

## General

METAPOR<sup>®</sup> is a composite material made of aluminum granules and epoxy resin. The material is air-permeable over the entire surface due to its micro-porous structure allowing for unique design considerations for prototype and production thermoform tools. In contrast to sintered materials, the pores do not close off after machining allowing excellent definition and surface quality.



Thermoformers have seen some of the following advantages:

- High Definition and Accuracy
- Faster Air Evacuation
- Improved Surface Quality
- Reduced Machine Time
- Trapped Air Elimination
- Improved Mold Detail

## METAPOR<sup>®</sup> - HD 210 AL

METAPOR<sup>®</sup> - HD 210 AL is the high temperature grade of the product. It can be used with polymer sheet most commonly thermoformed today such as PS, ABS, PVC, PET and PE, but is also suitable for polymers processing at higher temperatures such as polycarbonate and acrylic. Its upper operating temperature limit is 410 °F (210 °C).

## Physical properties at 67°F (20 °C)

Property	Value (Eng)	Value (SI)
Density	118.6 lb/ft <sup>3</sup>	1.9 g/cm <sup>3</sup>
Hardness Shore D	82	82
Flexural strength	6,239 psi	43 N/mm <sup>2</sup>
Flexural Modulus	1,567 ksi	10,800 N/mm <sup>2</sup>
Impact strength	5.2 ft-lb/in <sup>2</sup>	11 kJ/m <sup>2</sup>
Coefficient of thermal expansion 25 °C -125°C (77 - 257 °F)	17.6 x 10 <sup>-6</sup> in/in/°F	32 x 10 <sup>-6</sup> mm/mm/°C
Thermal conductivity: at 100°C (212 °F)	10.2 BTU/ hr-ft-°F	19 W / m-°C
Martens Dimensional Stability	410 °F	210 °C
Mean pore diameter	.0005 in	12 μm
Total porosity (by volume)	16 %	16 %

### **Design and Handling**

For detailed information on Handling, Machining and Adhesive bonding of METAPOR<sup>®</sup>, please refer to the "Handling Guidelines" brochure.

### **Storage**

Store dry, protect against jolts and impacts. Avoid contact with grease and fluids.

### **Machining**

The machining properties of METAPOR<sup>®</sup> are excellent and are comparable with rapid machinable aluminium. **METAPOR<sup>®</sup> must be machined dry and should not be in contact with any cooling liquids.** In order to avoid any closure of pores, sharp tools made of HSS or carbide with edge angles as for aluminium must be used. It is recommended to use dust extraction. Avoid contact with grease and fluids

### **Grinding/Polishing**

Grinding and polishing of the machined surfaces can be made by hand or with a vibrating grinder. Use corundum paper with grains of 400 / 600 / 1200 in the ascending order. **METAPOR<sup>®</sup> has to be polished dry and without any polishing paste!**

### **Air Flow Rates**

The numbers are average values for calculating air consumption for overpressure or under pressure applications. Specification is in cubic inches per minute per in<sup>2</sup>.

Pressure difference in psi	Plate thickness in Inches							
	0.39	0.59	0.79	0.98	1.18	1.57	2.36	3.94
2.9	82.6	66.9	43.3	35.4	27.5	23.6	15.7	3.9
4.4	98.3	82.6	51.1	47.2	35.4	27.5	19.7	7.9
5.8	114.1	98.3	62.9	55.1	43.3	35.4	23.6	11.8
7.3	129.8	110.1	70.8	62.9	51.1	43.3	27.5	11.8
8.7	149.5	125.9	78.7	70.8	59.0	47.2	35.4	15.7
10.2	165.2	141.6	90.5	78.7	62.9	55.1	39.3	19.7
11.6	180.9	153.4	98.3	90.5	70.8	59.0	43.3	23.6
13.1	196.7	169.1	106.2	98.3	78.7	66.9	47.2	27.5
14.5	212.4	180.9	118.0	106.2	86.5	70.8	55.1	31.5
29.0	357.9	314.6	200.6	184.9	149.5	129.8	98.3	62.9
43.5	487.7	428.7	279.2	251.7	208.4	180.9	141.6	90.5
58.0	601.7	527.0	346.1	314.6	259.6	224.2	177.0	118.0
72.5	696.1	613.5	401.2	369.7	302.8	263.5	212.4	145.5
87.0	774.8	684.3	448.4	413.0	338.2	298.9	239.9	169.1

### **Available Sizes**

METAPOR<sup>®</sup> is available in 4 standard sizes: 500L x 500W x 15 / 20 / 30 / 60mm (19.7" x 19.7 x 0.6 / 0.8 / 1.2 / 2.4"). After the cutting process, the air permeability of the slab surface is reduced due to partial closure of the pores. It is essential to **mill both surfaces of the slab** by cutting off approx. 0.5 mm, (0.02"), providing complete air permeability.