



LYDALL & LYTHERM DATA SHEETS

*Manniglas 1900, 2000, Lytherm,
Ceramic Free, LDF and more*

Non-Respirable, Glass Fiber Paper

Lydall: ManniGlas 1900

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OUTSTANDING THERMAL INSULATION

ManniGlas® 1900 is a non-respirable, low cost alternative to silicone and ceramic fiber gasketing materials. It excels in applications requiring superior thermal resistance where space is limited. The distinct advantages of these electrical grade glass fibers include:

- Ability to withstand continuous operating temperatures up to 1200 °F (649 °C) without shrinkage
- Achievement of UL's highest rating (94V-0) for non-flammability
- Highly uniform white surface and excellent thickness control
- Non-formaldehyde-based binders to satisfy low smoke and odor requirements
- Dimensional stability
- Easy die-cutting allows for intricate shapes with narrow spans
- Flexibility for conforming to 90° bend
- Compression resistant
- ISO-9001:2008 certified

TYPICAL MARKETS

- Automotive (underhood)
- Boilers
- Furnaces
- Hearth Products
- Lighting
- Steam Trace Lines
- Stoves
- Water Heaters

**To meet thermal conductivity needs in any space,
trust ManniGlas® 1900.**



Material Property	Standard Thickness (in, mm)			
	0.030 (0.76)	0.060 (1.52)	0.125 (3.18)	0.250 (6.35)
Measurement Gauge, psi (kPa)	7.3 (50)	7.3 (50)	0.5 (3.4)	0.5 (3.4)
Density - Post compression, pct (g/cc)	11 (0.18)	11 (0.18)	7 (0.12)	7 (0.12)
Basis Weight, lb/2880ft ² (g/m ²)	79 (137)	165 (275)	219 (383)	451 (760)
Ash,% by wt	94	94	94	94
Machine Direction Tensile Strength, lb/in (kg/25 mm)	14 (6)	30 (13)	40 (18)	80 (36)
Cross Direction Tensile Strength, lb/in (kg/25 mm)	11 (5)	30 (13)	30 (13)	70 (31)

Mean Temperature (°F, °C)	Thermal Conductivity,* BTU (in/hr ft ² °F, W/m ² °C)
167 (75)	0.26 (0.037)
350 (177)	0.34 (0.049)
500 (260)	0.43 (0.061)
650 (343)	0.51 (0.073)

* Per ASTM C177

DISCLAIMER

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Product Availability	
Standard Roll Width, (in, mm)	51 (1295.4)
Custom Roll Width, (in, mm)	2-104 (50.8-2641.6)
Roll Diameter – ID, (in, mm)	3 (76.2)
Roll Diameter – OD, (in, mm)	38-40 (965.2-1016)
Colour	Black, White
Slitting	Custom
Palletizing	Available upon request
Packaging	Stretched-wrapped

TYPICAL APPLICATIONS

- Provide thermal insulation where space is at a premium
- High temperature gaskets and seals
- Laminated to foil for use as a thermal shield
- PSA-coated and slit into strips to act as seals and protect thermal breaks
- Laminated/Mechanically attached to other substrates to create unique thermal solutions

TESTING/ENGINEERING SERVICES

- Thermal imaging for performance validation
- Thermal conductivity for material characterization
- Thermal modeling for engineering solutions

Low Cost, Non-Respirable Glass Fiber Paper

Lydall: Manniglas 2000

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OUTSTANDING THERMAL INSULATION

ManniGlas® 2000 is a non-respirable, non-woven fiber that offers thermal performance similar to woven glass at a fraction of the cost. Whether used alone or laminated to foil, this electrical grade fiber offers enhanced thermal performance along with:

- Ability to withstand humidity and continuous operating temperatures up to 1200°F (649°C) without shrinkage or loss of shape
- Achievement of UL's highest rating (94V-0) for non-flammability
- Low density that reduces the cost per unit area
- Dimensional stability
- Easy die-cutting that allows for intricate shapes with narrow spans
- ISO-9001:2008 certified

TESTING/ENGINEERING SERVICES

- Thermal imaging for performance validation
- Thermal conductivity for material characterization
- Thermal modeling for engineering solutions

**To meet the thermal conductivity needs in any space,
trust ManniGlas® 2000.**



Material Property	Standard Thickness (in, mm)		
	0.060 (1.52)	0.125 (3.18)	0.250 (6.35)
Basis Weight. lb/2880ft ² (g/m ²)	159 (270)	213 (361)	390 (660)
Measurement Gauge, psi (kPa)	7.3 (50)	0.5 (3.4)	0.5 (3.4)
Density - Post compression, pct (g/cc)	11 (0.18)	7.1 (0.11)	6.5 (0.10)
Ash,% by wt	94	94	94
Machine Direction Tensile Strength, lb/in (kg/25 mm)	25 (11)	33 (15)	83 (37)
Cross Direction Tensile Strength, lb/in (kg/25 mm)	22 (10)	34 (15)	71 (32)

Mean Temperature (°F, °C)	Thermal Conductivity,* BTU (in/hr ft ² °F, W/m ² °C)
75 (24)	0.22 (0.032)
167 (75)	0.25 (0.035)
350 (177)	0.38 (0.055)
500 (260)	0.51 (0.073)
650 (343)	0.66 (0.096)

*Per ASTM C177 at 0.125" thickness

Product Availability	
Standard Roll Width, (in, mm)	51 (1295.4)
Custom Roll Width, (in, mm)	2-104 (50.8-2641.6)
Roll Diameter - ID, (in, mm)	3 (76.2)
Roll Diameter - OD, (in, mm)	38-40 (965.2-1016)
Slitting	Custom
Palletizing	Available upon request
Packaging	Individually wrapped in polyurethane

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TYPICAL APPLICATIONS

- Laminated to foil for use as a thermal barrier for light fixtures
- Thermal shield in the automotive industry after laminating
- Provides aircraft noise reduction as well as thermal protection
- Outlet pipe insulation in stoves

Utility Paper

Lytherm: Rollboard

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HIGH TEMPERATURE THERMAL BARRIERS

LyTherm® Rollboard is a low cost, utility grade paper that has low shrinkage, good handling strength, and low thermal conductivity. It contains a small amount of organic binder for processing, which makes it flexible, yet reduces off gassing and odor during use. Its flexibility allows it to be wrapped or rolled to fit most even the most complex configurations.

Features/Advantages

- *Easy to cut wrap or form*
- *Temperature stability*
- *Low thermal conductivity*
- *Low heat storage*
- *Resilient & Light Weight*
- *Thermal shock resistant*
- *Good dielectric strength*
- *High fired tensile strength*
- *Good flame resistance*
- *ISO 9001: 2008 Certified*

TESTING/ENGINEERING SERVICES

- *Thermal imaging for performance validation*
- *Thermal conductivity for material characterization*
- *Thermal modeling for engineering solutions*

**For outstanding thermal barrier's at high temperatures,
trust the Lydall LYTHERM® series.**

Chemically Properties (%)

Al ₂ O ₃	46.5
SiO ₂	53.4
Na ₂ O	-
Fe ₂ O ₃	-
Others	0.10

Physical Properties

Melting Point, (°F, °C)	3200 (1760)
Use Limit, (°F, °C)	2300 (1260)
LOI, %	6
Density lb/ft ³ (kg/m ³)	10 (160)
Dielectric Strength, V/mil	50
Mullen Burst (psi)	-

Mean Temperature (°F, °C)	Thermal Conductivity,* BTU (in/hr ft ² °F, W/m ² °C)
167 (75)	0.300 (0.043)
350 (177)	0.390 (0.056)
500 (260)	0.468 (0.068)
650 (343)	0.548 (0.079)

*Per ASTM C177 at 1/8" Rollboard

Standard Product Sizes

Nominal Thickness, (in, mm)	1/16, 1/10, 1/8 (1.58, 2.54, 3.17)
Standard Widths, (in, mm)	24, 48 (60, 120)
Custom Widths, (in, mm)	<72 (<180)

Tensile Strength, (lb/in, kg/25mm)

	Roll 1/8"	Roll 1/10"	Roll 1/16"
Machine Direction Tensile	9.92 (4.43)	7.72 (3.44)	5.51 (2.46)
Cross Direction Tensile	8.81 (3.94)	6.61 (2.95)	5.51 (2.46)

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TYPICAL APPLICATIONS

- Asbestos Paper Replacement
- Investment cast mold wrap insulation
- One-time consumable insulating applications
- Backup lining for metal troughs
- Hot top linings
- Applies where low binder content is required
- Thermal and electrical insulation
- Can be an upgrade for fiberglass paper as well as blanket products

High Temperature Thermal Barriers

Lytherm: 970 Series

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COMMERCIAL AND BINDERLESS PAPERS

LyTherm 970-L Commercial grade paper is processed from washed, spun, high purity alumina-silica fibers formed into a highly flexible sheet. The in-line washing process removes unwanted shot particles yielding a clean, efficient insulating paper with a uniform surface and high strength.

LyTherm 970-LH Binderless Grade Paper is a 100% inorganic material processed from washed, spun, high purity alumina-silica fibers. 970-LH's patented manufacturing process overcomes the strength limitations of heat treated inorganic papers and offers advantaged of multiple stacking of parts, while preventing carbon pickup and surface discoloration.

Features/Advantages

- *Easy to cut wrap or form*
- *Temperature stability*
- *Low thermal conductivity*
- *Low heat storage*
- *Resilient*
- *Light Weight*
- *Thermal shock resistant*
- *High heat reflectance*
- *Good dielectric strength*
- *Excellent corrosion resistance*
- *ISO 9001: 2008 Certified*

TESTING/ENGINEERING SERVICES

- *Thermal imaging for performance validation*
- *Thermal conductivity for material characterization*
- *Thermal modeling for engineering solutions*

**For outstanding thermal barrier's at high temperatures,
trust Lydall LYTHERM® series.**

Chemically Properties (%)

Al ₂ O ₃	47
SiO ₂	52.62
Na ₂ O	0.18
Fe ₂ O ₃	0.03
Others	0.17

Physical Properties

Melting Point, (°F, °C)	3200 (1760)
Use Limit, (°F, °C)	2300 (1260)
LOI, %	8-10
Density lb/ft ³ (kg/m ³)	6-9 (0.096-0.144)
Dielectric Strength, V/mil	50

Mean Temperature (°F, °C)

Thermal Conductivity,* BTU (in/hr ft² °F, W/m² °C)

167 (75)	0.280 (0.040)
350 (177)	0.375 (0.054)
500 (260)	0.456 (0.066)
650 (343)	0.530 (0.076)

*Per ASTM C177

Tensile Strength (lb/in, kg/25mm)

	970-L	970-L H
Machine Direction Tensile	16.53 (7.38)	3.31 (1.48)
Cross Direction Tensile	13.23 (5.90)	1.10 (0.49)

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970-LH BINDERLESS GRADE APPLICATIONS

- Vacuum Heat Treat furnaces
- Powdered metal sintering
- Tray and basket liner
- Separating media to prevent sticking
- Heat treating for military aerospace. nuclear and medical industries
- Parting agent in brazing, heat treating, and metal forming processes

970-L UTILITY GRADE APPLICATIONS

- Parting plane in refractory linings
- Combustion chamber liners
- Backup lining for metal troughs
- Hot top linings
- Thermal and electrical insulation
- Refractory backup insulation
- Coke oven door shock absorption medium
- Kiln car deck covering

Lytherm 970 Product Availability

Grade	970-L	970-L H
Nominal Thickness (in, mm)	1/32, 1/16, 1/8 (0.79, 1.59, 3.18)	1/32, 1/16, 1/8 (0.79, 1.59, 3.18)
Standard Width (in, cm)	12, 24, 36, 48, (31, 61, 91, 122)	12, 24 (31, 61)
Custom Width (in, cm)	<72 (<183)	<72 (<183)

Premium Fiber Papers

Lytherm: 1530 Series

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HIGH TEMPERATURE THERMAL BARRIERS

LYTHERM® 1530-L premium papers are manufactured from highly washed, spun, high purity alumina silica fibers. Because of their extremely low content of shot and unfiberized particles, 1530-L papers have the lowest thermal conductivity and highest tensile strength of all Lytherm grades.

Applications

- *High Tensile Strength*
- *Low Shot Content*
- *Protection against corrosion*
- *Reduced heat loss and skulling*
- *Minimal Shrinkage*
- *Chemical Stability*
- *ISO 9001: 2008 Certified*

TESTING/ENGINEERING SERVICES

- *Thermal imaging for performance validation*
- *Thermal conductivity for material characterization*
- *Thermal modeling for engineering solutions*

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Chemically Properties (%)

Al ₂ O ₃	47
SiO ₂	52.62
Na ₂ O	0.18
Fe ₂ O ₃	0.03
Others	0.17

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Physical Properties*

	1530-L	1535-GC
Melting Point, (°F, °C)	3200 (1760)	3200 (1760)
Use Limit, (°F, °C)	2300 (1260)	2300 (1260)
LOI, %	8-10	10
Density lb/ft ³ (kg/m ³)	6-9 (0.096-0.144)	10-12 (160-192)
Dielectric Strength, V/mil	55	-
Mullen Burst (psi)	27	46
Machine Direction Tensile, (lb/in, kg/125mm)	26.46 (11.81)	28.77 (12.84)
Cross Direction Tensile, (lb/in, kg/125mm)	13.23 (5.90)	17.64 (7.87)

*1530-L Ye" thickness and 15353 GC Y." thickness

APPLICATIONS

- Careless Induction Furnaces
- Ladles
- Hot Metal Transfer Cars
- Mold Walls-D.C. Casting
- Holding and Melting Furnaces
- Molten metal pumping systems
- Radiant Heaters
- Rotary Kilns
- Automotive Heat Shields
- Dental Castings
- Gas Generating Canisters
- Commercial Safes

Mean Temperature (°F, °C) Thermal Conductivity,* BTU (in/hr ft² °F, W/m² °C)

500 (260)	0.43 (0.062)
800 (426)	0.57 (0.082)
1300 (704)	0.83 (0.120)
1600 (870)	0.98 (0.141)

*Per ASTM C177

Product Availability

Grade	1530-L	1535-L	1535-GC
Nominal Thickness (in, mm)	1/32, 1/16, 1/8 (0.79, 1.59, 3.18)	1/4 (6.35)	1/4 (6.35)
Standard Width (in, cm)	12, 24, 36, 48, (31, 61, 91, 122)	12, 24, 36, 48, (31, 61, 91, 122)	24 (61)
Custom Width (in, cm)	<72 (<183)	<72 (<183)	<72 (<183)

Ceramic Fiber-Free

Lytherm: LDF

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NON-RESPIRABLE FIBER PAPER

LYTHERM LDF PAPER is a lightweight insulating material composed of large diameter, inorganic, high temperature fibers processed into a highly flexible sheet. It is recommended for intermittent use at temperatures up to 1500 °F (815 °C) with a continuous use of 1400 °F (760 °C), in applications requiring an alternative to man-made vitreous blown or spun fiber products.

Features/Advantages

- *Easy to cut wrap or form*
- *Temperature stability*
- *Low thermal conductivity*
- *Non irritating*
- *Resilient*
- *Light weight*
- *Thermal shock resistant*
- *High heat reflectance*
- *High tensile strength*
- *Ceramic fiber alternative*
- *ISO 9001: 2008 Certified*

TESTING/ENGINEERING SERVICES

- *Thermal imaging for performance validation*
- *Thermal conductivity for material characterization*
- *Thermal modeling for engineering solutions*

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Chemically Properties (%)

Al ₂ O ₃	14.80
SiO ₂	54.30
CaO	17.40
MgO	4.90
Others	8

Physical Properties

Melting Point, (°F, °C)	1562 (850)
Use Limit, (°F, °C)	1382 (750)
LOI, %	3-7
Density lb/ft ³ (kg/m ³)	5-7 (0.080-0.112)
Dielectric Strength, V/mil	-
Mullen Burst (psi)	-

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Lytherm 970 Product Availability

Nominal Thickness (in, mm)	1/16, 1/8, 1/4, 3/8 (1.58, 3.17, 6.35, 9.53)
Standard Width (in, cm)	24, 36, 48, (61, 91, 122)
Custom Width (in, cm)	<72 (<183)

Mean Temperature (°F, °C)

Thermal Conductivity,* BTU (in/hr ft² °F, W/m² °C)

500 (260)	0.38 (0.055)
800 (426)	0.59 (0.085)
1300 (704)	1.18 (0.170)

*Per ASTM C177

Tensile Strength (lb/in, kg/25mm)

Grade

Machine Direction Tensile	14.33-19.84 (6.40-8.86)
Cross Direction Tensile	13.23-18.74 (5.91-8.37)

APPLICATIONS

- Ceramic fiber paper and blanket alternative
- Anode backing pit expansion joints
- Automotive heat shield Insulation
- Molten metal filter gaskets
- Appliance insulation
- Aircraft thermal barriers