Johns-Manville **Refractory Products**

Marinite I

1200°F Fireproof Structural Insulation

PLAINTIFF'S EXHIBIT
MGC-76

Description

Marinite I Fireproof Structural Insulation is an incombustible material in 4′ X 8′ panel form designed to combine structural strength and high thermal insulating values in a variety of fireproofing and heat processing equipment applications up to 1200°F. Free of asbestos and formed from calcium silicate with inert fillers and reinforcing agents, Marinite I panels provide structure and insulation in a single, easily erected material.

In addition to high strength and excellent thermal insulating characteristics, Marinite I structural insulation is highly damage-resistant, noncorroding, and extremely water-resistant. Marinite I panels also provide fire safety, uniform temperature control, minimal maintenance, and fast, easy fabrication. The airborne particulate generated by the fabrication of Marinite I untreated panels is classified by OSHA standards only as a nuisance dust.

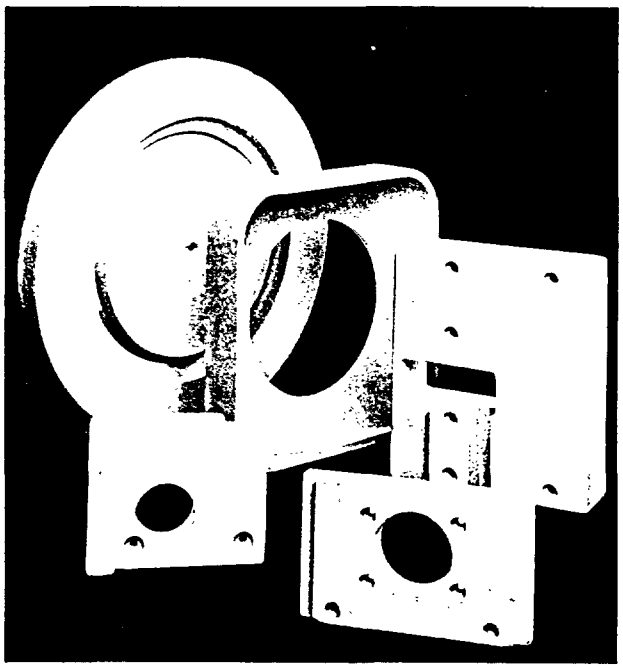
Available Forms

Marinite I. With a sanded finish on both sides, is furnished in 46 lbs/cu. ft. nominal density, in thicknesses of ½" through 2".

Marinite I-V. Veneered on both sides with a 0.100"-thick hydrothermally cured asbestos-cement sheets, is furnished in thicknesses of ¾", 1" and 1¼".

Typical Applications

Because it is both a structural and an insulating material, Marinite I in full size 4′ X 8′ panels offers major economic advantages in the construction of ovens, driers, and other insulated housings for the retention and control of heat. Because of its machineability, Marinite I can be readily fabricated into various sizes and shapes for heat baffles and all types of insulating parts. In addition, Marinite I is used in fire safety applications such as fire stops, cable trays, and fire doors, and provides an ideal, incombustible base for melamine veneers.



Machined Parts

McGCon 2380

Sect. 170 Part 09
Date: 12-79 Cancels: 8-79

Properties

Density, pcf	46
Moisture Content (normal) Percent of Dry Weight*	5
Transverse Strength (dry), psi (Modulus of Rupture)	725
Modulus of Elasticity (dry), psi (From Transverse Test)	300,000

Consolidation Under Load (normal), in./in.

Pressure, psi	Deflection Under Load	Permanent Consolidation
500	0.032	—
1000	0.058	0.025
2000	0.179	0.132
3000	0.299	0.235
4000	0.366	0.320
5000	0.418	0.369
6000	0.462	0.400

Tensile Strength (normal), psi	
Normal to face of sheet	55
Parallel to face of sheet	200
Shear Strength (normal), psi	
Normal to face of sheet	1000
Parallel to face of sheet	405
Brinell Hardness No. (dry) 45.4 kg load, 19.05 mm ball, 15 sec.	1.2
Charpy Impact Resistance, ft.-lb. 5 in. × ½ in. × ⅞ in. samples	0.27
Screw Holding Strength (normal), lb.	
½ in. penetration	87
⅞ in. penetration	208
Dimensional Change Due to Moisture, in./in.	
Shrinkage—normal to dry	0.0011
Expansion—normal to 90% RH	0.0013
Expansion—dry to saturated	0.0026
Thermal Expansion, in./in./°F (Average over temperature range indicated: shrinkage thereafter)	3.84×10^{-6} up to 300°F

*(normal) refers to normal conditions of 75°F and 50% R.H.
(dry) refers to oven-dried material

Standard Sizes

Type	Thickness, inches	Sheet size feet
Marinite I	½, ¾, 1, 1½, 2	4 × 8
Marinite I-V	¾, 1	4 × 8

Dimensional Tolerances (inches)

Length and Width	Thickness	Squareness (max. difference between diagonals)
$\pm 1/32$	$\pm 1/32$	⅛

Thermal Conductivity (Btu-in./sq. ft./ F/hr.

Temperature °F	k
75	0.88
350	0.82
400	0.81
500	0.80
600	0.79
700	0.80
800	0.81
900	0.83
1000	0.86

Specific Heat

Temperature °F	Specific Heat Btu/°F/lb.
200	0.28
400	0.30
600	0.32
800	0.34

Permeability

8.1 perm-inches

McGCon 2382

Minimum Thickness (inches) of Marinite I Required to Provide Indicated Surface Temperature and Heat Loss (with 80°F ambient still air) Make final check against Warpage Control Table

	Operating Temperature, °F								
	200	300	400	500	600	700	800	900	1000
125°F Surface Temperature: (Heat Loss: 87 Btu/sq. ft./hr.)	¾	1¾	2⅝	3 9/16	4 7/16	5⅜	6¼	7⅛	8
150°F Surface Temperature: (Heat Loss: 142 Btu/sq. ft./hr.)	5/16	15/16	1½	2 1/16	2⅝	3⅛	3 11/16	4¼	4¾
175°F Surface Temperature: (Heat Loss: 203 Btu/sq. ft./hr.)	*⅛	9/16	15/16	1⅜	1¾	2⅛	2½	2⅞	3¼

*Minimum available thickness of Marinite I is ½".

Fire Hazard Classification

Listed under Underwriters Laboratories Inc. Guide Numbers:

Guide No. BQJT

Flame Spread*	0
Fuel Contributed	Negligible
Smoke Developed	0

*This numerical flame spread rating is not intended to reflect hazards presented by this or any other material under actual fire conditions.

Guide No. CERZ
Two hour wall and partition fire resistance rating.
Guide No. ZCRW
Form board for structural element penetrations in System Nos. 1, 2, 3, 4, 5, 7, 10, 18, 23.

Electrical Properties

Marinite I panels possess relatively good electrical insulating properties when dry. Because the material is hygroscopic, however, its electrical resistance is reduced after moisture absorption.

As moisture pickup may be expected to cause problems under high-humidity ambient conditions or following the shutdown of equipment, Marinite I panels are not recommended for direct mounting of current-carrying parts.

Despite this stipulation, Marinite I structural insulation is used by some manufacturers for this purpose, particularly at low voltage and at elevated temperatures. The decision to use Marinite I panels for electrical purposes must rest solely with the user. In these applications, it is suggested that protection be provided against electrical shock hazard.

The following values compare the electrical properties of Marinite I panels with Flat Transite® sheets, a Johns-Manville building panel produced from asbestos cement and used in similar applications.

Volume Resistivity (ASTM D257)—taken at 100 volts DC and 1 minute electrafaction time using painted silver electrodes (ohm-cm)

Condition	1" Thick Marinite I	1" Thick Flat Transite
600°F—Dry	815 trillion	27,700,000
75°F—50% RH	98,300,000	10,500,000
71°F—91% RH	3,490,000	4,900,000

Dielectric Breakdown (ASTM D149)—taken at 500 volts per second rate of rise and 60 HZ. (volts per mil)

Condition	1" Thick Marinite I	1" Thick Flat Transite
600°F—Dry	50.5	20.3
72°F—50% RH	45.3	3.1
72°F—87% RH	—	1.55
72°F—90% RH	32.0	—
72°F—93% RH	—	Too wet for valid test

The physical and chemical properties of the Johns-Manville products presented in this brochure represent typical, average values obtained in accordance with accepted test methods and are subject to normal manufacturing variations. They are supplied as a technical service and are subject to change without notice. Therefore, the data contained herein should not be used for specification purposes. Check the Johns-Manville district office to assure current information.

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McGCon 2385

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