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Pittsburgh Corning Distributor-Contractors . . . more than a hundred of them across the country . . . are stocked and ready to recommend the UNIBESTOS installation which will solve your specific insulation problems. They're experts on industrial insulation—all of them—and UNIBESTOS is the ONLY insulation product you need for all applications between 100°F and 1500°F.

U. S. GOVERNMENT ACCELERATED LIFE TEST

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To determine resistance of UNIBESTOS Pipe Covering at operating temperatures to shock and vibration - sections of UNIBESTOS Pipe Covering were applied and secured between two circular 9⅛" diameter metal discs located 36" apart on a 3" pipe. Pipe Covering was 3" thick.

The material was first subjected to a temperature of 850°F. for a period of six months. It was then removed to a same size pipe connected to a vibration machine and shaken in a horizontal position with 700 vibrations per minute, through an arc of 15 minutes with a radius of 30 inches for 100 hours, and then examined for deterioration. The same sections were then again subjected for six months to 850°F. and again removed to the vibrating machine and shaken horizontally for another 100 hours. Again subjected to 850°F. for another six months and then shaken vertically 100 hours, - thus having 18 months' heat exposure and a total of 200 hours horizontal and 100 hours vertical shaking, with the following results:

Shock and Vibration Test

Material	Position in which material was tested	Weight of Section, lb.		Weight Loss During Test, lb.	Remarks
		Before Test	After Test		
After 6 mos. at 850°F. on pipe	Horizontal	24.29	24.29	0.00	Results of test satisfactory. Mat'l. did not shake down or sag away from the pipe.
Again 6 mos. at 850°F. on pipe and 100 hrs. horizontal vibration	Horizontal	24.29	24.29	0.00	(Same as above)
Further 6 mos. at 850°F. on pipe and 200 hrs. vertical vibration	Vertical	25.13	24.92	0.21	The mat'l. was in satisfactory condition at end of test. No sagging or shaking down was evident. Weight lost by the material was caused by flaking off of the outer surface due to cutting of securing wires.

PLAINTIFF'S EXHIBIT U-698

UNIBESTOS WATER SOAKING AND VIBRATION TESTS

GENERAL - Two tests have been concluded relative to the physical properties of UNIBESTOS. These tests were carried out in compliance with Mr. W. T. Clark's request for more laboratory data on UNIBESTOS, regarding the effects of water soaking and vibration.

WATER SOAKING TESTS - These tests were carried out to determine the effect that water soaking and re-drying has on UNIBESTOS relative to dimensional change and strength. Two series of tests were carried out. These first series of four specimens were soaked under a 2" water head for 45 minutes and dried at 250°F for 24 to 48 hours, three times. The second series of four specimens were soaked for 24 hours and dried at 250°F for 24 hours on the first cycles, 48 hours soaking and 48 hours drying on the second cycle, and 48 hours soaking and 72 hours drying on the third cycle.

SPECIMENS & PROCEDURE - The procedure for cutting the test specimens and calculating the modulus of rupture of each specimen was done in accordance with the standard method (ASTM C 446.) One full, 36" long section of UNIBESTOS pipe covering (2" I.P.S. with 1" wall thickness) was used to supply sufficient specimens. The pipe covering was cut in quarter sections to supply 90° specimens, 12" in length. The full section of pipe covering supplied three sets of 4 specimens each. Two sets were used for the soaking tests and the modulus of rupture of the third set was calculated for the UNIBESTOS in "as received" condition. The modulus of rupture tests were carried out with the use of the 6-to-1 lever apparatus. The two end support saddles and the center compression jig were constructed as specified by the procedure of test. The modulus of rupture of each specimen is determined by the following calculation.

$$S = \frac{0.25\,WL\,R(R^2-r^2) - 0.6\,(R^3-r^3)}{0.3214\,(R^4-r^4)\,(R^2-r^2) - 0.2829\,(R^3-r^3)^2}$$

Where:

S = Modulus of rupture in pounds per square inch,
W = Load in pounds (maximum) at which the specimen failed,
L = Distance between the supports in inches,
R = Outside radius of specimen = outside arc of specimen I 4/6.28 in inches, and
r = Inside radius of specimen = R minus the average thickness in inches.

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UNIBESTOS - M.R. AFTER SOAKING AND DRYING CYCLES

	SAMPLE NO.	LBS. LOAD	M.R.	AVE.PSI	%LINEAR SHRINKAGE
TEST 1					
UNIBESTOS AS RECEIVED	1	36	88.4		
	2	36	88.4	84.7	NONE
	3	36	88.4		
	4	30	73.7		
TEST 11					
CYCLE (A) WET 45 MINUTES DRY 24 HOURS	1	33	81.0		
	2	45	110.5		
CYCLE (B) WET 45 MINUTES DRY 24 HOURS	3	36	88.4	90.8	NONE
	4	34	83.5		
CYCLE (C) WET 45 MINUTES DRY 48 HOURS					
TEST 111					
CYCLE (A) WET 24 HOURS DRY 24 HOURS					
	1	45	110.5		
(B) WET 48 HOURS DRY 72 HOURS	2	36	88.4		
	3	33	81.0	88.4	NONE
	4	30	73.7		
(C) WET 48 HOURS DRY 72 HOURS					

(NOTE - DRYING TEMPERATURE WAS 250°F FOR SOAKED SPECIMENS.)

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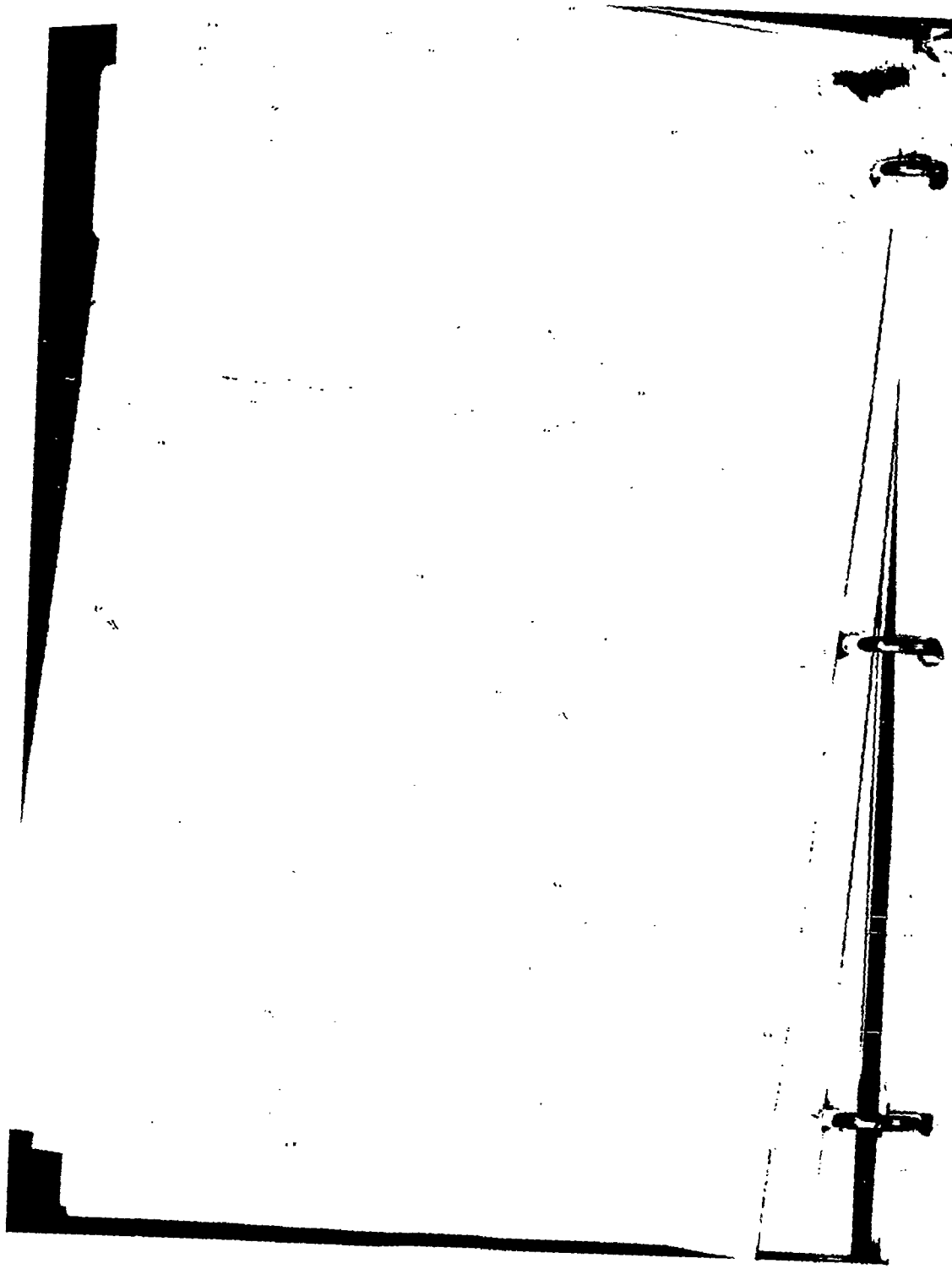

VIBRATION TEST - A full, 36" section of UNIBESTOS (2" I.P.S. and 2" wall thickness) was mounted on a 2" iron pipe. The end mountings, which supported the pipe, were 1/8" x 2" steel straps which in turn were bolted securely to our laboratory vibration table. The UNIBESTOS, after being carefully weighed and measured, was then strapped to the pipe with two aluminum bands. The unit was then left to vibrate rigorously for ten consecutive days at 60 cycles per second. The amplitude could not be determined; however, we are certain that it was greater than that of a steam line.

RESULTS - Visually, we could detect no damaging effects to the UNIBESTOS. The weights, before and after the test, were identical. The inside wall was callibrated with a dial indicator, before and after, at .3 points on each half section to the nearest .01 inches. No change could be measured on the inside wall.

CONCLUSIONS - These tests indicate that UNIBESTOS regains its strength 100% upon re-drying, even after prolonged soaking periods. These tests also showed a 4-to-6 pound increase in the modulus of rupture values after soaking. The UNIBESTOS pipe covering exposed to the 10 day vibration test was in no way affected.

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