UNITHERM
INSULATION SYSTEMS
We Mean Green

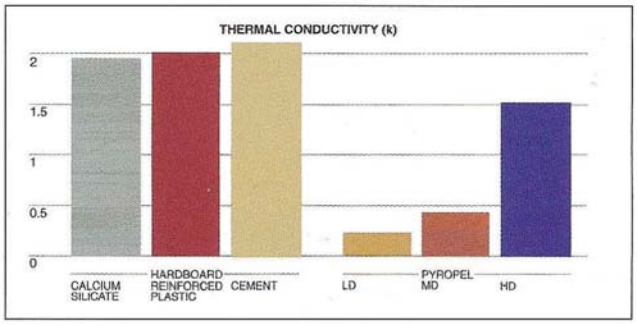
PYROPEL...

The First Insulation Designed Specifically for Plastics and Rubber Processing

Pyropel rigid polyamide fiberboard offers superior insulative properties across a broad temperature range, exceptional durability, and unmatched ease of fabrication and use.

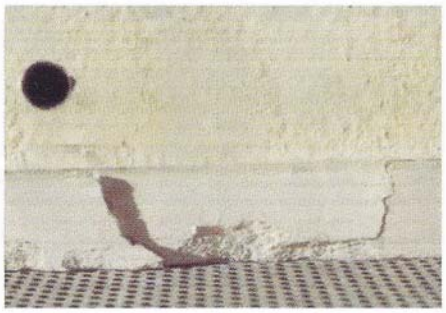
2 to 4 Time More Effective Than Other Common Insulation

A patented manufacturing process creates sintered fiber bundles which gives Pyropel its rigidity, compressive strength, dimensional stability, and durability. They also trap air making Pyropel a much better insulator that cement or plastic-based hardboard insulation.



Will Not Crack Under Pressure

Pyropel's unique thermoset fiber construction makes it both nonbrittle and compression resistant. Unlike other hardboard insulation, it will not crack when subjected to compression forces, thermal expansion, or thermal cycling and shock.



Custom Cut Insulation Boards

Pyropel requires special tooling using a table router or waterjet in which Uni-Therm Insulation Systems has to offer. This material can be custom cut into any patterns that is needed for your personal usage.

Easy to Install Using Adhesives or Mechanical Fasteners

Pyropel can be bonded to molds using RTV adhesive or countersunk flat head screws. Its rigidity eliminates the need for supporting structures.

Pays for itself in Energy Savings Alone in Months

Pyropel can also increase process output by improving heating and/or cooling efficiency. In addition, by reducing unwanted plant heating, Pyropel can reduce the load on plant environmental systems, increase worker comfort, and reduce employee injuries.

Applications

Pyropel is available in a range of thicknesses and densities and is ideal for most plastics and rubber processing applications including:

Tool base (compression and injection molding)
Hot runner systems
Tool Perimeter
Air rings

For specific product recommendations, refer to the Selector Guide on the following sheet.

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Physical Properties

Products for a Wide Range of Applications

Pyropel is available in three different forms:

Low Density

A flexible form of Pyropel, Pyropel LD is an industrial nonwoven. Typically used where thermal control is the major engineering concern, Pyropel LD can be easily wrapped around complex shapes or converted into insulation kits. Unlike other blanket type insulators, Pyropel LD is binder-free and has none of the shedding concerns associated with common fiber-based materials.

Medium Density

Pyropel MD is a lightweight fiberboard with superior insulation properties. Pyropel MD-12, MD-18, and MD-30 are semi-rigid and are normally used in areas that require both thermal isolation and limited mechanical resistance.

Pyropel MD-50 and MD-60 are rigid insulation for mechanically demanding areas. More resilient, MD-50 is ideal when loading is not evenly distributed or when equipment alignment is not perfect. MD-60 is the most structurally rigid grade of Pyropel MD and offers the highest compression resistance and physical tolerances.

High Density

Pure polyimide plate, Pyropel HD is easily machined to make both mechanical and thermal components for highly engineered equipment. These components include high-temperature spacers, washers, slides, and bearings.

	TEST METHOD	LD			
		LD-6		MD-12	
		English	Metric	English	Metric
PHYSICAL					
Form:		Flexible Blanket	Flexible Blanket	Semi-Rigid Fiberboard	Semi-Rigid Fiberboard
Color:		Yellow	Yellow	Gold	Gold
Density:		6 lb/ft³	0.10 g/cm³	12 lb/ft³	.19 g/cm³
Standard Thickness:[1]		1/8" - 1"	3.2 - 25.4 mm	1/8" - 3/8"	3.2 - 9.5 mm
Standard Sheet Size:[1]		54" wide	1.37 m	4' x 8'	1.2 x 2.4 m
MECHANICAL					
Tensile Modulus:	D-638	—	—	15,000 psi	107,000 kPa
Yield Strength (2% Offset):	D-638	—	—	1,500 psi	10,340 kPa
% Elongation:					
@ 2% Offset		—	—	6%	6%
@ Break		—	—	31%	31%
Compression Modulus:	D 638	—	—	800 psi	5,500 kPa
Strength @ 2% Strain:	D-695	—	—	10 psi	70 kPa
Flexural Modulus:	D-790	—	—	1,940 psi	13,380 kPa
THERMAL					
Continuous Use Temperature:		575°F	302°C	550° F	288° C
Glass Transition Temp (Tg):		600°F	315°C	600° F	315° C
Thermal Conductivity (k):					
@ 25°C (77°F)		0.22	0.032	0.24	0.036
@ 93°C (200°F)	C-177	0.27	0.039	0.26	0.038
@ 149°C (300°F)		0.31	0.045	—	—
@ 204°C (400°F)		0.38	0.055	0.32	0.046
Flammability Rating:	UL-94	—	—	94V-0	94V-0

[1] Custom sizes and thicknesses available. Consult Technical Services.

Design Considerations

Pyropel is a superior insulator and is very easy to work with. However, users should consider the following when forming or fabricating it into parts or structures.

- Under normal conditions, Pyropel will not shed fibers, but cutting, milling, drilling, or routing it will generate loose fibers. While these fibers pose no health risks, we recommend that workers wear masks and safety glasses for their own comfort.
- Pyropel provides excellent heat resistance. However, when fabricating Pyropel into components, housings, or other parts, users should consider the heat resistance of any mechanical fasteners or adhesives.
- Manufactured from 100% polyimide, Pyropel offers excellent chemical resistance and is not affected by most strong solvents or acids and many alkali materials. Consult Technical Service for Pyropel's resistance to specific chemicals.

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MD								HD	
MD-18		MD-30		MD-50		MD-60		HD Plate	
English	Metric	English	Metric	English	Metric	English	Metric	English	Metric
Semi-Rigid Fiberboard	Semi-Rigid Fiberboard	Semi-Rigid Fiberboard	Semi-Rigid Fiberboard	Rigid Fiberboard	Rigid Fiberboard	Rigid Fiberboard	Rigid Fiberboard	Solid Plastic	Solid Plastic
Gold	Gold	Gold	Gold	Gold	Gold	Light Brown	Light Brown	Black	Black
18 lb/ft³	.29 g/cm³	30 lb/ft³	.48 g/cm³	50 lb/ft³	.80 g/cm³	60 lb/ft³	.96 g/cm³	85 lb/ft³	1.36 g/cm³
1/8" - 1/4"	3.2 -6.4 mm	5/16"	8 mm	5/16"	8 mm	5/32", 1/4"	4, 6.4 mm	1/4", 1/2"	6.4, 12.7 mm
4' x 8'	1.2 x 2.4 m	2' x 3'	0.6 x 0.9 m	2' x 3'	0.6 x 0.9 m	2' x 3'	0.6 x 0.9 m	12" x 12"	305 x 305 mm
27,000 psi	186,200 kPa	31,000 psi	216,500 kPa	110,000 psi	750,000 kPa	164,000 psi	1,150 MPa	570,000 psi	3,930 MPa
1,700 psi	11,720 kPa	670 psi	4,620 kPa	1,960 psi	13,510 kPa	3,070 psi	21,170 kPa	10,000 psi	70 MPa
6% 22%	6% 22%	4% 29%	4% 29%	4% 13%	4% 13%	4% 6%	4% 6%	— 2%	— 2%
2,200 psi	15,170 kPa	15,000 psi	103,420 kPa	46,000 psi	317,160 kPa	58,000 psi	104,110 kPa	540,000 psi	3,720 MPa
15 psi	100 kPa	60 psi	410 kPa	275 psi	1,900 kPa	1,150 psi	7,930 kPa	—	—
6,620 psi	45,640 kPa	20,030 psi	138,100 kPa	49,390 psi	340,530 kPa	132,260 psi	911,910 kPa	550,000 psi	3,790 MPa
550°F	288° C	550°F	288°C	550°F	288° C	550°F	288° C	550°F	288° C
600° F	315° C	600° F	315° C	600° F	315° C	600° F	315° C	600° F	315° C
0.27 0.31 — 0.36	0.041 0.046 — 0.052	0.34 0.36 0.39 0.44	0.049 0.052 0.056 0.063	0.49 0.51 0.56 0.62	0.070 0.074 0.080 0.089	0.80 0.83 0.86 0.90	0.114 0.119 0.123 0.129	1.57 — — 2.09	0.23 — — 0.3
94V-0	94V-0	94V-0	94V-0	94V-0	94V-0	94V-0	94V-0	—	—

Other Pyropel Applications

Aerospace

Originally developed to meet the critical weight and fire safety demands of passenger airplanes, Pyropel is ideal for passenger compartment/cabin applications. Lightweight and easy to fabricate, Pyropel is nonflammable, nontoxic, and produces very little smoke when subjected to flame.

OEM Applications

Pyropel offers designers benefits that are unmatched by other forms of insulation. Superior insulating ability; light weight; resistance to heat, fire, chemicals, and mildew; and ease of fabrication make Pyropel the logical choice for products from electronics to refrigerated trucks to the Space Shuttle.

Acoustic Insulation

In addition to being an excellent thermal insulation, Pyropel offers impressive sound deadening capability. It is particularly well suited to applications where its rigidity and ease of fabrication simplify design or reduce assembly labor.

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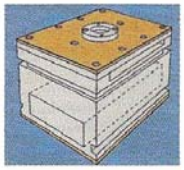
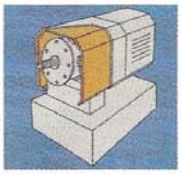
Selector Guide



Tool Base/Platen Insulation

Pyropel is an ideal base insulation for both compression molds and injection molds

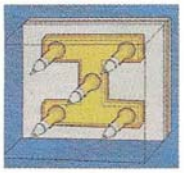
Application	Recommended Pyropel
Compression Molding	MD-60
Injection Molding	MD-60



Perimeter Insulation

Pyropel can be mechanically fastened or bonded to the sides of tooling or heated platens using high-temperature adhesives.

Temperature °(F)	--Durability-- High MD-18
201 - 300	1/8"
301 - 400	3/16"
401 - 550	1/4"



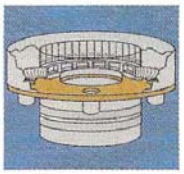
Hot Runner System Insulation

Pyropel should be installed inside the manifold cavity using high-temperature adhesives.

Pyropel thickness should be 1/2 that of the air gap.

For maximum effectiveness, the perimeter should be insulated as well as the top and bottom of the cavity.

Recommended Pyropel: MD-18



Air Ring/Flat Film Insulation

Air Ring

Installed between the top die plate and air ring, Pyropel improves cooling efficiency and bubble stability.

Pyropel thickness should be sufficient to seal the gap between the ring and the die.

Recommended Pyropel: MD-18

Flat Extrusion Dies

Typically, extrusion dies have no external loading but benefit from perimeter insulation. Pyropel can be bonded or mechanically fastened to existing dies or designed into new dies as an internal structural plate, isolating the heater section from the external structures.

Recommended Pyropel: MD-18