approx. 1.0(A)	50 lb bags
(m) Mix A (R)	1963	6/27/72	6.0(C)	40 lb bags
(m) Fibrous Adhesive (D)	1964	1965	13.1(C)	Steel container
(m) Hytempt Flexible Compound (R)	1963	1972	30.0(C)	5 gallon steel containers
(m) Expansion Joint Material (R)	1963	1966	100.0(A)	25 lb. bags
<u>INSULATING REFRACTORIES</u>				
(m) Lite Wate 22 (W)	1969	6/26/72	10.0(C)/ 27.0(C)	50 lb bags

KEY

(R) - R & I - Port Kennedy, Pennsylvania
 (D) - Detrick - Aurora, Illinois
 (W) - Walsh - St. Louis, Missouri
 (m) - manufactured
 (d) - distributed
 (C) - containing chrysotile
 (A) - containing amosite
 (*) - Trademark



CAUTION: This product contains asbestos fibers. Excessive inhalation of asbestos may be harmful. If adequate ventilation is not possible, wear respirators approved by U.S. Bureau of Mines.

EXHIBIT "C"

INDUSTRIAL INSULATIONS

TECHNICAL DATA

CE REFRACTORIES
A DIVISION OF COMBUSTION ENGINEERING, INC.



500° ROPE IS A COMMERCIAL GRADE, WHITE CHRYSOTILE ASBESTOS FIBER.

1000° ROPE IS A PURE 98/100% WHITE CHRYSOTILE ASBESTOS FIBER.

APPLICATIONS OF C-E ASBESTOS ROPE . . HERE ARE SOME OF THE MANY SERVICES

STEEL MILLS AND FOUNDRIES

Uses for C-E Asbestos Rope are almost endless. Sealing molds, vacuum-pouring equipment (where leakage can ruin an entire billet), sand molds off from pouring ladles, calking joints in large cores which must be segmented.

ATOMIC ENERGY

1000° is standard in the Industry because it withstands an integrated neutron flux of 10^{19} NTV units.

MARINE SERVICE

C-E Asbestos Rope is essential in the Engine Room for general boiler service such as calking, filling and expansion joints, wrapping hard-to-reach steam lines and in emergencies, for quick repair of damaged steam lines.

GENERAL INDUSTRY

Anywhere heat sealing is required, whether heat-treating furnaces, boilers or processing operations.

POWER PLANTS

Between boiler walls and brick-work to allow for expansion and contraction, wrapping steam and exhaust lines where space limitations preclude formed insulation, covering small ducts, calking hard-to-reach spaces, insulating hot pipes passing through fire-walls and bulkheads. It is the standard for use in grooves for door sealing, between boiler sections, expansion joints and in handling hot gases.

ASBESTOS ROPE CAN HANDLE EFFICIENTLY AND ECONOMICALLY

CHEMICAL INDUSTRIES

C-E 1000° rope is successfully used as calking rope for bell and spigot joints in chemical lines. Because it contains no organic components, it is used as yarning rope for water lines. In addition to its heat-resistance, the chemically inert characteristics have made it a "standard" in other chemical-handling operations such as packing for carboy-stoppers, and in Cryogenic services, and other applications where this property is required.

ALUMINUM PLANTS

Anywhere the control of heat and sealing is needed—heat-treating ovens, grooves for door sealing, pouring ladles, vacuum seals on crucibles, and in many other dry heat-sealing applications, C-E Rope is recommended.

Griptex® is a major development in insulation offering a unique combination of characteristics. Special mineral fibers combined with high temperature bonding materials, provide practical advantages. The embossed hard finish surface provides superior handling strength and stronger adhesion of cement finishes. The combination of flexibility and high strength make impaling over welded pins easy, without pre-drilling. The neutral PH of Griptex Block assures against corrosive action. This particularly is important when used in conjunction with aluminum jacketing.

Hydraulic setting cements and castable refractories may be applied directly to Griptex Block without premature loss of mixing water needed for proper hydration.

EFFICIENT

The felted fiber core of Griptex Block offers the maximum buffering action against heat penetration up to 1800°F. The thermal conductivity at 200°F. means temperature is .37 BTU; at 600°F. It is .49 BTU.

APPLICATION METHODS

Griptex may be simply impaled over standard welded pins and secured with speed clips or may be secured in place with metal bands. A sharp knife is the only tool needed to fabricate Griptex to fit irregular shaped equipment. Simply press over bolt heads and projections without additional cutting. Outdoor applications should be weatherproofed.

RECOMMENDED USES

BOILERS

Drums
Headers
Walls
Economizers
Air Preheaters

FURNACES

Heating
Heat Treating
Forging
Annealing
Normalizing

OVENS, KILNS & DRYERS
FIREPROOFING
TANKS & VESSELS

TURBINES & PUMPS
FAN HOUSING
DUCTS & BREECHINGS

SPECIFICATION REFERENCES

High Temperature mineral fiber block insulation shall be GRIPTEX complying with the performance requirements of ASTM C-392, Class 2; Federal Specification HH-1-564 and/or Commercial Standard CS-117 of the U. S. Department of Commerce.

*A C-E trade name.



SUPER 711 Insulating Cement is a mixture of high temperature mineral fibers specially processed into resilient wool nodules, combined with asbestos and suitable binders to form a high temperature plastic insulation. Water added according to directions gives a trowelable consistency that is ready for application on equipment to be operated at temperatures up to 1800°F.

WIDE USAGE

SUPER 711 is a versatile material for many types of insulation requirements. Applied over block or blanket insulations, it fills open joints and provides a monolithic surface for whatever type of subsequent finish is specified. Its plastic flexibility permits application directly to regular or curved surfaces -- such as valves, fittings, tanks and vessels.

EASY TO APPLY

SUPER 711 has excellent adhesive qualities. Its increased stickability means a better job in less time, from wet to dry. Will not slip or roll under trowel application and may be easily gun applied. This superior workability is a result of fine mineral nodules, special manufacturing methods and quality control.

MAXIMUM COVERAGE - LOW SHRINKAGE

SUPER 711 Insulating Cement assures maximum coverage and low shrinkage. The resilient nodules of mineral fiber do not collapse when mixed with water. See table of Physical Properties for coverage.

RECOMMENDED USES

BOILERS

Drums
Headers
Walls
Economizers
Air Preheaters

OVENS, KILNS & DRYERS

VALVES & FITTINGS
TANKS & VESSELS

FURNACES

Heating
Heat Treating
Forging
Annealing
Normalizing

TURBINES & PUMPS

FAN HOUSINGS
DUCTS & BREECHINGS

SPECIFICATION REFERENCES

SUPER 711 Mineral Fiber Insulating Cement conforms to ASTM C-195-48; Federal Specification HH-C-168 (Class C); and/or Commercial Standard CS-117 of the U. S. Department of Commerce.



SUPER 711 Insulating Cement is a mixture of high temperature mineral fibers specially processed into resilient wool nodules, combined with asbestos and suitable binders to form a high temperature plastic insulation. Water added according to directions gives a trowelable consistency that is ready for application on equipment to be operated at temperatures up to 1800°F.

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Walls
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OVENS, KILNS & DRYERS
VALVES & FITTINGS
TANKS & VESSELS

FURNACES

Heating
Heat Treating
Forging
Annealing
Normalizing

TURBINES & PUMPS
FAN HOUSINGS
DUCTS & BREECHINGS

SPECIFICATION REFERENCES

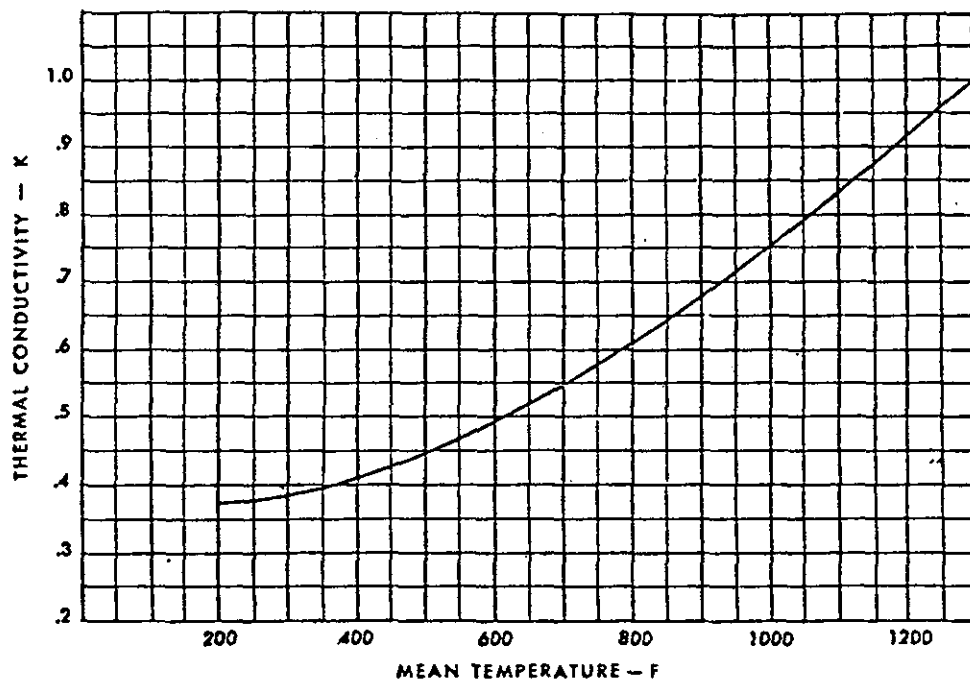
SUPER 711 Mineral Fiber Insulating Cement conforms to ASTM C-195-48; Federal Specification HH-C-168 (Class C); and/or Commercial Standard CS-117 of the U. S. Department of Commerce.

SUMMARY OF PHYSICAL PROPERTIES

Use Limit
Sintering Temperature
Thermal Conductivity
Compressive Strength
Density
Stability
Resistance to Moisture
Resistance to Corrosion
Handling Characteristics

Up to 1800°F.
2100°F.
See Accompanying Graph
18 psi
1.25 lbs./bd. ft.
Inert - durable
Water-repellent
Non-corrosive
Excellent

Thermal Conductivity - Griptex Block



STANDARD SIZES

6"x12"	12"x12"	12"x36"
6"x18"	12"x18"	18"x24"
6"x36"	12"x24"	24"x36"

Thicknesses range from 1" to 4"—in 1/2" increments.

TEAR TAPE CARTON

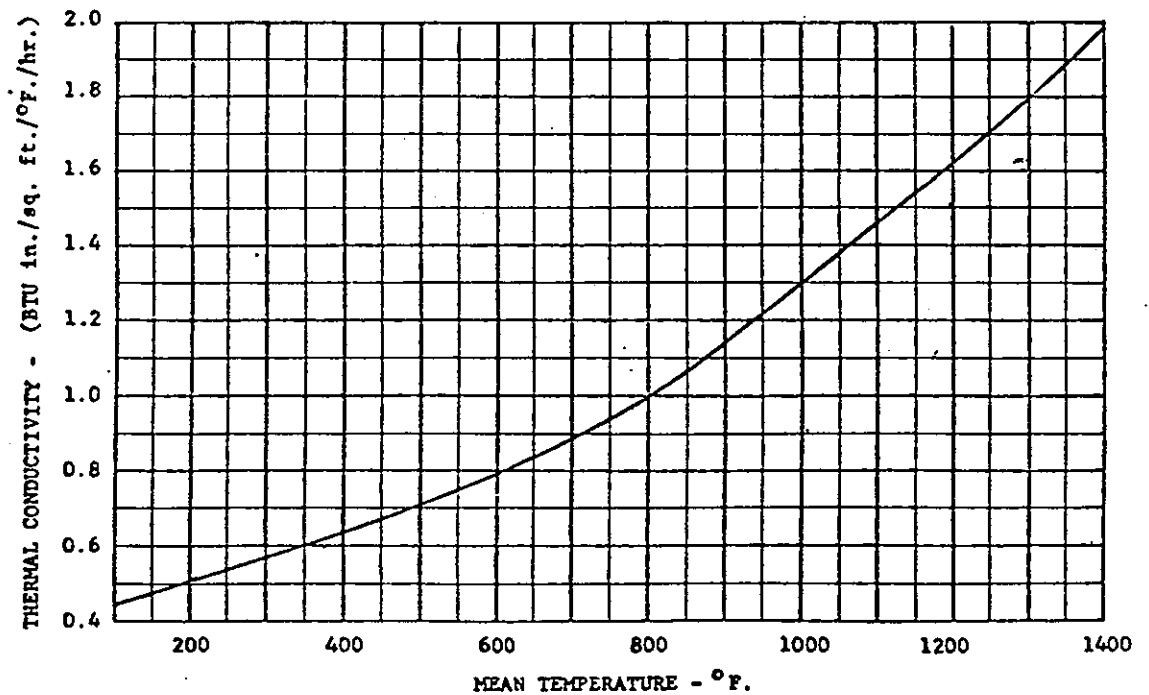
Griptex block is packaged in the new . . . easy open . . . tear tape carton. This easy open carton simply zips in half, forming two convenient containers . . . less waste . . . less damage . . . less lost time.

PHYSICAL PROPERTIES OF SUPER 711 INSULATING CEMENT

Service Temperature	1800°F.
Water Ratio	12 gals. per 50 lbs. bag
Dry Coverage	50 sq. ft. 1" thick per 100 lbs.
Material Requirements	2 lbs. per sq. ft. 1" thick
Compressive Strength	45 psi
Density (Applied and Dried)	24 lbs. per cubic foot
Shrinkage (Wet to Dry, by Volume)	15%
Thermal Conductivity	See Chart
Reclaimable to	1000°F.
Adhesion to Steel (Wet)	6 psi
Adhesion to Steel (Dry)	8 psi
Corrosion Resistance to Steel	Non-corrosive
Shipping Containers (Sewn Closure)	50 lb. paper bags

Tabulated values represent typical performance levels of SUPER 711 Insulating Cement - Trowel Grade. SUPER 711 Grade Cement consists of the same basic materials that smaller mineral wool nodules are utilized to facilitate application.

THERMAL CONDUCTIVITY OF SUPER 711 INSULATING CEMENT





REFRACTORIES

A DIVISION OF COMBUSTION ENGINEERING, INC.

Technical Bulletin

UTILITY THERMAL FINISH CEMENT

Utility Thermal Finish Cement is composed of high quality mineral fiber, hydraulic binders, and other suitable materials. Utility combines the flexibility, high temperature resistance, and excellent insulating qualities of uniformly nodulated mineral fiber with the strength, low shrinkage, and smooth finish of hydraulic setting cement. The result is a quick setting, smooth finish, thermal resistant, single layer insulating finish cement. For temperatures up to 1200°F.

QUICK SETTING

Utility Insulating Finish Cement develops a smooth, durable, protective finish within a few hours after application and without the presence of heat. Subsequent drying produces no excessive surface cracking or shrinkage in thickness, and occasional wetting does no damage after hydraulic set. Long drying periods under normal conditions are eliminated. Saves time in applying weatherproofing paint, or other finishes. Jobs are easier to schedule; scaffolding costs are reduced.

ONE COAT APPLICATION

Utility is normally applied in a single layer application. A second layer is needed only when multiple layer thicknesses are specified. Utility is virtually an all-purpose insulating finish cement, designed primarily for use over Griptex block or blanket insulations. Utility is widely used for insulating valves, fittings, heated equipment, and as an anti-sweat insulation for cold water tanks, pumps, etc.

Utility trowels with a good key on block insulation, blanket insulation and insulating cement. It has good wet adhesion to clean steel surfaces, such as valves and fittings.

PLEASING APPEARANCE

Utility dries to a smooth, light reflectant surface which as an interior finish, requires no further treatment. Utility, however, is easily painted if desired. Outdoor applications should be weather protected. Low temperature applications require a vapor seal type finish.

EXCELLENT THERMAL QUALITIES

Utility has a "K" factor of .79 at 600°F. mean temperature. This excellent insulating value as compared to other finish cements is a very desirable advantage when figuring job and operating costs.

PHYSICAL PROPERTIES

Service Temperature	1200°F.
Water Ratio (Trowel Application)	7 gals. per 50 lb. bag
Dry Coverage (Trowel Application)	37 sq. ft. 1/2" thick per 50 lb. bag
Setting Time	2 to 4 hours average conditions.
Material Requirements (Trowel Application)	1.3 lbs. per sq. ft. 1/2" thick.
Compressive Strength (Air Cured)	135 psi.
Compressive Strength (@ 1200°F.)	105 psi.
Density (Applied and Dried)	35 lbs. per cubic foot.
Shrinkage (Wet to Dry)	Negligible.
"K" Factor at 600°F. Mean Temperature	.79 Btu.
Corrosion Resistance to Steel	Non-corrosive.
Surface Treatment	Easily painted or weatherproofed when required.
Shipping Containers (Sewn Closure)	50 lbs. paper bag.

MIXING -

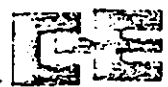
Utility Thermal Finish Cement should be mixed in a clean mortar box or mixer, using approximately 7 gallons of water per 50 lbs. bag for a good troweling consistency over most blocks, blankets, or insulating cements. Because of the hydraulic binder, Utility should not be mixed with water more than two hours in advance of its application. With cold mixing water (below 60°F.) it remains workable up to 4 hrs.

STORAGE

Store in a cool, dry location until ready to use.

C.E. REFRACTORIES, A DIVISION OF COMBUSTION ENGINEERING, INC.
VALLEY FORGE, PENNSYLVANIA 19481

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REFRACTORIES

A DIVISION OF COMBUSTION ENGINEERING, INC.

Technical Bulletin

PERMISEAL - THERMAL COAT

Basically there are three types of asphalt mastics used in the insulation field. They are usually classified as water emulsion, solvent cutback, or chemical dispersion types. The thinning agent or dispersion chemical determines which basic classification will be given a particular product, and dictates the end use of the resultant product.

It is important to know which thinning agent is used to determine the useful qualities of a particularly blended asphalt mastic. The quality and/or type of basic asphalt determines the service temperature of the product involved.

WATER EMULSION ASPHALT MASTICS

The water emulsion type of asphalt weather coating such as Thermal Coat, is normally a blend of petroleum asphalt, asbestos fiber and Bentonite clay, emulsified in water.

Water emulsions are primarily used as a breathing mastic, i.e., if suitable pressure is built up beneath its surface, moisture present will pass through to the atmosphere. However, atmospheric pressure is normally not sufficient to pass moisture back through to the insulation, except, of course, on low temperature work. In this case, a vapor barrier type mastic such as Duriseal is essential.

Summer grade water emulsions, because of the water present, will freeze and should be protected at all times prior to and during application. Alcohol is usually added to Winter grade emulsions. The amount used determines the resistance to freezing of the resultant product. Water emulsions should always be stored and used at temperatures above freezing in any event. A water emulsion that has been frozen is useless and will "alligator" if applied.

Water emulsions usually are suitable only for trowel application and are used wherever a breathing mastic is required. Because they lack the adhesive qualities and resiliency of a cutback type mastic, they should be mechanically bonded to poultry netting except on extremely small surfaces. They should be used in conjunction with a cutback or dispersion type flashing compound. Water emulsions can only be repaired with such types of mastics since they do not bond to themselves. It is imperative that they be repaired as soon as possible if a break in the applied surface should occur to insure service life of the product.

Thermal Coat may be applied at temperatures up to 200°F, and will withstand a maximum temperature of 450°F. after drying.

CAUTION:

Water emulsions are soluble in water and should not be applied if there is a possibility of rain washing the product within twelve hours of the initial application time. Keep Winter Grade above 20°F.

CHEMICAL DISPERSION TYPE ASPHALT MASTICS

Chemical dispersion type asphalt mastics, such as PERMISEAL, incorporate a unique combination of the desirable qualities of the water emulsion and cutback types. They normally consist of petroleum asphalt dispersed in a non-flammable chemical with suitable fillers, blended in one consistency suitable for brush, trowel or spray applications. Containing non-flammable solvents, they are fire-safe for use around open flame, welding torches and similar hazardous job conditions. They have the breathing characteristic of a water emulsion for a period of sixty to ninety days after application. This controlled curing process prevents shrinkage of the surface film and permits trapped moisture to escape. The result is a flexible, blister free, vapor seal type coating of exceptional toughness. A good chemical dispersion product is not affected by freezing and resists most acids and alkalis. However, solubility in water is a factor, depending upon humidity conditions, for a period of eight to twelve hours or longer after application. The anodizing and rust inhibiting agents contained in PERMISEAL make this product excellent for metal protection purposes. PERMISEAL has a useful service temperature up to 300°F. and a maximum of 400°F.

CAUTION:

Dispersion type mastics should be treated the same as water emulsion types, in that they should not be applied if there is a danger of rain washing within eight to twelve hours of the application time. Under proper temperature and humidity conditions, PERMISEAL will be dry to touch in four hours or less.

C.E. REFRACTORIES, A DIVISION OF COMBUSTION ENGINEERING, INC.

VALLEY FORGE, PENNSYLVANIA 19481

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WEATHER COATINGS AND SEALERS

CLASSIFICATION	WATER EMULSION	CHEMICAL DISPERSION
	THERMAL COAT	PERMISEAL
Application Method	Trowel	Brush-Trowel-Spray
Maximum Temperature	450° F.	400° F.
Application Temperature	40° F. to 200° F.	40° F. to 200° F.
Coverage - Wet	5-6 sq. ft., 1/4" thick/gal.	10 sq. ft., 1/4" thick/gal.
Coverage - Dried	5-6 sq. ft., 1/8" thick/gal.	10 sq. ft., 1/8" thick/gal.
		20 sq. ft., 1/16" thick/gal.
Trowel or Flash Coat	1/4" thick wet	1/4" thick wet
Brush or Spray Coat	Trowel only	Brush or Spray two 1/8" thick wet coats reinforced as req'd.
Reinforcement when required	Poultry netting	Suitable fabric
General Use	Breather type weater coating	Weather coating and sealer for insulation, masonry steel, alum.
Adhesive Strength	Should be bonded to poultry netting	Excellent after curing on clean dry surface
Curing for Best Results	Avoid low temperature and high humidity conditions	Avoid low temperature and high humidity conditions
Flame Resistance	Non-flammable	Non-flammable
Freeze Resistance	Protect from freezing	Not affected
Corrosion Resistance	Not inhibited	Inhibited against rust and corrosion
Vapor Resistance	Will breathe	Will breathe during 2-3 month curing period, then becomes vapor-seal
Packaged	5 Gal. 50 Gal. Steel Container	5 gal. and 54 gal. (plastic liner) steel container
Shipping Weight	55 lbs. 550 lbs.	45 lbs. 480 lbs.



Type T-178, T-278

Duriseal Protective Coatings are special blends of mastics, combined with asbestos fiber and mineral fillers to provide an excellent sealing material. Applied over masonry settings, they dry slowly to form a black, fire-resistant, air-tight film that is impervious to water exposure, chemical attack and normal abrasion. Duriseal Coatings also are used in conjunction with Detrick Thermal Coat where a flexible flashing compound is required to seal joints around openings, as a caulking compound, and for low temperature stack linings to prevent corrosion.

STANDARD TEMPERATURE GRADES (To 400 F)

For surface temperatures that will not be operated in excess of 350-400°F the Standard Grades are recommended. Standard Type T-178 is made to a semi-viscous, troweling consistency.

HIGH TEMPERATURE GRADES (To 700 F)

When surface temperatures will exceed 400°F during operation, but not in excess of 700°F, Duriseal High Temperature Coatings should be used.

EASY TO APPLY

Duriseal Coatings may be applied over any cool, clean, dry surface, using suitable membrane between spray coats and for patching purposes. Where used, membrane should be lapped 4" at all joints or around patch applications. For ease of application, the best workable temperature range is 50°F to 100°F. Storage temperature should not exceed 100°F. Duriseal Protective Coatings require no thinning.

COVERAGE

Material requirements are estimated on wet coverage of approximately 5 to 6 square feet (1/4" thick) per gallon.

CONTAINERS

Duriseal Protective Coatings are shipped in 5 or 55 gallon steel containers.

CAUTION:

Surface during application should be above 100°F for indoor applications or 130°F for outdoor applications. Provide adequate ventilation and do not apply in vicinity of open flame, welding arcs, etc.



FOR FIREPROOFING STRUCTURAL STEEL

Pyroscat is a special formulation of high-temperature aggregates, asbestos fibers, hydraulic binder and other materials. These ingredients are factory blended to a uniform dry mixture that is ready for application after mixing with water at the job site. Pyroscat is adapted to application by spraying, casting and trowelling techniques, depending on job conditions.

USES:

Pyroscat provides a lightweight, fire-retardant protective treatment for structural steel columns, beams, tower skirts, LP gas tanks, and other exposed applications in refineries and chemical plants. Pyroscat sets up to a hard, durable sheath capable of withstanding for hours the 2000°F. flame temperatures and high-pressure water streams commonly encountered in industrial fires.

RECOMMENDED THICKNESSES:

Fire-retardant materials are customarily rated in Hours, based on a given thickness used and on the method of application. For example, fire ratings for steel columns represent the number of hours required for heat from a "standard fire" to penetrate the protective treatment as applied, and to increase the steel column temperature to a critical level (1200°F.) The thermal conductivity and heat capacity of a material are of some importance in an ASTM Fire Test. But the ability of the complete treatment to withstand thermal shock without destruction is one of the most significant factors in determining practical fire ratings in industrial installations.

The Pyroscat thicknesses recommended below were determined by physical tests on a series of sprayed, cast and trowelled applications. Tests included direct exposure to 100 psi hose pressure, both before and after subjecting the Pyroscat treatment to severe flame conditions.

THICKNESS OF PYROSCAT	APPROX. FIRE RESISTANCE RATING
1"	2 Hours
1-3/4"	3 Hours (UL-R-3960)
2"	4 Hours

ADVANTAGES OF PYROSCAT

SAFER WHILE FIGHTING FIRES . . . Many concrete aggregates and common bricks used for fireproofing purposes will spall and shatter when they are heated and subjected to hose stream. Pyroscat remains virtually unaffected after direct flame exposure and saturation with a 200 psi hose stream.

LIGHTER WEIGHT . . . Pyroscat weighs less than 55 lbs./cu. ft. in place, compared to approximately 150 lbs./cu. ft. for conventional concrete fireproofing. Excess dead weight is eliminated. As usually sprayed or trowelled in a protective sheath, Pyroscat weighs about 1/10 as much as formed concrete - at equivalent thickness per running foot.

*A C-E trade name.

ADVANTAGES OF PYROSCAT (Continued)

SPRAY, CAST OR TROWEL . . . Pyroscat is specially formulated to permit installation by spray, trowel and casting techniques, depending on local job conditions. No other fireproofing material is as versatile from an application standpoint. Employs conventional supporting materials and placement. Only the one fireproofing material is required - no need for subsequent finishing layers nor heavy mastic coatings.

DURABLE AND WEATHER-RESISTANT . . . Pyroscat develops great strength from its selected high-temperature aggregates and hydraulic-setting binders. It withstands continued cycles of saturated freeze-and-thaw weathering tests.

SUMMARY OF PHYSICAL PROPERTIES

Coverage (Trowelled)	1.1 cu. ft./50 lb. bag
Material Required (Trowel Application)	45 lbs. per cu. ft.
Air-Cured Weight (After Hydration and Drying)	54.5 lbs. per cu. ft.
Compressive Strength - Air-Cured	1650 psi
Compressive Strength After Firing at 1500°F.	1.5%
Lineal Shrinkage - Air Cured	Less than 1%
Lineal Shrinkage After Firing at 1500°F.	1.5%
Density After Firing at 1500°F.	39.1 lbs. per cu. ft.
Fusion Temperature	2200 F
Thermal Conductivity (k) at 1000°F..Mean Temp.	1.50 Btu
Setting Time	4 to 6 hours
Mixing Water:	
For Spray & Trowel Consistency	3-1/2 Gal. water/50 lbs. bag
For Casting Consistency	5 Gal. water/50 lbs. bag

Curing:

Pyroscat is a cementitious material and should be kept moist during the curing period of 72 hours or longer.

BOILER WALL COATING CEMENT

ELIMINATES AIR INFILTRATION

PREVENTS HEAT LEAKAGE

SAVES FUEL

INCREASES BOILER EFFICIENCY

Air-Check Cement is an asphaltic-asbestos fibre mixture in plastic form for covering the outside of both fire brick and red brick boiler walls. It is also used for pointing up cracks in boiler walls. Its safe, effective limit of usefulness is 350° F.

Air-Check Cement is tough, rubbery, plastic, easy to apply. A 3/16" thick coat troweled over the surface, dries to a thickness of slightly more than 1/8". It remains semi-plastic even though in service for a number of years.

ALL PURPOSE PLASTIC INSULATION

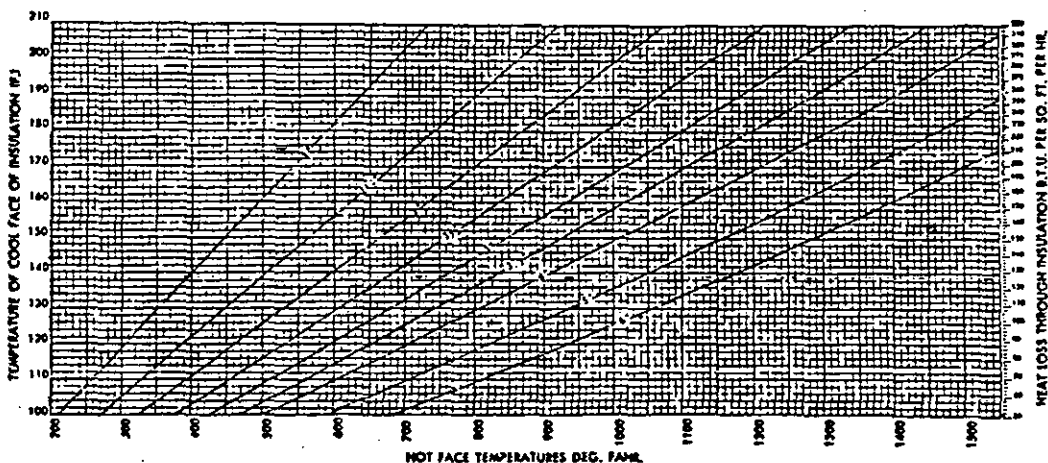
Stic-Tite and Super Stic-Tite plastic insulations are the most versatile insulating materials known. Mixed with water, right on the job, they adhere to any clean surface—and stay on—at all temperatures to 1800° F. They are light, strong and unusually durable.

Both Stic-Tites are a powerful barrier against heat loss. Composed of a special mixture of mineral wool and diatomaceous earth, the applied and dried material forms a spongy mass of billions of dead air cells, uniform in size and well isolated from each other. This stops air infiltration and resultant heat transmission.

HOW TO SELECT THE RIGHT THICKNESS

Estimate the operating temperature of your installation, (hot face). Follow the hot face temperature (bottom of chart) vertically until it intersects the line connecting the cool face (left hand column) or B.t.u. loss (right hand column). Use the amount of Stic-Tite indicated on the curve nearest the point of intersection.

For example, assume operating temperature is 825° F. and a cool face of 139° or 126 B.t.u. loss is desired. Follow the 825° line vertically until it intersects the horizontal 139° and 126 B.t.u. loss lines. The intersection is nearest the 3-1/2" Stic-Tite curve. Therefore, 3-1/2" of Stic-Tite should be used. At the same operating temperature if a cool face of 124° or B.t.u. loss of 96 is desired, the intersection would be nearest the 5" Stic-Tite curve. Therefore, 5" of Stic-Tite should be used.



WHERE STIC-TITE IS USED

Air Heaters	Elbows	Hot air lines	Steam pumps
Burner casings	Flanges	Hot piping	Tanks
Boiler, front, side and rear walls	Feed water heaters	Hot water heaters	Tube doors
Breechings	Furnace and Oven; walls, floors, roofs	Kettles	Uptakes
Cookers	Gas generators	Reaction vessels	Valves and fittings
Drum heads	Hot air ducts	Regenerator faces	All irregular surfaces
		Steam heaters	

CAN BE USED ON ALL SURFACES

Stic-Tite adheres strongly and permanently to metal (special inhibitors help prevent rusting of metal surface), tile, brick, insulating block and blankets or other clean surfaces, hot or cold. It can be used in difficult places where other types of insulation are unsuitable—on intricate piping, on elbows and flanges, on slanting vertical or curved surfaces and rounded corners. Stic-Tite provides a monolithic, seamless, jointless covering which can be troweled perfectly smooth for appearance.

EXCELLENT ADHESION—REALLY "STAYS ON"

Stic-Tite adheres permanently without lifting off or shaking loose even when subjected to severe vibration, abrasion or impact.

STOPS HEAT LOSS

The spongy mass of dead air cells checks air infiltration—prevents heat loss. Since dry Stic-Tite does not shrink or form cracks, the high insulating efficiency is never impaired.

EASY TO APPLY

Stic-Tite, mixed with the proper amount of water, forms an easily workable, plastic mass which can be troweled or safely applied with the bare hands. The usual practice is to apply first a roughing coat over the area to be covered, then trowel smooth around joints, over the surface and elbows, curves, etc.

LARGE COVERAGE

Since Stic-Tite dries with practically no shrinkage (an inch of Stic-Tite applied wet remains practically an inch thick when dry), less is required to provide sufficient insulating thickness. Mixed and applied as directed, 100 lbs. of the material cover 45 sq. ft. with a 1" thick layer.

CAN BE REUSED

If used at temperatures below 900°F., old Stic-Tite can be removed from equipment, crushed, mixed with clean water and reapplied like new Stic-Tite. This makes equipment repairs less costly since the insulation can be saved. Reclaimed Stic-Tite is equal to the new product in insulating efficiency, adhesion and plasticity.

SAVES LABOR AND MATERIALS

Stic-Tite is so easy to apply on all types of regular and irregular surfaces and over other insulations that labor cost is very low. Skilled men are not needed. Since Stic-Tite adheres so strongly, reinforcing wires and other supports are unnecessary when used up to 1-1/2" thick.

CONVENIENT PACKING

Stic-Tite is shipped dry in heavy, lined, dustless paper bags containing 25 lbs. and 50 lbs. each. It does not deteriorate in dry storage—can be kept indefinitely if dampness or wet places are avoided.

HOW TO APPLY

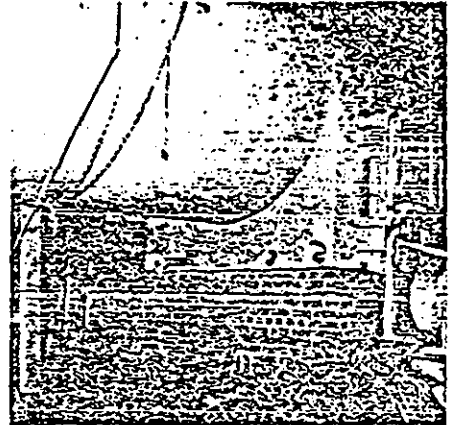
1. Each 50# bag should be mixed with 12 gallons (100 lbs.) of fresh water.
2. After thoroughly mixing, Stic-Tite can be applied immediately, but better results can be obtained by allowing it to soak for at least a half hour or longer.
3. All surfaces to be covered should be free of paint, dust, dirt and grease.
4. Roughing coats can be applied by hand or trowel or combination of hand and trowel.
5. If hot surfaces are to be insulated with Stic-Tite, the material should be spotted in place with a trowel and dragged down to a feather edge. The spotted material will dry quickly and then a rough coat about 1" thick can be applied over and between the spots.
6. On cold surfaces for covering up to 1-1/2" thick, after being mixed according to directions on the bag, Stic-Tite should be applied by spreading it over the surface to as even a thickness as possible. After the rough coat has dried out, a finish coat up to 1/2" thick can be applied over the rough surface and finished with a trowel to a smooth, attractive finish. Stic-Tite can be used up to 1-1/2" thick without reinforcing.
7. For covering over 1-1/2" thick, apply a rough coat about 1" thick. When rough coat is dry apply another 1" coat and continue until desired thickness is obtained. Each coat should be dried before additional coats are applied. Prior to application of finish coat, we recommend reinforcing with #20 gauge 2" mesh chicken wire.
8. Finish coats should be applied from 1/4" to 1/2" thick, troweled to a smooth, hard finish. Where desired, Stic-Tite finish can be painted. Best results are obtained by painting with a glue sizing and paint over this.
9. If more Stic-Tite is mixed than can be used, the left over material can be laid aside and remixed with water at a later date when it is required.



REFRACTORY & INSULATION CORPORATION

UTILITY THERMAL FINISH CEMENT

Utility Thermal Finish Cement is composed of high quality mineral fiber, hydraulic binders, and other suitable materials. Utility combines the flexibility, high temperature resistance, and excellent insulating qualities of uniformly nodulated mineral fiber with the strength, low shrinkage, and smooth finish of hydraulic setting cement. The result is a quick setting, smooth finish, thermal resistant, single layer insulating finish cement. For temperatures up to 1200°F.



QUICK SETTING

Utility Insulating Finish Cement develops a smooth, durable, protective finish within a few hours after application and without the presence of heat. Subsequent drying produces no excessive surface cracking or shrinkage in thickness, and occasional wetting does no damage after hydraulic set. Long drying periods under normal conditions are eliminated. Saves time in applying weatherproofing, paint, or other finishes. Jobs are easier to schedule; scaffolding costs are reduced.

ONE COAT APPLICATION

Utility is normally applied in a single layer application. A second layer is needed only when multiple layer thicknesses are specified. Utility is virtually an all-purpose insulating finish cement, designed primarily for use over Griptex block or blanket insulations. Utility is widely used for insulating valves, fittings, heated equipment, and as an anti-sweat insulation for cold water tanks, pumps, etc.

Utility trowels with a good key on block insulation, blanket insulation and insulating cement. It has good wet adhesion to clean steel surfaces, such as valves and fittings.

PLEASING APPEARANCE

Utility dries to a smooth, light reflectant surface which as an interior finish, requires no further treatment. Utility, however, is easily painted if desired. Outdoor applications should be weather protected. Low temperature applications require a vapor seal type finish.

EXCELLENT THERMAL QUALITIES

Utility has a "K" factor of .79 at 600°F. mean temperature. This excellent insulating value as compared to other finish cements is a very desirable advantage when figuring job and operating costs.

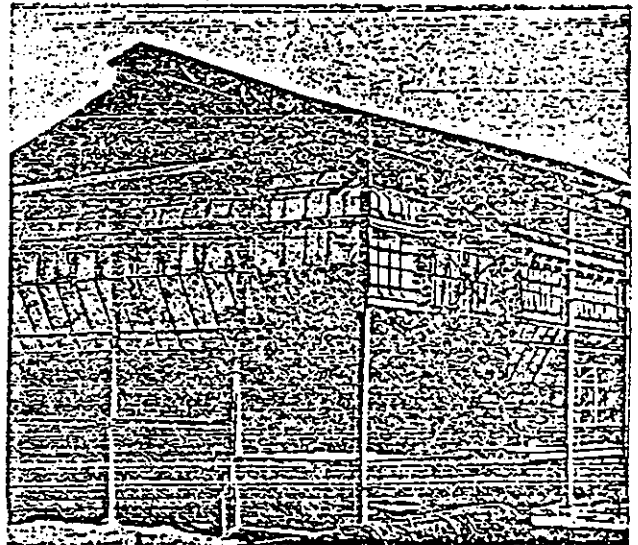
May, 1964

PHYSICAL PROPERTIES

Service Temperature	1200°F.
Water Ratio (Trowel Application)	7 gals. per 50 lb. bag.
Dry Coverage (Trowel Application)	37 sq. ft. 1/2" thick per 50 lb. bag
Setting Time	2 to 4 hrs. average conditions.
Material Requirements (Trowel Application)	1.3 lbs. per sq. ft. 1/2" thick.
Compressive Strength (Air Cured)	135 psi.
Compressive Strength (@1200°F.)	105 psi.
Abrasion Factor (Air Cured)	98 seconds (MHD Method 102).
Density (Applied and Dried)	35 lbs. per cubic foot.
Shrinkage (Wet to Dry)	Negligible.
"K" Factor at 600°F. Mean Temperature	.79 Btu.
Corrosion Resistance to Steel	Non-corrosive.
Surface Treatment	Easily painted or weatherproofed - when required.
Shipping Containers (Sewn Closure)	50 lb. paper bag.

MIXING

Utility Thermal Finish Cement should be mixed in a clean mortar box or mixer, using approximately 7 gallons of water per 50 lb. bag for a good troweling consistency over most blocks, blankets, or insulating cements. Because of the hydraulic binder, Utility should not be mixed with water more than two hours in advance of its application. With cold mixing water (below 60°F), it remains workable up to 4 hrs.



Utility Gunned on Balloon Flue.

STORAGE

Store in a cool, dry location until ready to use.

REFRACTORY & INSULATION CORPORATION

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PENNSYLVANIA

**REFRACTORY & INSULATION CORPORATION****SUPER 711 INSULATING CEMENT***Trowel or Gun Grade*

SUPER 711 Insulating Cement is a mixture of high temperature mineral fibers specially processed into resilient wool nodules, combined with asbestos and suitable binders to form a high temperature plastic insulation. Water added according to directions gives a trowelable consistency that is ready for application on equipment to be operated at temperatures up to 1800°F.

**WIDE USAGE**

SUPER 711 is a versatile material for many types of insulation requirements. Applied over block or blanket insulations, it fills open joints and provides a monolithic surface for whatever type of subsequent finish is specified. Its plastic flexibility permits application directly to regular or curved surfaces -- such as valves, fittings, tanks and vessels.

EASY TO APPLY

SUPER 711 has excellent adhesive qualities. Its increased stickability means a better job in less time, from wet to dry. Will not slip or roll under trowel application and may be easily gun applied. This superior workability is a result of fine mineral nodules, special manufacturing methods and quality control.

MAXIMUM COVERAGE - LOW SHRINKAGE

SUPER 711 Insulating Cement assures maximum coverage and low shrinkage. The resilient nodules of mineral fiber do not collapse when mixed with water. See table of Physical Properties for coverage.

RECOMMENDED USES**BOILERS**

Drums
Headers
Walls
Economizers
Air Preheaters

FURNACES

Heating
Heat Treating
Forging
Annealing
Normalizing

OVENS, KILNS & DRYERS
VALVES & FITTINGS
TANKS & VESSELS

TURBINES & PUMPS
FAN HOUSINGS
DUCTS & BREECHINGS

SPECIFICATION REFERENCES

SUPER 711 Mineral Fiber Insulating Cement conforms to ASTM C-195-48; Federal Specification HH-C-168 (Class C); and/or Commercial Standard CS-117 of the U.S. Department of Commerce.

May, 1964

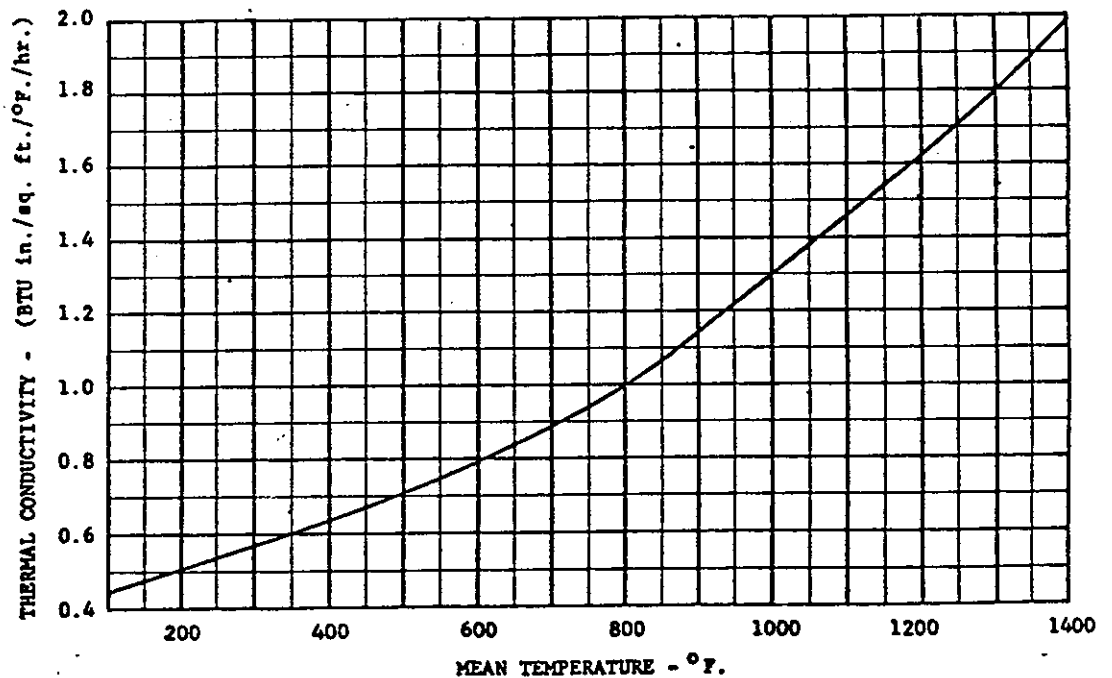
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PHYSICAL PROPERTIES OF SUPER 711 INSULATING CEMENT

Service Temperature	1800°F.
Water Ratio	12 gals. per 50 lb. bag
Dry Coverage	50 sq. ft. 1" thick per 100 lbs.
Material Requirements	2 lbs. per sq. ft. 1" thick
Compressive Strength	45 psi
Density (Applied and Dried)	24 lbs. per cubic foot
Shrinkage (Wet to Dry, by Volume)	15%
Thermal Conductivity	See Chart
Reclaimable to	1000°F.
Adhesion to Steel (Wet)	6 psi
Adhesion to Steel (Dry)	9 psi
Corrosion Resistance to Steel	Non-corrosive
Shipping Containers (Sewn Closure)	50 lb. paper bags

Tabulated values represent typical performance levels of SUPER 711 Insulating Cement - Trowel Grade. SUPER 711 "Gun" Grade Cement consists of the same basic materials that smaller mineral wool nodules are utilized to facilitate application.

THERMAL CONDUCTIVITY OF SUPER 711 INSULATING CEMENT



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**REFRACTORY & INSULATION CORPORATION****PYROSCAT® FIREPROOFING CEMENT***Application Details for Steel Columns and Beams***A. Surface Preparation**

1. Remove dirt, scale or loose paint from the surface to be treated, then apply rust preventative paint or coating when specified.
2. For trowel applications to columns and beams, form 3/8" rib lath (or paper-backed lath) to box-in the member. Apply rib lath with ribs turned in and spanned from flange to flange. On members 14" and larger, first weld 1/4" rods across the flanges approximately 12" to 18" on centers to provide additional support for the lath. Secure the lath in place with wire or bands. For gun application, use 2 x 2 #16 paper-backed lath such as Steeltex.
 - a) Provide 2" firestops on columns at 8' to 12' intervals (or as otherwise specified). Form the metal lath into a horizontal shelf extending to and supported at the web. Apply Pyroscat 2" thick in the opening. Provide similar stops at the top elevation of the fireproofing.
 - b) Plasterer's corner bead may be wired to the metal lath, forming and supporting it to attain the total Pyroscat thickness specified. Corner bead shall be of the type having open-mesh legs to facilitate complete filling of the corners. The corner bead may be spaced the proper distance from the flanges by means of corner clips, rods, studs; or Pyroscat may be spotted-in to space the corner bead at specified fireproofing thickness.

B. Application of Pyroscat

1. Mix Pyroscat to recommended consistency with clean, fresh water, before application. Refer to mixing instructions on the bag and use no more water than called for. Mix Pyroscat to a homogeneous plastic mass; avoid over-mixing, particularly with mechanical mixers.
 - a) Apply Pyroscat well into the metal lath, installing approximately 1/2 the total thickness in the scratch coat. Leave the first coat rough or scratch the surface.
 - b) On the underside of beams, the application may be in three coats. Apply a thin scratch coat first to improve adhesion.
 - c) If corner bead was not applied previously, wire it in place when the scratch coat has set.
2. Let the scratch coat harden until well set (4 to 6 hours or longer), then double-back with the finish coat. Apply it flush with the corner bead. Sponge-float the surface to a textured finish or as otherwise specified.
 - a) When application of the finish coat is deferred over night or longer, wet down the scratch coat thoroughly before proceeding with the finish coat.

May, 1964

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C. Curing Pyroscat

1. Pyroscat is a cementitious material; to develop its strength, keep it moist for 72 hours or longer. Depending on atmospheric conditions when applied, the required water retention may be accomplished with wet burlap, periodic water spray or a hydrostatic (resin-base) sealer.
2. Following the curing period and when visual moisture has dried, apply a suitable flashing material at all intersecting joints and exposed ends of members treated (Duriseal T-178 Coating).
3. Pyroscat may be painted with (1) masonry paint, (2) two coats of asphalt-base aluminum paint, or (3) other finishes as specified for operating conditions involved. (Note: When conventional masonry paint of the hydrating-type is used, wet down the Pyroscat before painting to insure proper hydration).

ALTERNATES FOR TOWER SKIRTS (VERTICAL)

- A-2 Attach a layer of 1" x 1" square mesh reinforcing, positioned 1" away from the skirt, i. e., at the approximate center of the fireproofing thickness specified.
- a) Trowel or gun Pyroscat solidly through openings in the square mesh, bringing the scratch coat out approximately 1" thick. Start at the bottom of the skirt and work upward. Leave the surface rough, or scratch it when trowel applied.
 - b) Screed strips may be attached temporarily over the square mesh reinforcing, to accurately gauge the thickness of the second layer.
 - c) When fireproofing is applied to skirts of heated vessels while they are in operation, heat conducted to the skirt may prematurely dry the initial layer of Pyroscat. Wet the first coat thoroughly, particularly at the top, before applying the final layer.

ALTERNATES FOR HORIZONTAL TANKS

- A-2 Bolster bars are preferred for anchorage of the reinforcing mesh. The bolster bar selected would have legs extending from the tank surface approximately one-half of the total thickness of Pyroscat to be applied. Form the bolster bars to fit the tank curvature, then weld or wire in place circumferentially approximately 3' on centers. Wire the reinforcing mesh to the bolster bars.
- C-3 When tanks so fireproofed are to be operated below ambient temperature, suitable vapor-sealing treatment is recommended after the Pyroscat has been cured, dried and flashed.

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REFRACTORY & INSULATION CORPORATION

PYROSCAT

For Fireproofing Structural Steel

TECHNICAL DATA

Pyroscat is a special formulation of high-temperature aggregates, asbestos fibers, hydraulic binder and other materials. These ingredients are factory blended to a uniform dry mixture that is ready for application after mixing with water at the job site. Pyroscat is adapted to application by spraying, casting and trowelling techniques, depending on job conditions.

USES:

Pyroscat provides a lightweight, fire-retardent protective treatment for structural steel columns, beams, tower skirts, LP gas tanks, and other exposed applications in refineries and chemical plants. Pyroscat sets up to a hard, durable sheath capable of withstanding for hours the 2000°F. flame temperatures and high-pressure water streams commonly encountered in industrial fires.

RECOMMENDED THICKNESSES:

Fire-retardent materials are customarily rated in Hours, based on a given thickness used and on the method of application. For example, fire ratings for steel columns represent the number of hours required for heat from a "standard fire" to penetrate the protective treatment as applied, and to increase the steel column temperature to a critical level (1200°F.). The thermal conductivity and heat capacity of a material are of some importance in an ASTM Fire Test. But the ability of the complete treatment to withstand thermal shock without destruction is one of the most significant factors in determining practical fire ratings in industrial installations.

The Pyroscat thicknesses recommended below were determined by physical tests on a series of sprayed, cast and trowelled applications. Tests included direct exposure to 100 psi hose pressure, both before and after subjecting the Pyroscat treatment to severe flame conditions.

Thickness of Pyroscat

Approx. Fire Resistance Rating

1"
1-3/4"
2"

2 Hours
3 Hours - (UL-R-3960)
4 Hours

ADVANTAGES OF PYROSCAT

Safer While Fighting Fires Many concrete aggregates and common bricks used for fireproofing purposes will spall and shatter when they are heated and subjected to a hose stream. Pyroscat remains virtually unaffected after direct flame exposure and saturation with a 100 psi hose stream.

May, 1964

*An R & I trade name.

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