

PLAINTIFF'S
EXHIBIT
RMC-134

Johns-Manville

MARINITE®

For

conveying

molten metals

to 1350F...

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J-M MOLTEN METAL MARINITE offers these 7 impt

J-M MOLTEN METAL MARINITE is a new board insulation made of amosite asbestos fiber, diatomaceous silica and an inorganic binder. It is an ideal material for feeding and conveying molten metals up to approximately 1350F.

Molten aluminum, zinc, lead, and other non-ferrous metals (see table adjoining page), do not wet the surface of Molten Metal Marinite. They do not adhere, even when they cool and solidify, so there is no metal contamination.

Two Types

Furnished as **Molten Metal Marinite** for most uses—with a density of 36 pcf and an average Modulus of Rupture of 1200 psi.

Molten Metal Marinite-SG is for use only where stronger material with more wear resistance is desired — density of 45 pcf and an average Modulus of Rupture of 1400 psi.

Eliminates Pre-heating

Because of its low heat capacity and excellent thermal insulating value, melting and holding furnaces do not have to run at higher temperatures to compensate for the normal heat loss throughout the system. Nor do components have to be heated before the first pour, and kept hot between pours. This improves metal quality and yield.

Wide Variety of Uses

Molten Metal Marinite is widely used in the aluminum industry for launders and troughs, trough linings, distribution boxes, pouring boxes, pouring spouts, floating baffles, and ingot mold liners ("hot tops").

Many of these components are used in conjunction with the "D.C." (Direct Chill) semi-continuous process for casting ingots, billets, and rolling slab.

The metal-feed system of many continuous casting machines is made of Molten Metal Marinite. This includes the launder, tap-out box, distributor, and metal-supply nozzles of the Hunter Engineering continuous sheet-casting machine. It also includes the reservoir and metal distributor of the Alcan aluminum strip-casting machine.

Heat Treating

In some applications, **Molten Metal Marinite** is used as received. Among such uses are launders and troughs, trough linings, distribution boxes and pouring boxes.

For greater life and improved machining characteristics of machined components, many customers heat-treat the material at approximately 1050F. This removes chemically-combined water from the amosite asbestos fiber and the *Marinite composition itself*. It also removes shrinkage that normally occurs up to the highest heat treating temperature (1050F).

Heat-treating ovens should have high air velocity. Also, the Molten Metal Marinite sheets should be separated by spacers.

Even after heat treatment, Marinite can regain a small amount of moisture from the atmosphere. For this reason, it should be kept in a warm, dry area prior to pouring.

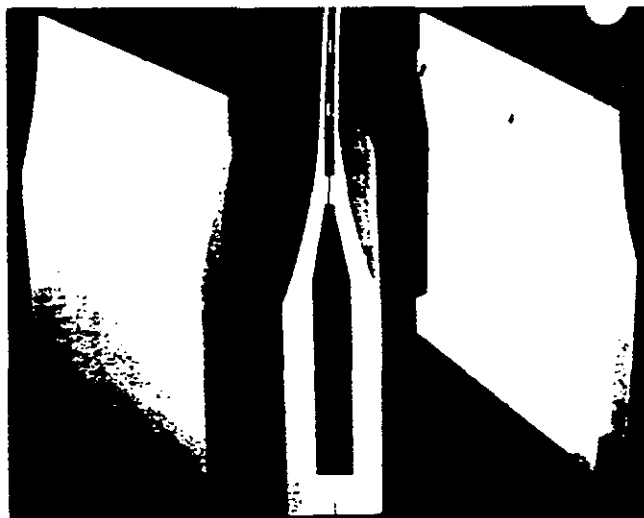
When casting begins, a slight bubbling usually occurs, but it is of short duration. It can happen even though the Marinite has been oven dried prior to casting. In this instance, it is due to the expansion of air in the surface pores of Marinite when the hot molten metal comes in contact with it.

Recommended Procedures *

The recommended heat-treating procedure for Molten Metal Marinite is as follows:

1. Place in an oven at room temperature and raise temperature uniformly to 250F in one hour.
2. Then raise temperature to 1050F at a uniform rate over a period of nine hours.
3. Maintain 1050F for 5 hours for 1"-thick material; 8 hours for a 2" thickness. (Greater thicknesses cannot be heat treated in sheet form. See warning on next page.)
4. Allow to cool gradually in the oven.

When heat-treating Molten Metal Marinite-SG, a more extended procedure is recommended, due to its higher density, as follows:



NOZZLES—Section of the Molten Metal Marinite Metal-Supply Nozzle for the Hunter Engineering Continuous Sheet-Casting Machine.

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Important advantages

- Not wetted by molten metals—requires no foundry facing wash
- "Skull" easily removed
- No metal contamination
- Readily machined and fabricated
- Holds metals at uniform temperature
- No pre-heating necessary
- Maintains strength at high temperatures

1. Place in an oven at a temperature not over 250F and hold for 4 hours.
2. Raise temperature to 300F and hold for 4 hours.
3. Raise temperature to 400F and hold for 4 hours.
4. Raise temperature uniformly to 1050F over a period of 12 hours.
5. Maintain 1050F for 4 hours.
6. Allow to cool gradually in the oven.

WARNING: Sheets thicker than 2" must be machined to rough size before heat treating is possible. Because Marinite is an excellent insulating material, there is a considerable temperature lag at the center compared with the outside surfaces, even when an extremely slow heating rate is used. This causes the outside to shrink at a greater rate than the inside which makes the edges curl outward and splits the sheet into a number of layers. Machining to rough size prior to heat treating permits the heat to enter the Marinite from a number of surfaces so uniform shrinkage can be maintained. However, heat treating is not possible if rough shape is thicker than 2" and of solid construction, since heat cannot enter center of piece.

*Although it in no way affects the material, it is interesting to note that Molten Metal Marinite changes color at high temperatures, thus indicating the temperature to which it is being subjected.

For example, the normal white color changes to a gray-brown at 1000F. At 1200F, the color becomes an orange-red; and brightens to a coral shade at 1300F. It should also be noted that if heat-treating is conducted in a reducing atmosphere, the color change will not occur.

MOLTEN METAL MARINITE CAN BE USED WITH THESE NON-FERROUS METALS:

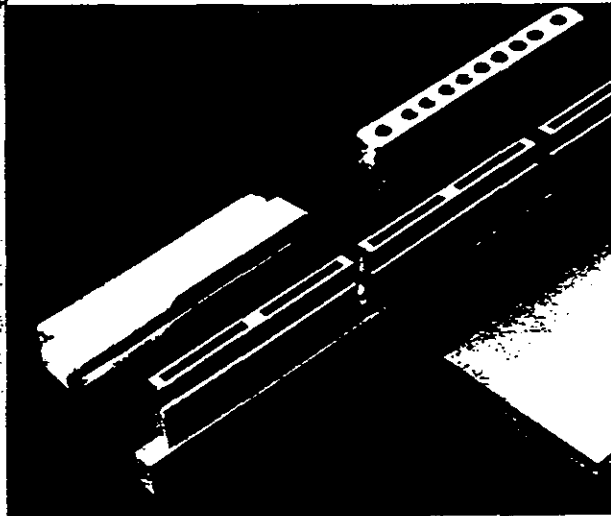
Metal	Melting Point, F
Aluminum	1220
Zinc	787
Die-casting metal**	710
Lead	621
Bismuth	520
Tin	449

*Can also be used with alloys of these metals.

**Such as Kirkcaldie A of National Lead Co.; Typical composition = 90-92% Zn, 4% Cu, 3.5-5% Al, less than 1% Mg.



SPOUTS AND BAFFLES—Molten Metal Marinite Pouring Spouts and Floating Baffles used in the D. C. (Direct Chill) Semi-Continuous Casting Process.



DISTRIBUTORS—Parts of the Molten Metal Marinite Distributor for the Alcan continuous strip-casting machine for aluminum.

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PHYSICAL AND THERMAL PROPERTIES

STANDARD SIZES AND THICKNESSES

Material	Thicknesses, inches	Sheet Size, feet
Molten Metal Marinite	$\frac{1}{2}$ 1 2 •3 •4	All sheets 4 x 8
Molten Metal Marinite-SG	$\frac{1}{2}$ 1	

*Special order only—Subject to 6 to 10 weeks delivery

DIMENSIONAL TOLERANCES

Material	Length & Width, inches	Thickness, inches	Squareness, max. dev. per linear yd., inches
Molten Metal Marinite	$\pm 1/16$	$\pm 1/32$	$\pm 1/16$
Molten Metal Marinite-SG	$\pm 1/16$	$\pm 1/32$	$\pm 1/16$

Johns-Manville

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Sales Offices in Principal Cities



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