

ZONOLITE
DIVISION W. R. GRACE & CO.
135 S. La Salle St., Chicago 3, Illinois

GRACENo. P-7-B-13Page 1 of 1Date 7/3/64Supersedes 3/31/64Approved R. W. S.

Subject: **MONO-KOTE**
(Resistance to Air Erosion)

Technical Bulletin

PM-2

**PLAINTIFF'S
EXHIBIT**

WRG-432

We have asked Boyle Engineering Laboratory to issue a revision of the January, 1964, Report of "EFFECT OF HIGH VELOCITY AIR UPON THE SURFACE OF MONO-KOTE MATERIAL".

This revision reflects a correction of a minor contradiction of figures in describing sample size, and also notes the approximate dry density of material used.

A copy of the report is attached; additional copies are available by requisition under the number PA-86-1.

DLG:lj

DLG:lj

Attachment

BOYLE ENGINEERING LABORATORY

DIVISION OF ROTHERM ENGINEERING COMPANY, INC.

CONSULTING AND EXPERIMENTAL ENGINEERING

7280 W. DEVON AVENUE

CHICAGO 31, ILL.

PHONE ROdney 3-8579

REPORT

ON

EFFECT OF HIGH VELOCITY AIR
UPON THE SURFACE OF MONO-KOTE MATERIAL
(Revision of Jan. 1964 Report)

Test performed for
Zonolite Division
W. R. Grace & Company

Report consists of
2 pages and 3 data sheets.

BOYLE ENGINEERING LABORATORY

Robert W. T. Olson

Robert W. T. Olson,
Professional Engineer

April 30, 1964

20005239



PA-86-1

STATE AND OBJECTIVE

Three (3) flat aluminum pans, having dimensions of approximately $10\frac{1}{2}$ X $15\frac{1}{2}$ X $3\frac{3}{4}$ " and filled with Mono-Kote material, were received by Boyle Engineering Laboratory from Zonolite for the purpose of exposing the Mono-Kote material surface to a high velocity air stream test.

The objective of the test was to determine if the high velocity air stream would erode the surface of the Mono-Kote material.

ABSTRACT

1. Exposure of Mono-Kote surface to a 104.8 M.P.H. air stream for 87 hours caused no erosion of Mono-Kote.
2. Surfaces of test samples were not smooth as would occur for a hand travelled surface but were somewhat rough. Surfaces were machine texture finish.
3. Calculated density of Mono-Kote material used in tests was approximately 26.84 lbs. per cu. ft.

INSTRUMENTATION AND EQUIPMENT

1. 5 H.P. motor and suitable centrifugal blower.
2. Suitable triangular shaped duct in which Mono-Kote samples were mounted.
3. Oven.
4. Beam type pan weight balance, minimum weight division 0.1 gram.
5. Pitot tube.
6. "W" tube water manometer.
7. Psychrometer.
8. Barometer

PROCEDURE

The Mono-Kote samples were air dried in an oven for six (6) hours at 118°F. to eliminate moisture from test samples. Upon removal from the oven, the Mono-Kote samples were weighed on a beam type pan weight balance having a minimum weight division of 0.1 grams.

A suitable triangular shaped duct was constructed and the aluminum pan Mono-Kote test samples were mounted in cut-outs in the walls of this duct. The cut-outs in the duct wall allowed the surface of the Mono-Kote material in the aluminum pans to be positioned flush with the interior surface of the duct. See Data Sheet 2.

Air velocity in the duct and hence over and parallel with the Mono-Kote sample surfaces was determined by a pitot tube traverse.

Test samples were oven dried for seven (7) hours at 115°F. after the Mono-Kote samples had been exposed to the high velocity air stream for eighty-seven (87) hours. Samples were weighed on gram weight scale to determine if erosion of Mono-Kote had occurred. All pertinent data is recorded on Data Sheets 1 and 2.

Gain or loss of 0.2 grams in the weight of the samples as indicated on Data Sheet 1 was due to normal inaccuracy of weighing scale.

Volume of Mono-Kote test material contained in the aluminum pans was determined by noting the volume of water required to fill pan to the very top edge of the pan. Fifty (50) cubic centimeters were arbitrarily added to this noted volume since Mono-Kote material protruded slightly above the top edge of the aluminum pan. Weight of Mono-Kote test material determined by subtracting empty aluminum pan weight from combined weight of pan and Mono-Kote. Density of Mono-Kote calculated from this volume and weight values.

CONSTANT DATA

BOYLE ENGINEERING LABORATORY

Division of Rotherm Engineering Company Inc.
7280 W. Devon Ave. Chicago 31, Illinois

Title TEST OF MONO-KOTE MONO-KOTE
MATERIAL EXPOSED TO HIGH
VELOCITY AIR STREAM.

Data Sheet No. 1.
Test No. BS25
Date JAN 16 1964

WEIGHT OF MONO-KOTE SAMPLES @ START OF TEST.

SAMPLE #1 - 1488.4 GRAMS
SAMPLE #2 - 1456.5 GRAMS
SAMPLE #3 - 1492.6 GRAMS.

NOTE: SAMPLES WERE PLACED IN DRY BOX AT
18°F FOR PERIOD OF 6 HRS. PRIOR
TO SAMPLES BEFORE AROUND WEIGHT WAS
NOTED.

ALL SAMPLES WERE EXPOSED TO AN AIR
VELOCITY OF 104.5 MPH. (75°F). DIRECTION
OF AIR WAS PARALLEL TO MONO-KOTE SURFACE.
TOTAL EXPOSURE TIME 87 HOURS.

WEIGHT OF MONO-KOTE SAMPLES @ END OF 87 HOUR

EXPOSURE TO 104.5 MPH. AIR VELOCITY
SAMPLE #1 - 1488.6 GRAMS
SAMPLE #2 - 1456.8 GRAMS
SAMPLE #3 - 1491.8 GRAMS

NOTE: SAMPLES AIR DRIED AT 115°F
FOR 7 HRS.

20005242

RESULTS: NO LOSS IN WEIGHT OF
MONO-KOTE SAMPLES FOR
87 HOUR EXPOSURE TO 104.5 MPH. VEL.
PA-86-4

CONSTANT DATA

BOYLE ENGINEERING LABORATORY

Division of Retherm Engineering Company Inc.
7280 W. Devon Ave. Chicago 31, Illinois

Title TEST OF ZINCITE MONO-KITE

Data Sheet No. 2

MATERIAL EXPOSED TO HIGH

Test No. BS 28

VELOCITY AIR STREAM

Date JUN 16 1964

TEST DATA

BANK PRESS. = 29.25" Hg

DRY BULB TEMP. = 79°F

WET BULB TEMP. = 51°F

DENSITY = 0.0713 #/FT³

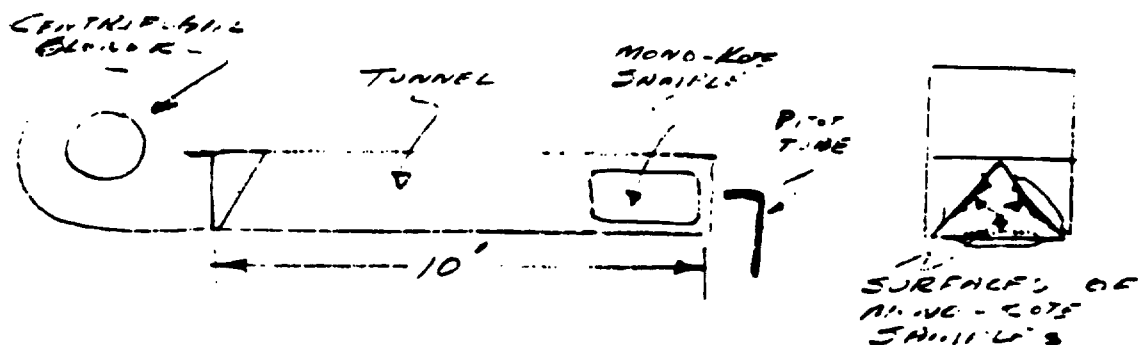
AVERAGE VELOCITY PRESS. = 5.05 W. H. O

AIR VELOCITY = $1046 \sqrt{\frac{5.05}{0.075}} \times 1.02 = 7200 \text{ ft/min}$

1.02 = CORRECTION FACTOR FOR DENSITY OF AIR.

W. H. O. = $\frac{7200}{37.1} \times 1.02 = 19.8 \text{ W. H. O.}$

TEST SET UP



SIZE OF EACH MONO-KITE SAMPLE - CONTAINED IN AN ALUMINUM PAN (APPROX) $10\frac{1}{2} \times 15\frac{1}{2} \times \frac{3}{4}$ "

CONSTANT DATA

BOYLE ENGINEERING LABORATORY

Division of Rotherm Engineering Company Inc.
7280 W. Devon Ave. Chicago 31, Illinois

Title TEST OF ZONOLITE "MONO-KOTE" Data Sheet No. 3
MATERIAL EXPOSED TO HIGH Test No. 8528
VELOCITY HIGH STREAM Date 4-30-64

DENSITY CALCULATION

WEIGHT OF ALUM PAN. = 460.7 GRAMS

AVERAGE WT. OF MONO-KOTE MATERIAL
CONTAINED IN ALUM. PAN. 1018.3 GRAMS

SAMPLE #1 1488.4 GRAMS
- 460.7

1027.7 - WT OF MONO-KOTE

SAMPLE #2 1456.5 GRAMS
- 460.7

995.8 WT OF MONO-KOTE

SAMPLE #3 1492.0
- 460.7

1031.3 WT OF MONO-KOTE

AV. MONO-KOTE WT. = $\frac{1027.7 + 995.8 + 1031.3}{3} = \underline{\underline{1018.3}}$

VOLUME OF ALUM PAN = 2300 CC + 50 = 2350 CC

DENSITY = $\frac{1018.3}{2350} = 0.43 \text{ GRAMS/CC.}$

$0.43 \times 62.43 = 26.84 \text{ LB/FT}^3$ - DENSITY OF
MONO-KOTE

20005244

PA- 86-6