GENERAL DESCRIPTION AND USE

Superex Block Insulation is manufactured from calcined diatomaceous silica, blended and bonded with asbestos fibre, and is suitable for use at temperatures between 600° and 1900° F. Superex blocks are used generally in stationary and marine power plant service, in industrial furnaces and ovens, regenerators, kilns, roasters, high temperature mains, flues, stacks and other high temperature equipment.

MANUFACTURING AND FACTORY STOCKING POINTS

Manville Waukegan Redwood City

Magnesia & Superex Issued 11/27/42

PLAINTIFF'S EXHIBIT K-1645

SIZES

Flat Blocks

Length - 18" and 36"
Width - 3, 6, 9 and 12"
Thickness - 1/2" to 4" inclusive in increments of 1/2"

Special sizes shall be furnished, on order within maximum size limits of 12" wide x 45" long x 4½" thick. Tapered blocks shall be furnished as specified within above size limitations.

Curved (Lagging) Blocks:

Length - 18" and 36"
Width - (M & R) 3", 6", 9" and 12" (Inside chord)
(W) 9" and 6" (Inside chord)
Thickness - 1 1/4" minimum for 3" and 6" wide blocks
1 1/2" minimum for 9" and 12" wide blocks
Maximum thickness limited by radius of curvature and maximum flat block thickness of 4½" from which curved blocks may be cut.

Special sizes shall be furnished on order with maximum length of 45" and maximum widths and thickness indicated above.

SIZE AND SHAPE TOLERANCES

The aim shall be to manufacture blocks to specified dimensions. A variation of plus or minus 1/8" is permitted on all dimensions. Opposite faces of flat blocks shall be parallel within 1/32" on a 36" length. Edges and corners of blocks shall be square.

COMPOSITION

Material shall consist of calcined diatomaceous silica, asbestos fibre and necessary bonding materials.

DENSITY

The density of Superex Blocks shall be as low as possible. The aim shall be to manufacture Superex Blocks so that the average density will not exceed 24 lb. per cu. ft.. No material shipped from Manville shall exceed 26 lb. per cu. ft. in density. No material shipped from Redwood or Waukegan shall exceed 26.5 lb. per cu. ft. in density.

DEFENDANT'S EXHIBIT OI-217

ISSUED	ORIGINAL SPEC. EFFECTIVE	LAST REVISION EFFECTIVE	THIS REVISION EFFECTIVE	APPROVED
DEC 28 1939	Dec. 28, 39			CONTROLLER

FORM X-8918 2-39 PRINTED IN U.S.A.

RESISTANCE TO ABRASION

The components of the material shall be well bonded and shall provide a material resistant to excessive loss of weight due to abrasion suffered in shipping and normal handling in application.

The aim shall be to manufacture material which, under the standard abrasion test, shall not average a loss of more than 40% in weight after 10 minutes of test and not more than 60% after an additional 10 minutes under test. The standard abrasion test referred to is performed as follows:

> Twelve 1" cubes of the material and twenty-four 3/4" oak cubes (sp. gr. 0.65) are placed in an oak box having inside dimensions of 7 1/2 x 7 3/4 x 7 3/4 inches. The closed box is then rotated around its own axis at a speed of 60 R.P.M. for two 10 minute periods.

Material manufactured at Manville and Waukegan is acceptable, although recent production has shown abrasion losses as high as shown below:

	Abrasion Loss	
	After 10 minutes	After 20 minutes
Manville	40%	75%
Waukegan	55 to 60%	85 to 90%

Steps are being taken to bring the abrasion loss on Manville and Waukegan production within the desired limits.

STRUCTURAL STRENGTH

The structural strength of the insulation shall be sufficient to prevent breakage during shipment, installation, and in service under normal conditions. The modulus of rupture of the material shall not be less than 60 lb. per sq. in.. It is desired that the average modulus of rupture of all Superex Blocks shall not be less than 65 lb. per sq. in.. Exception: At Waukegan Factory the aim shall be to manufacture material having a modulus of rupture greater than 60 lb. per sq. in.. Approval of the Sales Dept. shall be obtained before material having a modulus of rupture of less than 45 lb. per sq. in. is shipped from Waukegan or less than 55 lb. per sq. in from Manville.

The resistance to compression of the material shall be sufficient to prevent deformation under normal handling during application and under stresses encountered in recommended installations. It is desired that a 1 1/2" thick Superex Block shall not be compressed more than 1/8" under a uniform load of 8,000 lb. per sq. ft.

LINEAR SHRINKAGE

The linear shrinkage shall be as low as possible and shall not exceed 3% after material has been heated at 1900° F. for 24 hours.

ISSUED	ORIGINAL SPEC. EFFECTIVE	LAST REVISION EFFECTIVE	THIS REVISION EFFECTIVE	APPROVED
DEC 2 3 1939	[illegible]			COMPTROLLER

MM 1-8918 2-39
PRINTED IN U.S.A.

CONDUCTIVITY
The conductivity of Superex shall be as low as possible and shall not exceed the following at the specified mean temperature:

Mean Temperature °F	Conductivity in Btu.-In. per hr. per sq. ft. per °F.							
	200°	400°	600°	800°	1000°	1200°	1400°	1600°
	.63	.66	.71	.74	.78	.84	.92	1.01

GENERAL
Blocks shall be smooth surfaced without pits or cracks and shall not warp in normal service.

ACCESSORIES
Lagging hooks and wire shall be furnished in sufficient quantities for application of blocks, only when order so specifies. The various factories furnish hooks and wire as follows:

Manville
Hooks are furnished in the following sizes: 1, 1 1/4, 1 1/2, 1 3/4, 2, 2 1/4, 2 1/2, 2 3/4, 3, 3 1/2 and 4 inches. Hooks are furnished at the rate of 2 per 18" long block and 3 per 36" long block, size of hooks corresponding with block thickness.

#14 ga. galvanized iron wire is furnished in one piece at the rate of 2 ft. for each 6" of block width ordered.

Waukegan
Hooks are furnished in the following sizes: 3/4, 7/8, 1, 1 1/4, 1 3/8, 1 1/2, 1 5/8, 1 3/4, 1 7/8, 2, 2 1/8, 2 1/4, 2 3/8, 2 1/2, 2 5/8, 2 3/4, 2 7/8, 3, 3 1/4, 3 1/2, 3 3/4, and 4 inches. Hooks are furnished at the rate of 3 per block, size of hooks corresponding with block thickness.

#14 ga. galvanized iron wire is furnished in one piece at the rate of 1 1/2 ft. for each 6" of block width.

Redwood City
Hooks are furnished same as Waukegan, wire at the rate of 2 ft. for each 6" of block width ordered.

Lagging hooks furnished from Waukegan and Redwood City have 1" bars at top of "T", those from Manville have 5/8" bars.

Accessories are packed in containers with blocks or in separate containers as convenient.

MARKINGS
One end of Superex blocks shall be colored red.

PACKAGING
Superex Blocks shall be packed to insure acceptance by common carriers and to insure safe delivery to and warehousing and handling by the customer and ultimate user at the lowest total cost of packing, shipping and transportation.

ISSUED	ORIGINAL SPEC. EFFECTIVE	LAST REVISION EFFECTIVE	THIS REVISION EFFECTIVE	APPROVED
DEC 28 19	Dec. 28, 39			COMPTROLLER

CRW 1-8918 2-39
PRINTED IN U.S.A.

PACKAGING (Cont'd)
At present, domestic shipments are packed in cartons. The number of blocks per carton are as follows:

THICKNESS	NUMBER OF SUPEREX BLOCKS PER CARTON													
	FLAT BLOCKS									CURVED BLOCKS				
	6" x 36"			9" x 36"			12" x 36"			6" x 36"			9" x 36"	
	M	R	W	M	R	W	M	R	W	M	R	W	R	
1"	30	36	30	18	24	16	-	-	15	30	-	30	-	
1-1/4"	24	28	24	15	18	13	-	-	12	24	-	24	-	
1-3/8"	22	26	22	12	16	12	-	-	11	22	-	22	-	
1-1/2"	20	24	20	12	16	12	10	12	10	20	24	20	16	
1-3/4"	16	20	16	10	14	9	8	10	8	16	20	16	14	
2"	14	18	14	7	12	8	7	9	7	14	18	14	12	
2-1/4"	12	16	12	6	10	6	6	8	6	12	16	12	10	
2-1/2"	12	14	12	6	8	7	6	7	6	12	14	12	8	
2-3/4"	10	12	10	5	8	5	5	6	5	10	12	10	8	
3"	10	12	10	5	8	6	5	6	5	10	12	10	8	
4"	7	8	6	3	6	4	3	4	3	7	8	6	6	

Cartons for domestic shipment shall be printed and stenciled in accordance with J-M Package Printing Layout No. MG-2 dated 11/13/39.

At Waukegan Factory, a printed paster is available to convert cartons printed for Magnesia blocks to use for some sizes of Superex blocks. The paster which reads, "Superex, Reg. U. S. Pat. Off., U. S. Pat. No. 1,782,383 and 2,033,106" is applied on the Magnesia cartons to cover that part of the legend which reads, "85% Magnesia".

Material for export shipment is packed in wooden crates which are reinforced with bands of wire at Redwood and of steel strapping at Manville (Waukegan does not ship material for export).

Unless order specifies otherwise, all domestic shipments shall be marked to show size and quantity of contents and those packages on which patent numbers are not printed shall be marked "Pat. Nos. 1,782,383 and 2,033,106". Export shipments shall be marked as specified on order.

No changes shall be made in packages described above without prior approval of the Sales Department.

M. J. BOEDEKER
Comptroller

ISSUED	ORIGINAL SPEC. EFFECTIVE	LAST REVISION EFFECTIVE	THIS REVISION EFFECTIVE	APPROVED
DEC 28 1939	[illegible]			MB COMPTROLLER

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PRINTED IN U.S.A.

GENERAL DESCRIPTION AND USE
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MANUFACTURING AND FACTORY STOCKING POINTS

Manville	Waukegan	Redwood City

SIZES

Flat Blocks
Length - 18" and 36"
Width - 3, 6, 9 and 12"
Thickness - 1/2" to 4" inclusive in increments of 1/8"
Special sizes shall be furnished, on order within maximum size limits of 12" wide x 45" long x 4½" thick. Tapered blocks shall be furnished as specified within above size limitations.

Curved (Lagging) Blocks:
Length - 18" and 36"
Width - (M & R) 3", 6", 9" and 12" (Inside chord)
(W) 9" and 6" (Inside chord)
Thickness - 1 1/4" minimum for 3" and 6" wide blocks
1 1/2" minimum for 9" and 12" wide blocks
Maximum thickness limited by radius of curvature and maximum flat block thickness of 4½" from which curved blocks may be cut.
Special sizes shall be furnished on order with maximum length of 45" and maximum widths and thickness indicated above.

1/3/40 Curved blocks will be placed on dimension charges

SIZE AND SHAPE TOLERANCES
The aim shall be to manufacture blocks to specified dimensions. A variation of plus or minus 1/8" is permitted on all dimensions. Opposite faces of flat blocks shall be parallel within 1/32" on a 36" length. Edges and corners of blocks shall be square.

COMPOSITION
Material shall consist of calcined diatomaceous silica, asbestos fibre and necessary bonding materials.

DENSITY
The density of Superex Blocks shall be as low as possible. The aim shall be to manufacture Superex Blocks so that the average density will not exceed 24 lb. per cu. ft.. No material shipped from Manville shall exceed 26 lb. per cu. ft. in density. No material shipped from Redwood or Waukegan shall exceed 26.5 lb. per cu. ft. in density.

ISSUED	ORIGINAL SPEC. EFFECTIVE	LAST REVISION EFFECTIVE	THIS REVISION EFFECTIVE	APPROVED
Dec 28	Dec. 28, 39			MB COMPTROLLER

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PRINTED IN U.S.A.

RESISTANCE TO ABRASION

The components of the material shall be well bonded and shall provide a material resistant to excessive loss of weight due to abrasion suffered in shipping and normal handling in application.

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ISSUED	ORIGINAL SPEC. EFFECTIVE	LAST REVISION EFFECTIVE	THIS REVISION EFFECTIVE	APPROVED
DEC 2 3 19[illegible]	[illegible]			COMPTROLLER

CONDUCTIVITY

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	Conductivity in Btu.-In. per hr. per sq. ft. per °F.							
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Waukegan

Hooks are furnished in the following sizes: 3/4, 7/8, 1, 1 1/4, 1 3/8, 1 1/2, 1 5/8, 1 3/4, 1 7/8, 2, 2 1/8, 2 1/4, 2 3/8, 2 1/2, 2 5/8, 2 3/4, 2 7/8, 3, 3 1/4, 3 1/2, 3 3/4, and 4 inches. Hooks are furnished at the rate of 3 per block, size of hooks corresponding with block thickness.

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ISSUED	ORIGINAL SPEC. EFFECTIVE	LAST REVISION EFFECTIVE	THIS REVISION EFFECTIVE	APPROVED
[illegible]	Dec. 28,39			AB COMPTROLLER

[illegible] 1-8918 2-39
PRINTED IN U.S.A.

PACKAGING (Cont'd)
At present, domestic shipments are packed in cartons. The number of blocks per carton are as follows:

NUMBER OF SUPEREX BLOCKS PER CARTON

THICKNESS	FLAT BLOCKS									CURVED BLOCKS			
	6" x 36"			9" x 96"			12" x 96"			6" x 36"			9" x 36"
	M	R	W	M	R	W	M	R	W	M	R	W	R
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1-1/2"	20	24	20	12	16	12	10	12	10	20	24	20	16
1-3/4"	16	20	16	10	14	9	8	10	8	16	20	16	14
2"	14	18	14	7	12	8	7	9	7	14	18	14	12
2-1/4"	12	16	12	6	10	6	6	8	6	12	16	12	10
2-1/2"	12	14	12	6	8	7	6	7	6	12	14	12	8
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Material for export shipment is packed in wooden crates which are reinforced with bands of wire at Redwood and of steel strapping at Manville (Waukegan does not ship material for export).

Unless order specifies otherwise, all domestic shipments shall be marked to show size and quantity of contents and those packages on which patent numbers are not printed shall be marked "Pat. Nos. 1,782,383 and 2,033,106". Export shipments shall be marked as specified on order.

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M. J. BOEDEKER
Comptroller

	ISSUED	ORIGINAL SPEC. EFFECTIVE	LAST REVISION EFFECTIVE	THIS REVISION EFFECTIVE	APPROVED
8918 2-39 IN U.S.A.	DEC 2 6 1939	[illegible]			MB COMPTROLLER

Superex Lagging