

FILE NAME: Hopeman Brothers (HB)

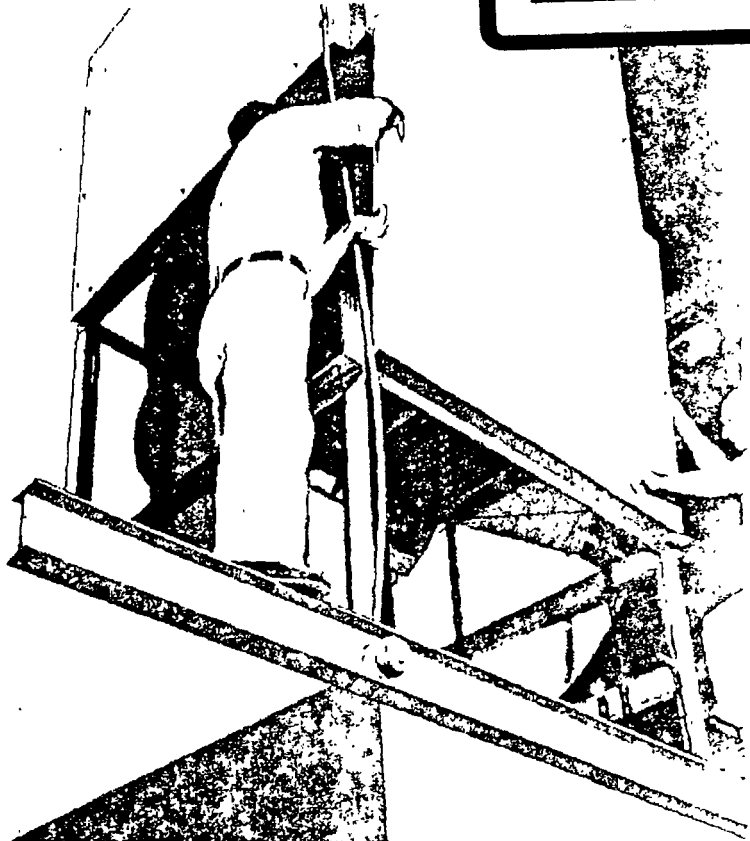
DATE: 1954

DOC#: HB026

DOCUMENT DESCRIPTION: Johns-Manville Sales List for Marinite

PLAINTIFF'S
EXHIBIT
tabbies
HB-83

**You can
BUILD
and
INSULATE
with...**



Johns-Manville
MARINITE

For Constructing

driers
ovens
breedings
housings

...easy to erect, needs no maintenance, saves fuel

J-M History
FILE COPY

4220
12/5/54

MT-006380

for the construction

of ovens, driers

and other

insulated housings...

You can cut costs

by Building and Insulating (w)

Johns-Manville

the fireproof, non-corroding



Johns-Manville Marinite is an insulating sheet material composed of asbestos fiber, diatomaceous silica and an inorganic binder. Because it is both a structural and an

insulating material, it offers major economic advantages in the construction of ovens, driers and other process equipment requiring a housing for the retention and control of heat. Marinite is the only insulation available that can be erected without the metal sheathing necessary when mineral-wool-fiber type and similar insulating materials are employed

Marinite combines great structural strength with light weight and excellent thermal properties. It is fireproof and has a low thermal expansion coefficient. Marinite is completely non-corroding and will not disintegrate after prolonged immersion in water.

Marinite is furnished in three different densities: 23, 36 and 65 pounds per cubic foot. Marinite-23 has the best thermal insulating characteristic and is recommended for use where insulating value takes precedence over structural strength. Marinite-65, having the greatest structural strength, is recommended where strength is of paramount importance. Marinite-36, combining both good insulating and structural properties, is recommended for most applications

All three densities of Marinite are supplied in two types, A and B. Type A sheets, with a plain sanded finish on both side, are recommended where painting is not required. Type B sheets are also sanded on both sides, but in addition are impregnated with an inorganic primer and are ready for subsequent painting.

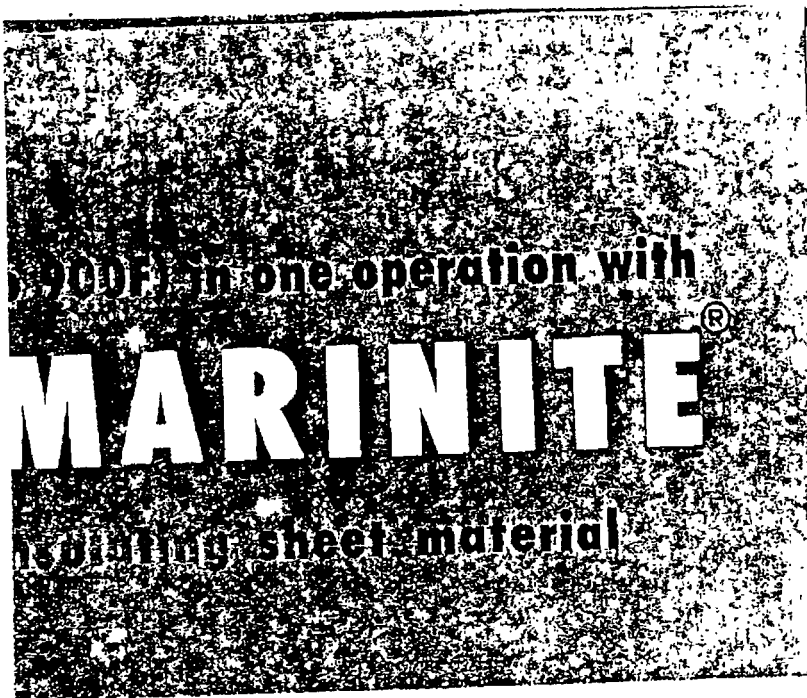
Developed to help prevent fires at sea

When the American cruise ship *Morro Castle* caught fire and was beached on the New Jersey coast with a large loss of life in September, 1934, laws designed to prevent the recurrence of this appalling tragedy were speedily enacted. These laws required the construction of firescreen bulkheads at specified intervals along the length of all passenger vessels, as well as the enclosure of all staterooms, passageways, offices and similar areas, with incombustible material.

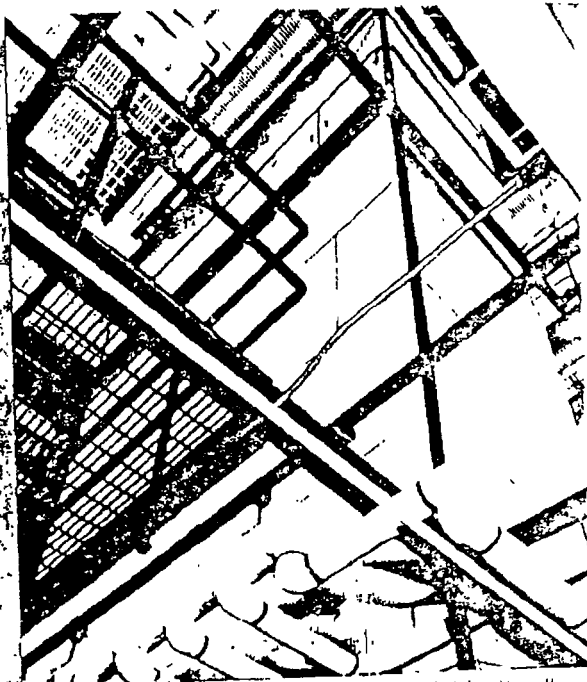
This fire-proofing requirement for passenger ships built to sail under American registry led to the development of Johns-Manville Marinite.

$\frac{3}{4}$ " Marinite successfully passes the rigid Coast Guard B-15 bulkhead requirement which specifies that bulkhead panels shall be so constructed that, if subjected to the standard fire test reaching 1400F in 15 minutes and 1550F in one-half hour, they shall be capable of preventing the passage of flame for one-half hour. In addition, the requirement specifies that the insulation value of each panel must be such that the temperature of the unexposed side will not rise more than 250F above the original temperature within 15 minutes

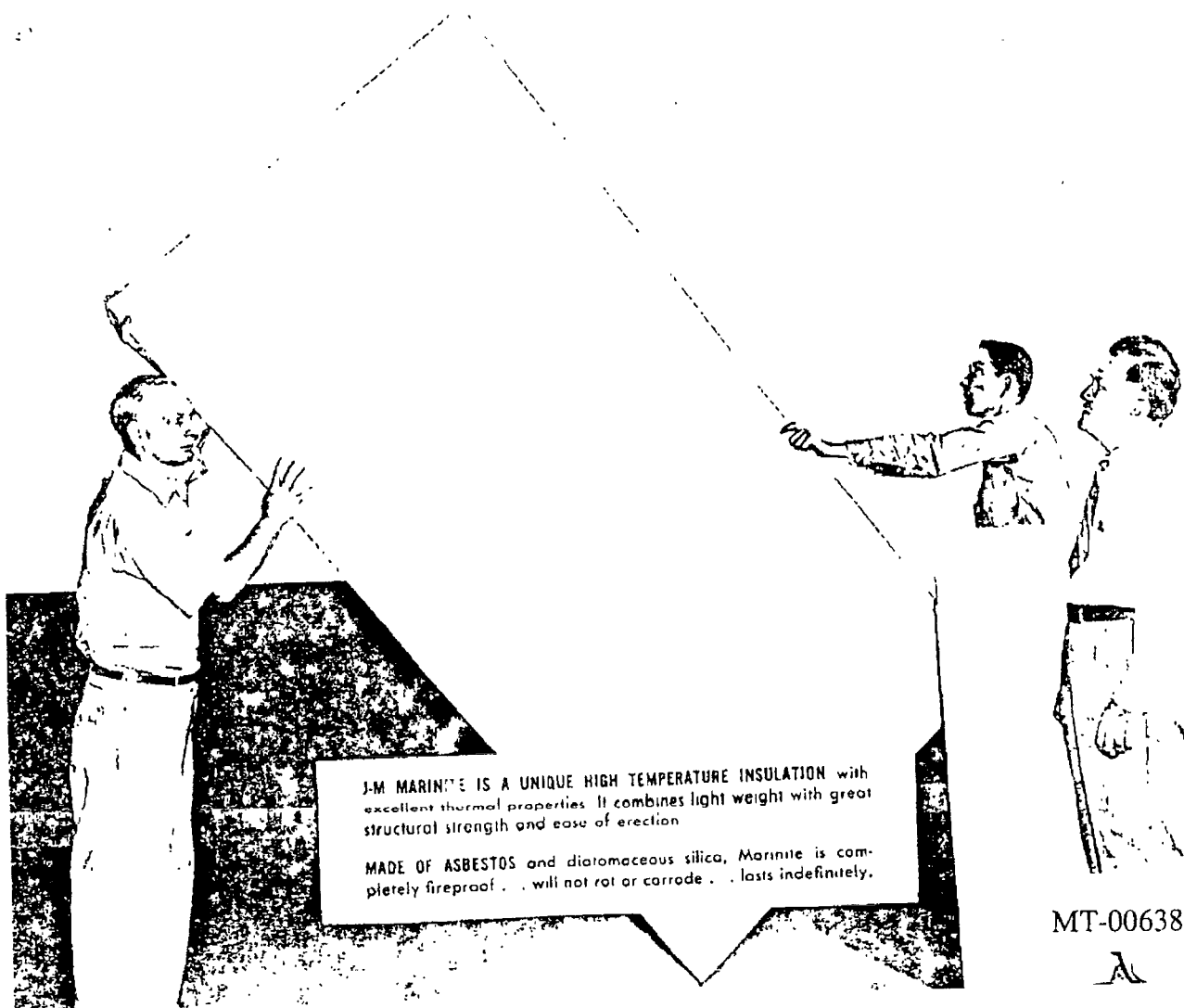
Sufficient proof of the excellence of Marinite is the fact that commencing with the construction of the *SS America*, it has been installed on every American flag passenger vessel built since the early 1940's—as well as the majority of all American cargo ships built during the same period. For details see J-M brochure IN-109A, *Johns-Manville Marinite Joiner Panels*.



900°F in one operation with
MARINITE®
insulating sheet material



Coating tower, 41 feet high, built and insulated with Johns-Manville
Marinite by Electro Technical Products, Nutley, New Jersey.



J-M MARINITE IS A UNIQUE HIGH TEMPERATURE INSULATION with
excellent thermal properties. It combines light weight with great
structural strength and ease of erection.

MADE OF ASBESTOS and diatomaceous silica, Marinite is com-
pletely fireproof . . . will not rot or corrode . . . lasts indefinitely.

MT-006382

MARINITE saves money 3 ways

1 costs less to erect

—Large, easy-to-handle sheets can be applied as quickly and easily as plywood.

2 gives better heat control

—Solid, uniformly textured material eliminates costly "hot spots" often caused by settling or sagging of ordinary insulations. Staggered-joint construction with no through-metal keeps insulating effectiveness high.

3 requires no maintenance

—Inorganic and not affected by moisture, will not rust, rot or corrode . . . lasts indefinitely.

MARINITE IS EASY TO ERECT

With a surface hardness comparable to yellow pine, Marinite can be readily worked without special tools or costly equipment. It can be cut or machined to any desired shape, and will take screws and nails like lumber. The ease of cutting and drilling this versatile material permits observation holes, ports, etc., to be readily incorporated in the equipment during construction.

Regardless of the size of the job, Marinite can be handled and applied by your own construction staff without special training. Because Marinite is strong and

rigid, and comes in large sheets*, the angle-iron framing supports can be widely spaced and reduced in number. This speeds construction, keeps labor costs at a minimum, reduces the time required to put the equipment into active service.

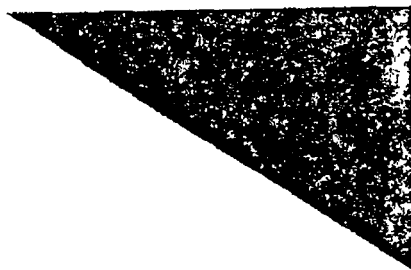
Where desired, Marinite can be prefabricated to your own drawings at our factory, or by one of the many local Johns-Manville contractors.

*See table of Sizes and Thicknesses on page 15.

MARINITE REDUCES HEAT LOSS

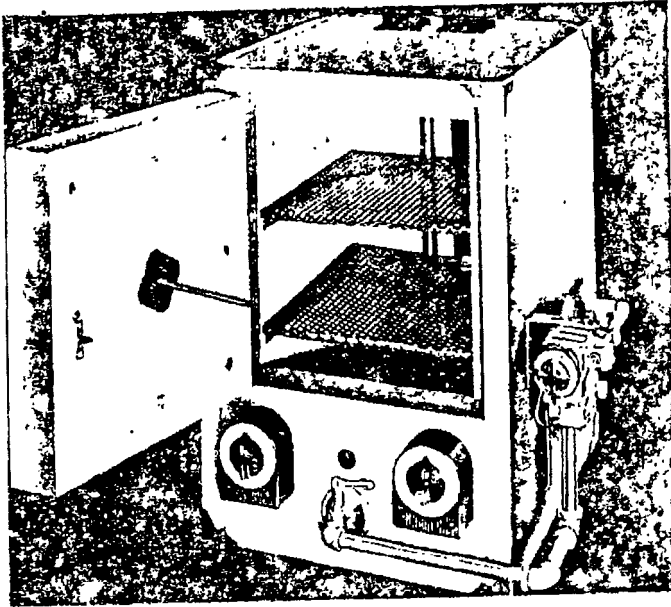
In the usual type of oven or drier constructed of sheet metal and mineral-wool-fiber type insulation, there exists a large amount of through-metal which tends to increase heat losses to the extent that the benefits resulting from the insulation are, to a large degree, nullified. By "through-metal" is meant metal which extends from inner to outer door, wall or ceiling surface, and which provides an easy path for heat to escape.

The use of Johns-Manville Marinite with broken-joint panel construction eliminates practically all through-metal and provides uniform temperature control throughout the equipment. Moreover, because it is an homogeneous material, Marinite never loses its insulating qualities through settling or sagging.



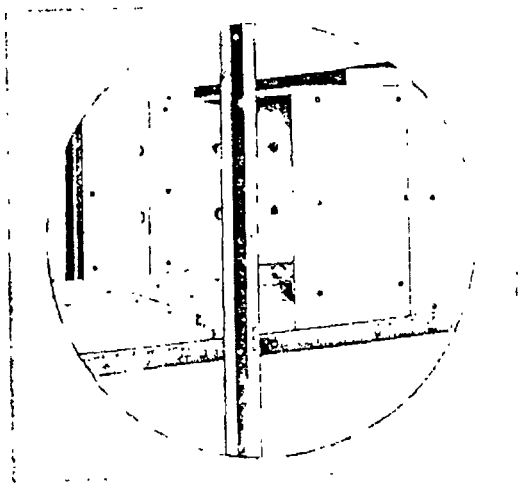
MT-006383

This small, gas-fired testing oven employs double-layer, staggered joint Marinite construction. Because of Marinite's excellent thermal properties the oven can be operated at 650F all day long without becoming hot on the outside.



prevents the occurrence of local "hot spots"

The method of installing Marinite panels in a band type oven is clearly illustrated in the photograph below. In this picture (a detail close-up of the illustration on page 9) it will be noted that angle-iron framing is erected on the outside of the insulation to reduce the thermal expansion of the metal. Where the panels join, a staggered-joint, with no framing between, is used to insure a tight seal against the escape of heat. Panels are units built up of multi-layers of Marinite bolted together and fastened to the framing with a minimum number of key bolts.



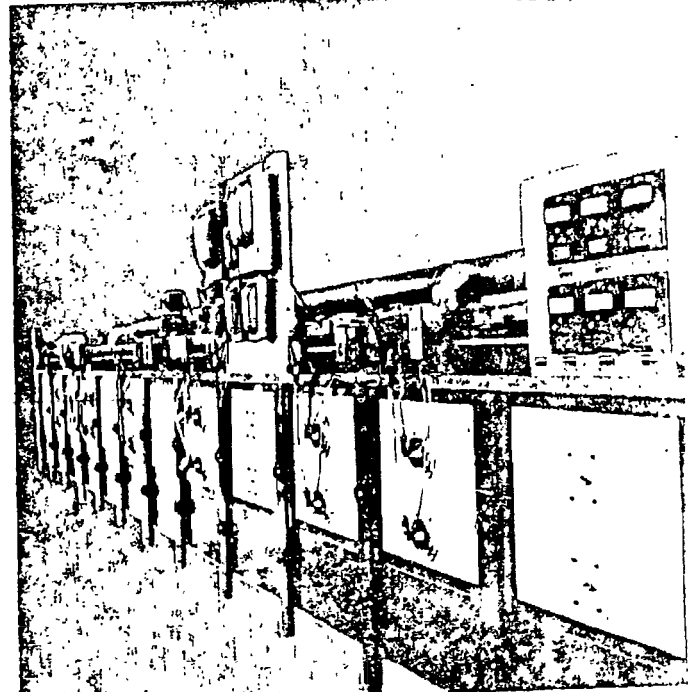
Band type drying oven is constructed of multi layer Marinite panels bolted together and secured to angle-iron framing. Staggered joints reduce through-metal to a minimum, keep insulating effectiveness high.

MARINITE REQUIRES NO MAINTENANCE

Where sheet metal panel construction with mineral-wool-fiber type insulation is used for building ovens and driers, the inner faces of the metal walls, i.e., the faces in contact with the insulation fill — difficult or impossible to keep properly coated with preservatives — are particularly susceptible to corrosion as a result of moisture condensation during cyclic shut-downs. This results in high maintenance and replacement costs, and is the source of much trouble. Such a condition never occurs with Marinite because moisture will not cause Marinite to rot or corrode. Marinite requires no protective painting or coating under normal conditions, and it leaves no voids to collect water.

The completely inorganic composition of Marinite renders it immune to decay and unattractive to vermin and rodents. It will not support the micro-organisms that cause mold growth. Marinite retains its attractive appearance without special care, requires only an occasional wiping or dusting with a clean cloth, and will last indefinitely.

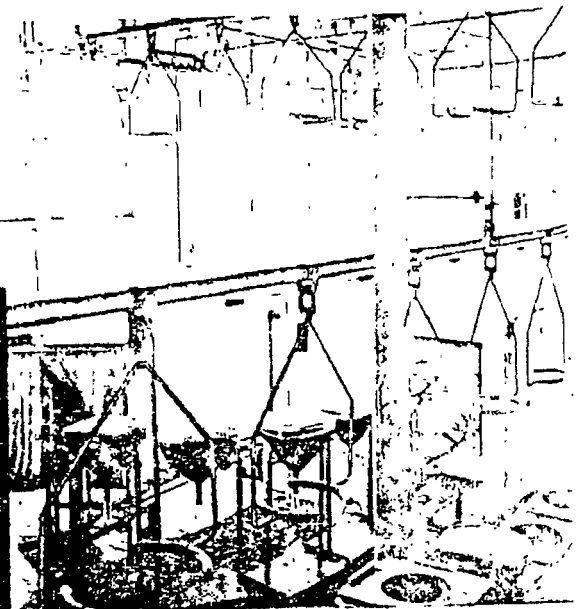
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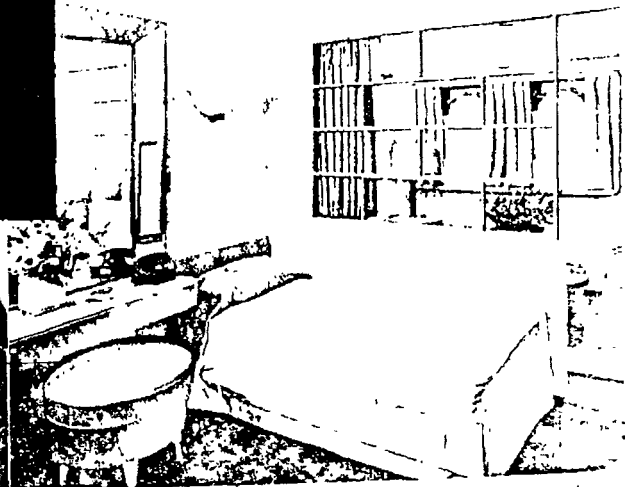
This modern bakery oven operates efficiently with a minimum of maintenance. Built of Marinite, it is unaffected by the corrosion to which sheet metal and mineral wool ovens are particularly susceptible.

Johns-Manville
MARINITE

**Serves many industries,
in many ways, as a
structurally strong, fireproof
insulating sheet material**



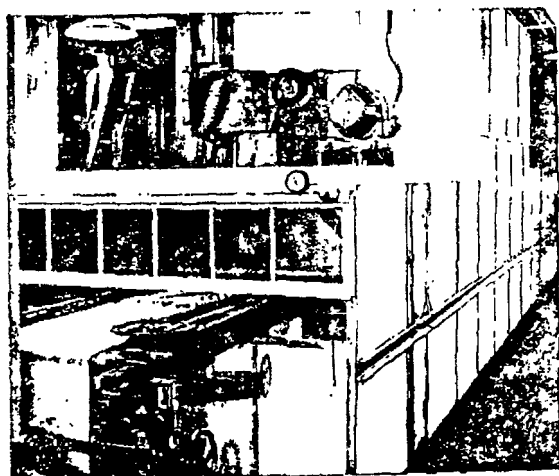
ELECTRONICS — In this 170 foot Marinite oven, sensitive TV tubes go through a complex baking cycle, involving many temperature phases.



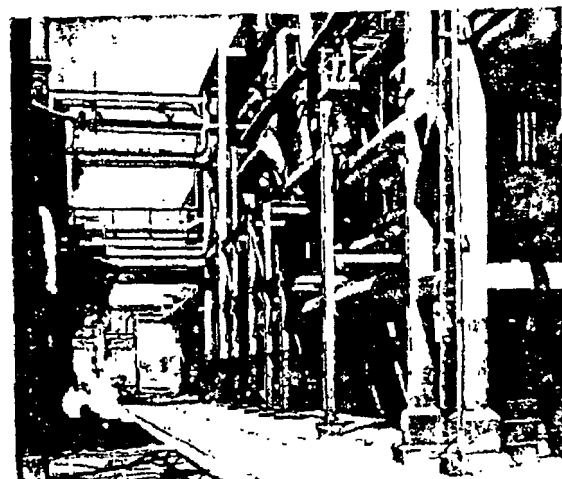
MARINE — Protected by structurally strong, fireproof Marinite bulkheads, passengers on American ships sleep safely as well as comfortably.



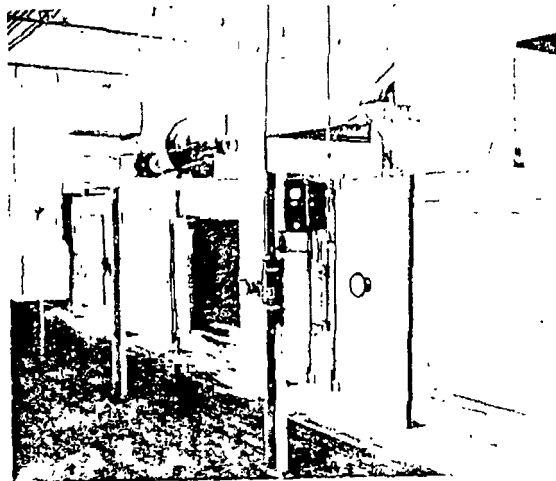
FOOD — Uniformly crisp, perfectly baked cookies testify to the uniform temperatures maintained in this modern Marinite bakery oven



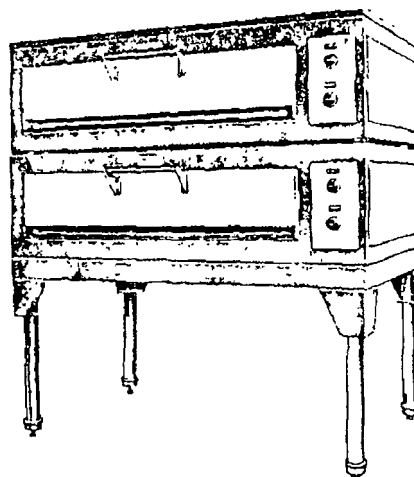
TEXTILE — Marinite speeds production, reduces maintenance-replacement costs to a minimum in this 75 foot tenterframe housing.



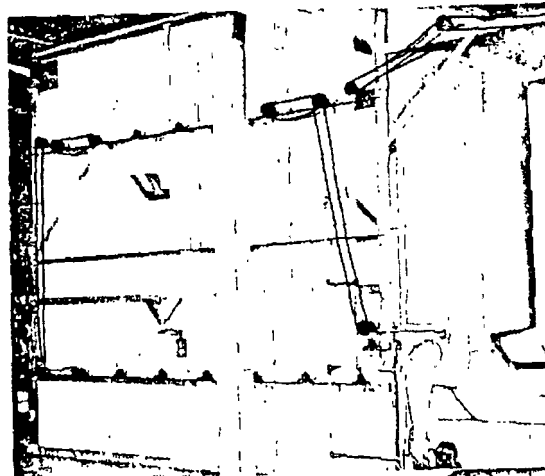
PETROLEUM — Marinite is ideal for fireproofing structural steel in refineries. Call your nearest J-M office for detailed recommendations



PLASTICS — Plastics manufacturer whose maintenance force built this Marinite drying oven reports: "No specialized skills or tools were needed."



APPLIANCE — Restaurants require modern equipment that turns out properly cooked food every time. This Marinite restaurant oven does just that.



TEXTILE — The high humidity present in textile dye-setting operations will never affect the Marinite used to construct this ageless machine

How to use MARINITE

Recommendations on handling and fabricating

The following procedure is recommended in order that work may progress smoothly and efficiently:

- 1** Detailed sketches should be prepared by the carpenter, superintendent or engineering department to permit cutting and drilling of the Marinite prior to fitting in place. This will minimize cutting and scaffolding (where it is necessary) at the point of erection.
- 2** Power-cutting equipment should be used on the job to effect maximum construction savings. The use of untrimmed* Marinite sheets, furnished approximately 1" over-size in length and width but unsquared, will also effect savings. The extra material (approximately 1/2" on both dimensions after squaring) will reduce losses due to saw kerfs.
- 3** Marinite sheets should be piled convenient to the cutting equipment.
- 4** Wherever possible, templates should be used for drilling, especially where duplicate pieces occur. (See illustration on page 11.)
- 5** Only bolting or screwing should be required at the actual point of application or erection. Hand sawing and fitting should be reduced to a minimum.

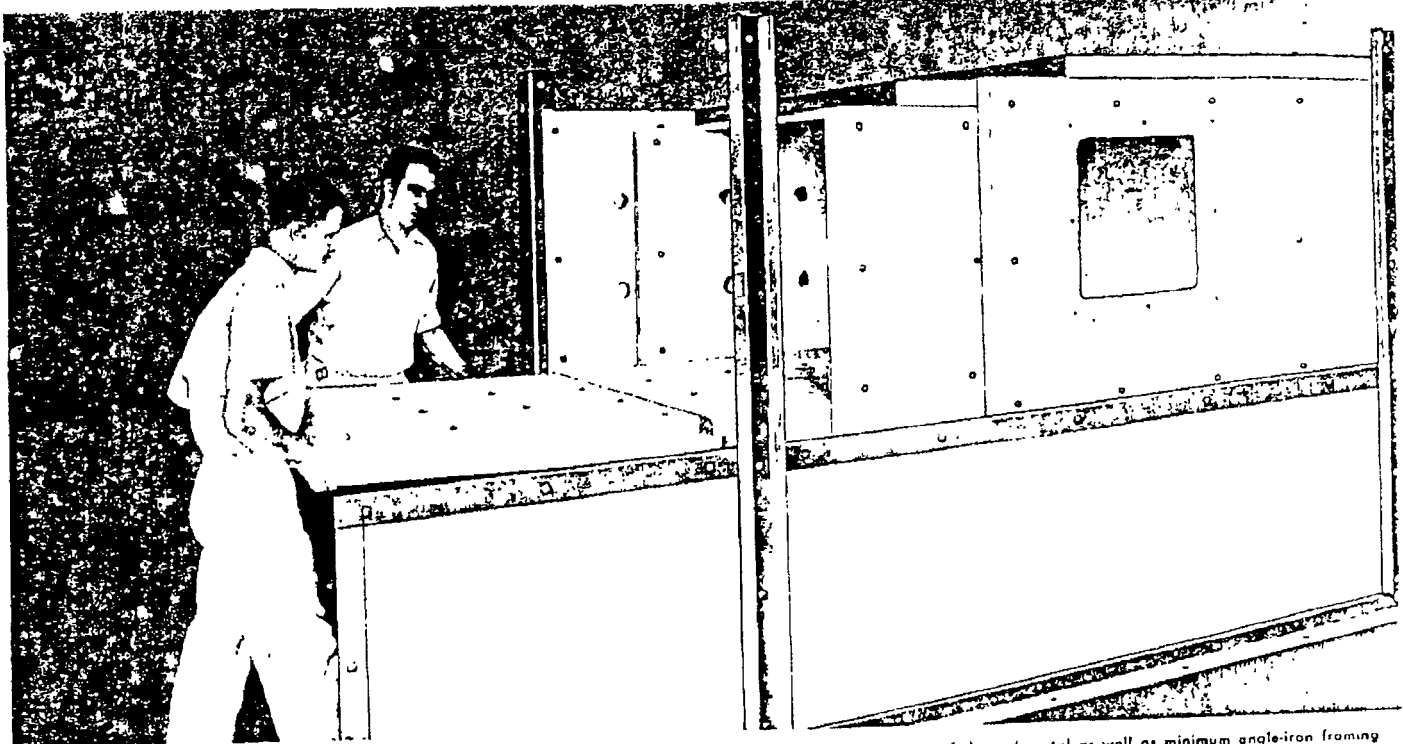
* Available on special order.

HANDLING OF MARINITE

Marinite is amply strong for the service intended, but the nature of its composition is such that it should be handled with a little more care than more common structural materials to avoid marring or breaking. For example, when removing sheets from piles:

- 1** Slide the top sheet at a slight angle to allow for a hand hold. Then lift at each corner (two men to a sheet are sufficient) taking care to prevent a corner from ripping across the face of the next undersheet.
- 2** Turn the sheet edgewise and carry in this position. This is not only more convenient, but will minimize whipping of the sheet and eliminate a source of possible fracture.
- 3** Reverse these operations when laying a sheet on a truck, pile, or finishing table.
- 4** Avoid sliding the faces of Marinite sheets over one another whenever possible. Do not walk on sheets, and avoid dropping heavy objects on them to prevent marring of the finish.

MT-006387



Mechanics assembling a bakery oven with pre-fabricated Marinite panels. Note staggered joints and absence of through-metal as well as minimum angle-iron framing

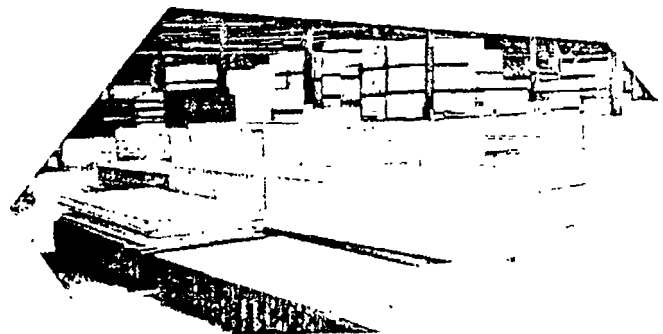
PILING OF SHEETS

Piles can be carried to any desired height without affecting the material, provided the base is true and level. Otherwise the lower sheets will be deformed, the amount of deformation being dependent upon the height of the pile. For convenient unloading of the pile, however, its height should be limited to 5 feet. If sheets are piled on 4 x 4's, or similar bases, spacing should not exceed 24" on centers.

Where possible, Marinite should be stored under cover, out of the weather. If necessary to store outdoors, the sheets should be completely covered with waterproof tarpaulins and supported free from ground water to avoid possible discoloration. While water has no effect on the chemical composition or strength of the material, it will make cutting more difficult and add to the weight of the sheet. Also, Type B (primed) material must be thoroughly dry before painting or peeling of the paint film may result.

WORKING OF MARINITE

General—Marinite can be cut with an ordinary carpenter's hand saw, or power saws (equipped with wood-cutting steel blades) of the circular, radial, band or jig type. However, since the composition of the material tends to dull steel saws quickly, the use of carbide-tipped saws or abrasive wheels on floor or bench type power saws, or portable heavy-duty saws, has proved



most successful. If some cutting is necessary at the point of application or erection, either a carpenter's hand saw or a portable power saw can be used. Allowances must be made for the saw kerf in all cases when figuring the number of pieces to be cut from a sheet. If sufficient quantities of Marinite are to be cut, an investment in proper equipment will pay for itself. Both circular and radial saws have been used successfully. The circular saw is recommended because it more readily permits the collection of dust from cutting by means of an exhaust located beneath the table. Also, the cutting wheel can be fitted with a satisfactory guard and tends to carry the cutting refuse away from the operator. Marinite should always be dry-cut; it should not be fed into the saw too rapidly or binding and overheating, with consequent shortening of the life of the wheel, will result.

How to use

MARINITE

continued

POWER SAW CUTTING

(Floor or bench type circular saw)

for stationary power cutting

1

A floor or bench type circular saw equipped with a carbide-tipped saw or abrasive wheel located beneath the table is recommended. Such machines will generally permit cutting at the rate of 300 to 500 linear feet of 1" thick Marinite-36 per hour, including time to handle the material on and off the machine. The table should be equipped with an adjustable guide capable of being clamped rigidly in place for cutting differing widths. A wheel guard should also be provided.

2

An auxiliary metal-faced table top (can be constructed of wood) placed at the far end of the power saw, and a roller table placed at its side will provide support and permit easy sliding of the 4' x 8' sheets when cutting. These tables should, of course, be level with the top of the saw table.

3

Some means for removing the dust from cutting operations should be provided. Many of the floor type circular saws are equipped with a spout within the base for connection to a dust-collecting system.

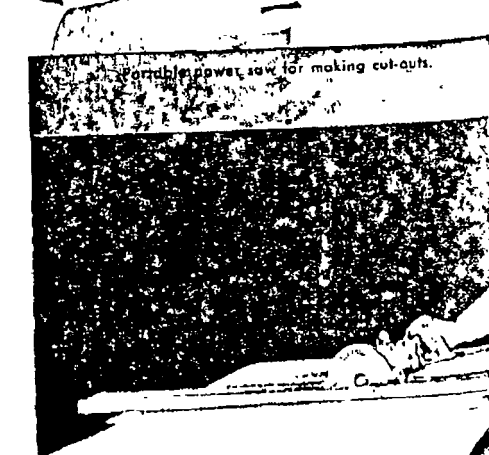
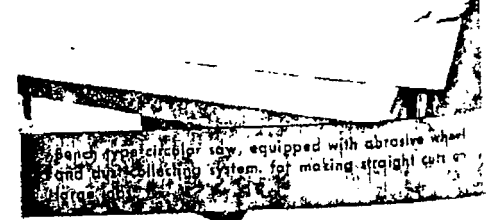
PORTABLE POWER SAW CUTTING

for small jobs

Where small quantities of material are to be cut, a portable heavy-duty power saw, equipped with a carbide-tipped saw or an abrasive wheel, is recommended. It is suggested that with this type of equipment, a respirator be worn by the operator, and that an air hose be attached to the frame to blow dust away from the operator.

DRILLING AND BEVELLING

Electric power drills equipped with steel-working drills render drilling of Marinite effortless, and should be used whenever available. Where extensive drilling is required, power drills should be considered a necessary investment which will save both time and labor. Beveling and similar cutting can be done with wood-jointer tools, or with special-width abrasive wheels.

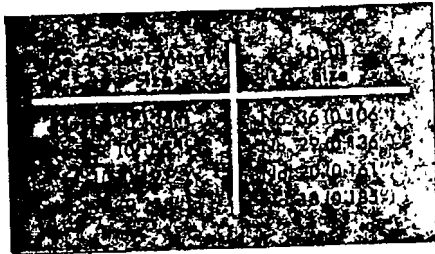


MT-006389

Heavy-duty portable power saw is recommended for straight cutting on small and medium jobs.

SCREW SECUREMENT

When using screws in Marinite, preliminary holes should always be drilled. Sheet metal screws are recommended in preference to wood screws. Where Type A sheet metal screws are used, the recommended drill sizes are as follows:

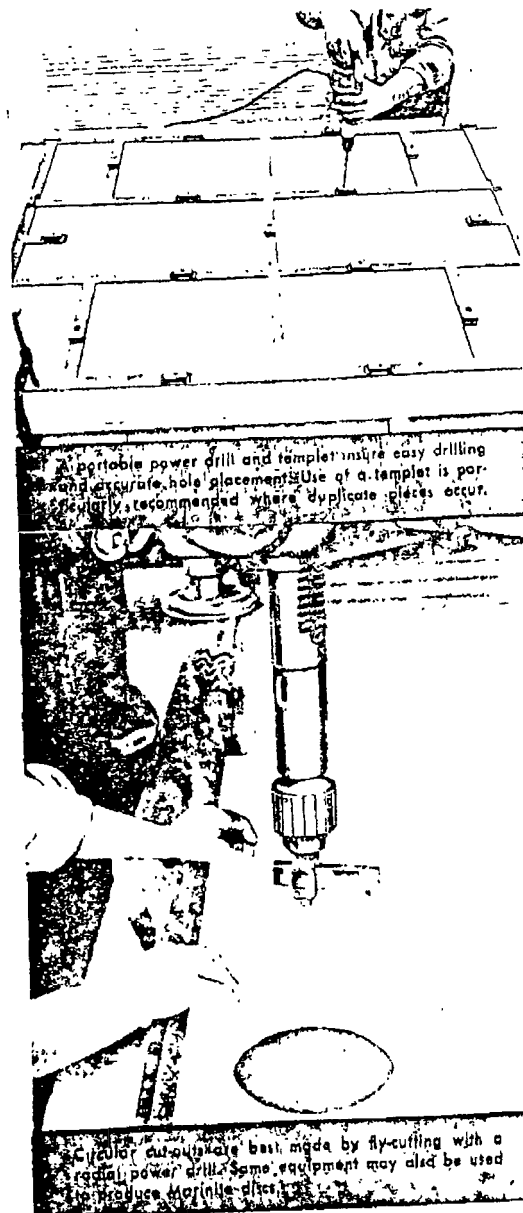
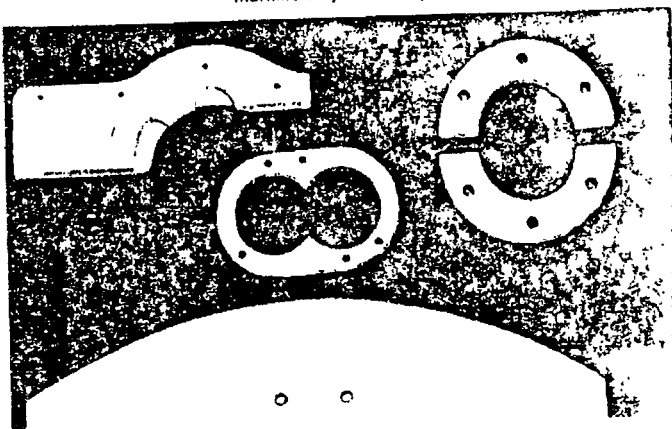


To prevent stripping of the thread in the material, screws should not be turned after they have been screwed "home." A round-head, No 10" x 3/8" Type A sheet metal screw correctly turned in a properly pre-drilled hole will withstand a pullout load of approximately 130 lb in Marinite-23, 240 lb in Marinite-36 and 460 lb in Marinite-65.

PAINTING MARINITE

Marinite Type A, as generally used for the construction of ovens, driers and other industrial equipment, requires no painting. If external painting is desired for appearance purposes, Marinite Type B (primed) should be used. All freshly cut edges, including the edges of holes and ports, that will subsequently be painted, should be given a coat of boiled linseed oil, allowing time for drying prior to painting. In applying paint, the manufacturer's directions for thinning, drying time, etc., should be followed. It is important to remember that Marinite is not a vapor barrier, therefore, any paint used should also be pervious to the outward passage of moisture. Otherwise the moisture

Marinite may be readily fabricated into special shapes



will be trapped in the material, causing the paint to blister.

For the selection of a suitable exterior coating, the industrial finishes department of the following manufacturers may be consulted:

E. I. DU PONT DE NEMOURS & CO.
PITTSBURGH PLATE GLASS CO.
SHERWIN-WILLIAMS PAINT CO.
SOCONY-VACUUM OIL CO.

Whenever it becomes necessary, for any reason, to apply paint to Marinite Type A, two coats of boiled linseed oil should be brushed on all exposed surfaces prior to painting, each coat being allowed to dry for at least 24 hours before the succeeding application.

MT-006390

TYPICAL MARINITE

FOREWORD

Constructing a dryer or oven out of Johns-Manville Marinite is essentially quite simple. However, to insure proper operating efficiency and long life, several design details should be kept in mind:

Marinite will expand slightly when first heated to temperatures up to 250F. As temperatures rise higher than 250F slight shrinkage occurs. In order to compensate for this movement bolt holes should be drilled at least $\frac{1}{8}$ " oversize as shown in drawings of sidewall and ceiling designs on page 13. Nuts should be hand-tightened only, and then backed off one-half turn.

The following table gives the minimum total wall thicknesses of Marinite necessary to limit the effects of warpage resulting from expansion and shrinkage:

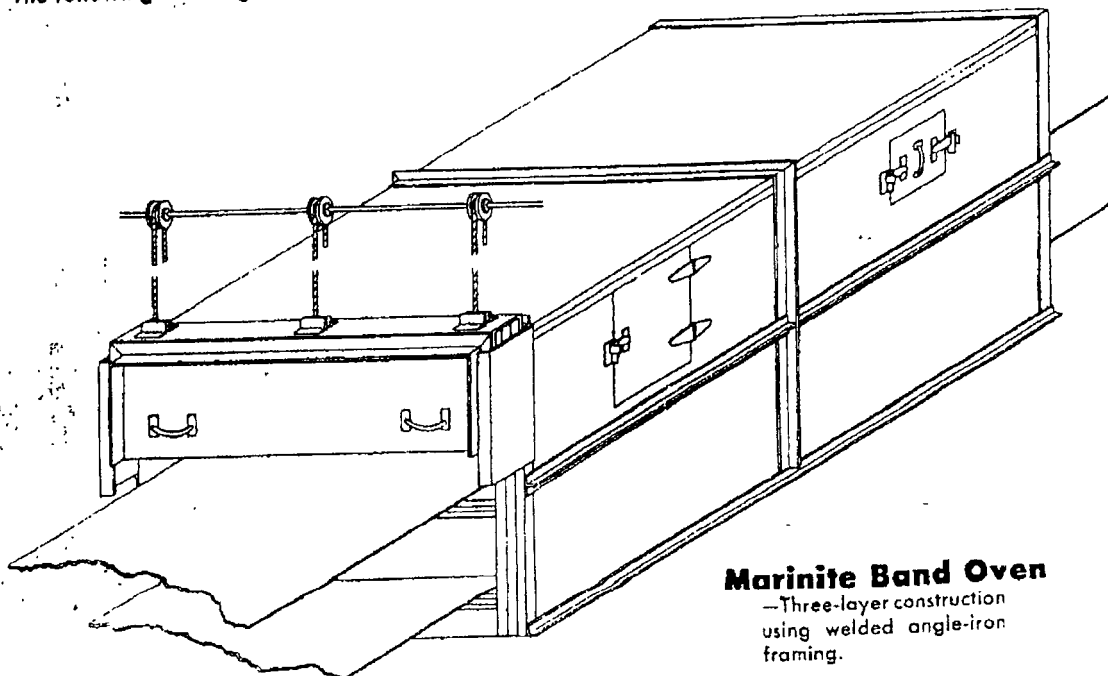
Largest panel dimension, feet	Operating temperature—F							
	100 to 200	201 to 300	301 to 400	401 to 500	*501 to 600	*601 to 700	*701 to 800	*801 to 900
	Minimum total wall thickness, inches							
3	1	1	1	1	2	2	3	3
4	1	1	1	2	2	3	3	4
6	1	1	2	3	3	4	4	5
8	1	1	2	3	4	5	6	6
10	1	2	3	4	5	6	7	8

*At temperatures above 500F, only multiple layers of 1" thickness should be used

Framing members for panel support should not be spaced on greater than 4' centers.

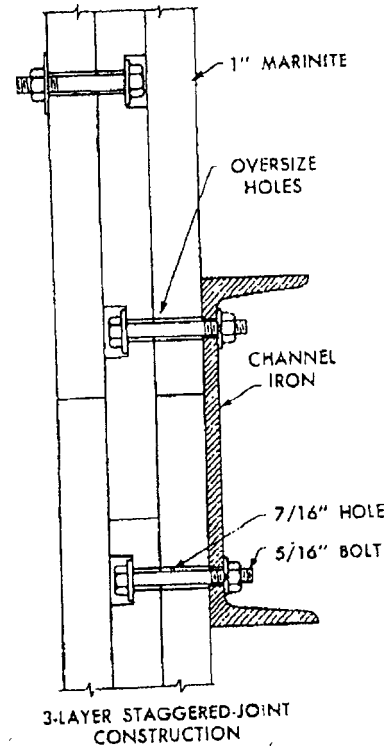
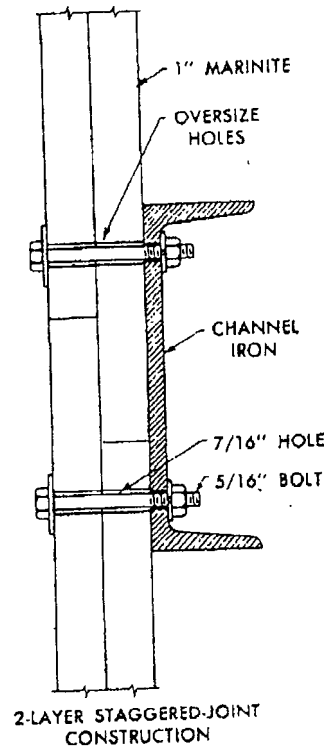
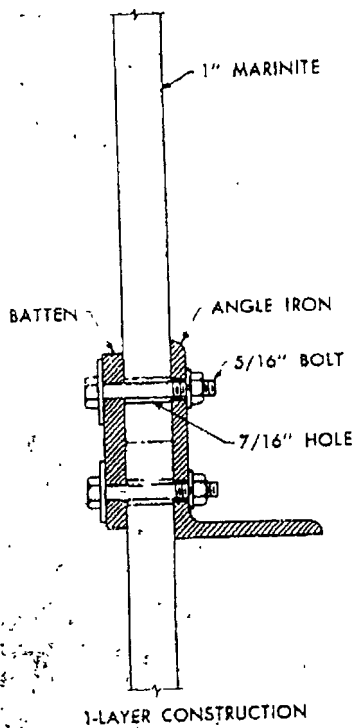
To insure highest thermal effectiveness, staggered joint construction is recommended where 2 or more layers of Marinite are used in forming panels. In 1-layer construction, joints should be covered with Marinite battens.

The following drawings illustrate some of the recommended construction methods:

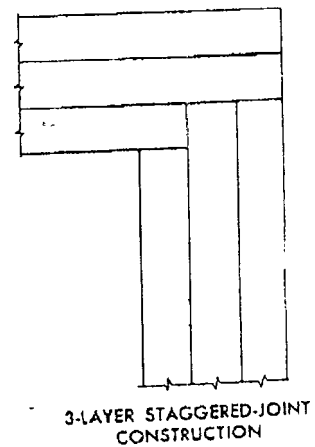
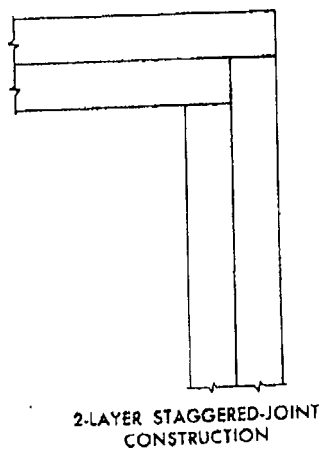
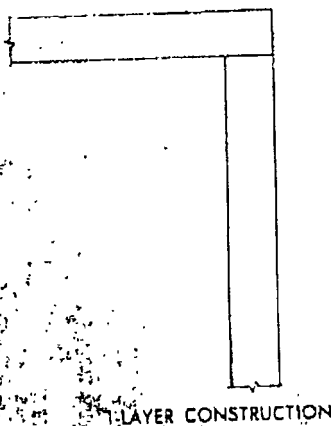


Marinite Band Oven
—Three-layer construction using welded angle-iron framing.

CONSTRUCTION DETAILS



Marinite sidewall and ceiling designs.

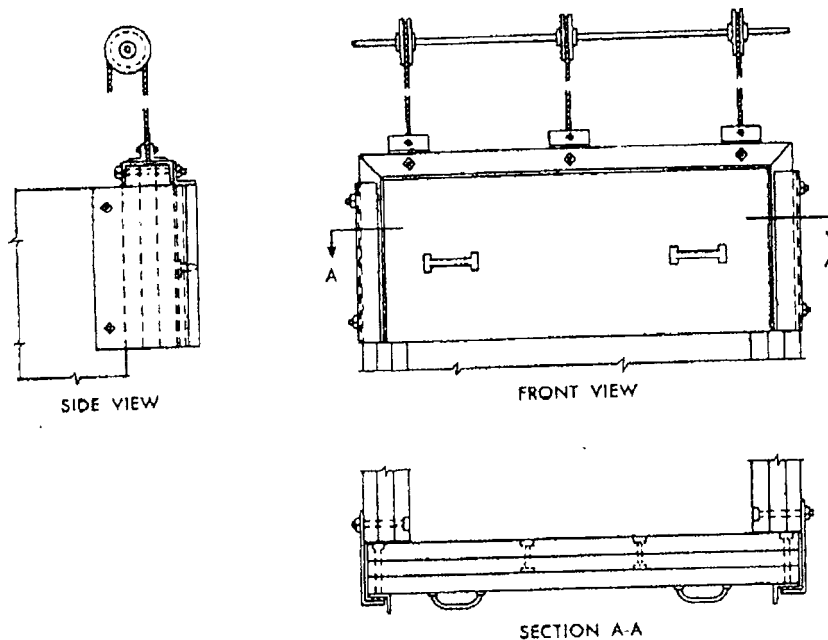


Marinite corner designs.

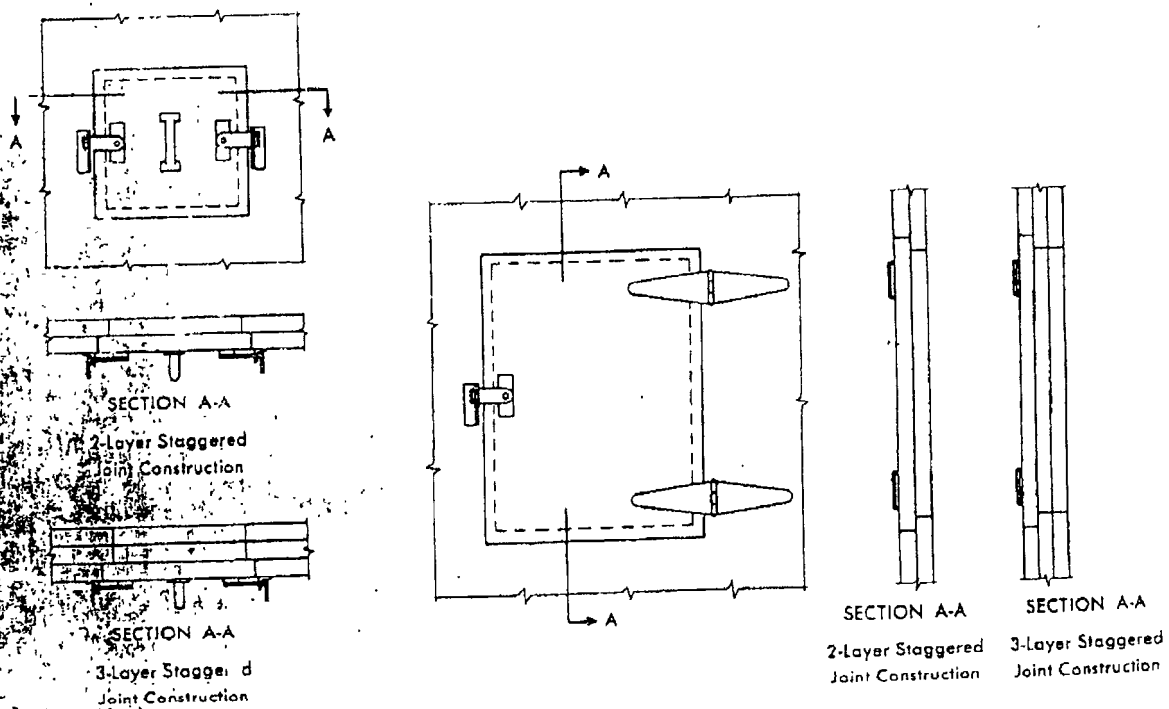
MT-006392

TYPICAL CONSTRUCTION DETAILS

continued



Marinite Sliding Door



Marinite Observation Port

PHYSICAL AND THERMAL PROPERTIES

	Marinite-23	Marinite-36	Marinite-65
Density, Dry, lb per cu ft	21.25	34.38	60.70
Normal Moisture Content, % of dry weight	5 (approx.)	5 (approx.)	5 (approx.)
Transverse Strength, Dry, Ultimate, psi	550	900	1500
Modulus of Elasticity, psi x 10 ⁻⁴ (from transverse test)	0.15	0.40	0.70
Consolidation, in. per in. under load of 500 psi	0.030 max.	0.025 max.	0.020 max.
Impact Resistance, Ultimate, Inch-lb (15" span, 15" width, 1" radius head wt)			
4 lb wt on 1/2" thickness	42	78	150
6 lb wt on 1" thickness			
Screw Holding Power, Ultimate, lb (Sheet metal screws, Type A, Sizes 6-12)			
1/2" penetration	35	80	180
3/8" penetration	130	240	460
Brinell Hardness, Dry			
10 kg load, 10 mm ball, 10 sec	0.5	1.8	4.6
50 kg load, 10 mm ball, 10 sec	—	(Comparable to yellow pine)	
Moisture Expansion, in. per in.			
Shrinkage, normal to dry	0.0008	0.0011	0.0011
Expansion, dry to 100% R. H.	0.0009	0.0011	0.0011
Expansion, dry to saturated	0.0010	0.0013	0.0013
Thermal Expansion, in. per in. per F x 10 ⁴			
avg over temperature range indicated	2.0	1.3	2.6
(Detailed information for special cases furnished on request)	up to 200F; shrinkage thereafter	up to 250F; shrinkage thereafter	up to 250F; shrinkage thereafter
Maximum Service Temperature, F (for continuous service)	*900	*900	*800
Conductivity, Btu in. per sq ft per F per hr at mean temperature			
100F	0.55	0.76	1.50
200F	0.57	0.77	1.56
300F	0.58	0.78	1.62
400F	0.60	0.79	1.68
500F	0.61	0.80	1.74
600F	0.63	0.81	1.80

*See page 12 for table of minimum total wall thicknesses necessary, depending on panel dimensions and operating temperature, to limit effects of warpage resulting from expansion and shrinkage.

†The figures given above for the specified properties are average values obtained in accordance with accepted test methods. However, due to factors beyond our control, responsibility for the results obtained from the use of

this information is not assumed. Ultimate strength figures must be modified by applying adequate factors of safety in arriving at working values.

Standard Sizes and Thicknesses

Material	Sheet Sizes	Thicknesses
Marinite-23	36" x 96" 42" x 96" 48" x 96" 48" x 120"	1", 1 1/2" and 2"
Marinite-36 and Marinite-65	36" x 96" 42" x 96" 48" x 96" 48" x 120"	3/8", 1/2", 3/4", 7/8" and 1"

*Can be furnished on request where volume warrants special run.

**2" material furnished on request where volume warrants special run.

†Furnished only in Marinite-65.

HEAT TRANSMISSION

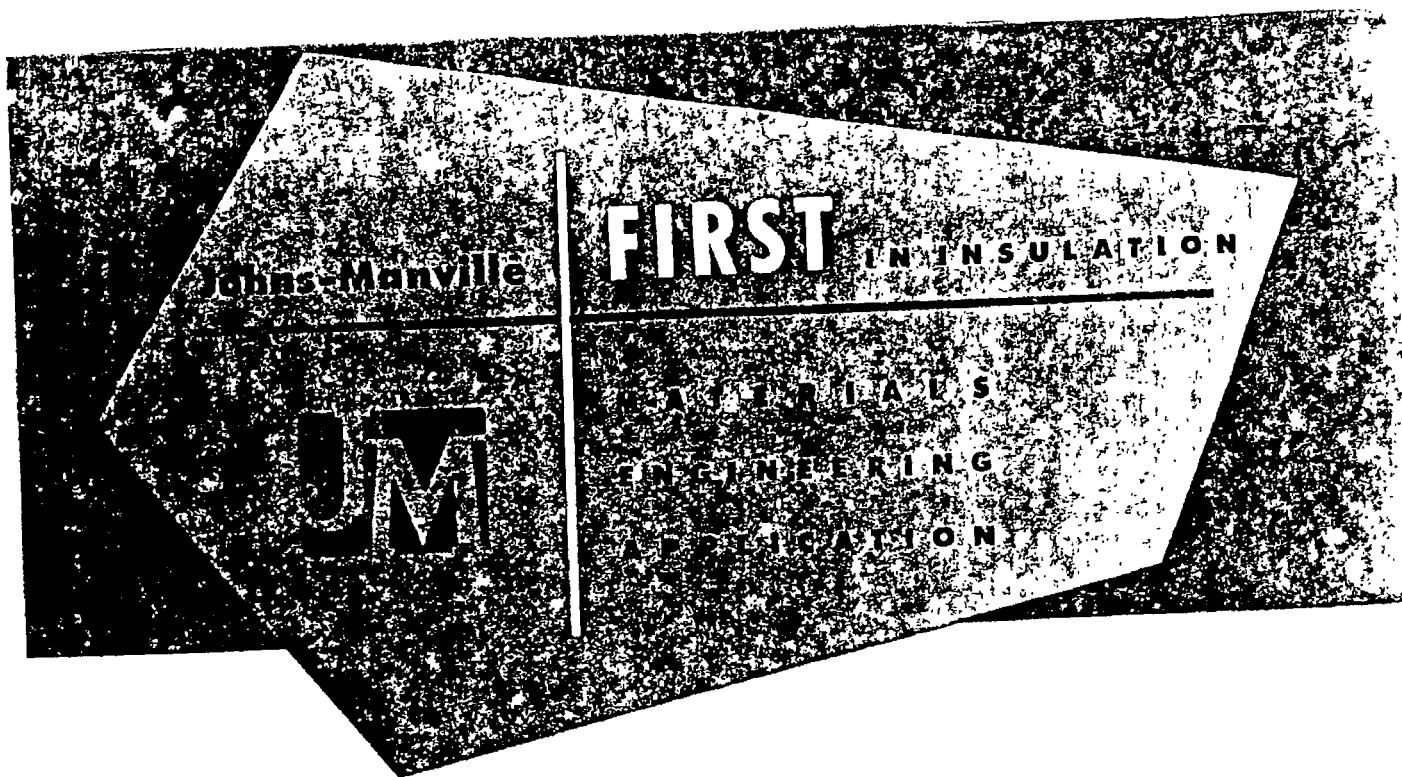
BTU per square foot per hour

Thickness, Inches	Operating temperature—F								
	100	200	300	400	500	600	700	800	900
	Difference between operating temperature and ambient air temperature—F								
	25	125	225	325	425	525	625	725	825
Marinite-23									
1	10.6	53.9	99.2	146	195	—	—	—	—
1 1/2	7.63	38.9	71.2	105	139	—	—	—	—
2	5.98	30.4	55.5	81.5	108	136	164	—	—
3	4.17	21.1	38.6	56.6	75.0	94.0	114	133	154
4	3.19	16.2	29.8	43.4	57.5	72.0	86.8	102	118
5	2.59	13.2	24.0	35.2	46.6	58.3	70.4	82.6	95.3
6	2.18	11.1	20.2	29.6	39.2	49.0	59.2	69.5	80.1
Marinite-36									
1	13.4	38.2	125	184	246	—	—	—	—
2	7.84	39.4	72.2	105	139	174	209	—	—
3	6.09	28.0	50.8	74.0	97.6	122	146	171	196
4	4.29	21.6	39.2	57.1	75.3	93.7	112	131	151
5	3.50	17.6	32.0	46.5	61.3	76.2	91.5	107	122
6	2.96	14.9	27.0	39.2	51.7	64.3	77.0	90.0	103

Marinite-65—furnished on request

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Use J-M Application Service for peak performance

When you pay for top-quality insulation, back up your investment with the best installation service money can buy. Today, with high fuel and maintenance costs, it is especially important to place your insulation job in skilled hands. The scientific application of J-M quality insulations by J-M Insulation Contractors will assure you of the maximum return on your insulation investment for years to come. Moreover, you get undivided responsibility for *all* your insulation requirements.

Johns-Manville has established J-M Insulation Technical Service Units and J-M Insulation Contract Units throughout the country to serve you—units staffed with men who understand insulation engineering and with

skilled applicators who are thoroughly trained in proven Johns-Manville methods.

Working with J-M materials and with J-M Insulation Engineers, these contractors *know* how to apply J-M insulation correctly to insure long, trouble-free performance. You can have the utmost confidence in their ability to handle your insulation application from start to finish.

And remember this important point: When your architect or engineer specifies Johns-Manville insulations any J-M Insulation Contractor in the country will be able to give you a quick, accurate bid, regardless of the size or location of the job.

Johns-Manville

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