

# Principal Features of MELDIN® 2000

## Excellent Tensile Strength and Elongation

MELDIN® 2000 materials exhibit superior tensile strength and elongation properties, even at elevated temperatures, providing the mechanical integrity necessary for the most demanding applications.

## High Compressive Strength

With an ultimate compressive strength of over 40,000 psi and a usable limit of 34,000 psi at 10% strain, MELDIN® 2001 provides the highest resistance to compressive failure of any of the MELDIN® 2000 compositions. The additional formulations, however, also offer excellent compressive properties.

## High Modulus

MELDIN® 2000 materials have inherently high moduli and yield points in tension, compression, and flex. These combined features provide non-brittle materials for use in applications where extreme rigidity is essential.

## Superior Creep Resistance

These materials all display minimal deformation under load. MELDIN® 2030 provides additional ductility and conformability without sacrificing load carrying capacity when a sealing surface is required. These characteristics allow for dry-running bearing operation at high PVs and high-static loading without concern for deflection.

## Superb Dimensional Stability

MELDIN® 2000 products have no observable melting point. This feature, combined with an extremely low thermal expansion, high resistance to deformation under load, and low hysteresis, provides excellent dimensional stability. Even under the most severe conditions of harsh chemicals and temperature extremes, MELDIN® 2000 retains its dimensional quality and functionality.

## Balanced Electrical Properties

Both MELDIN® 2001 and MELDIN® 2030 have high dielectric strength, a stable dielectric constant, and very high volume and surface resistivity. MELDIN® 2001, with its balance of physical and electrical properties, is ideal for stationary electrical insulating applications. Bearings made of MELDIN® 2030 provide dry self-lubrication in addition to electrical insulation.

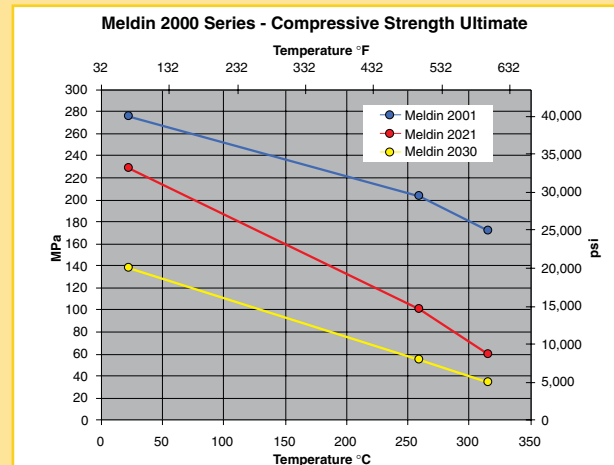
## Low Outgassing

In independent testing to ASTM R595, MELDIN® 2000 exhibited remarkably low outgassing. Other than absorbed water, MELDIN® 2000 materials showed negligible mass loss and collectible condensables. This feature allows for trouble-free, clean operation in ultra-high vacuum environments.

## Low Friction, High Resistance to Wear

MELDIN® 2021, MELDIN® 2211, and MELDIN® 2030 bearing grades are all capable of carrying high loads at temperature extremes. Specially designed for optimum friction and wear properties, these MELDIN® products provide smooth interaction and zero abrasion when operating against both ferrous and non-ferrous mating surfaces.

## Technical Graphs



# MELDIN® 2000 Compounds



## MELDIN® 2001

This material is best suited for thermal and electrical insulation and radiation resistance. MELDIN® 2001 has the highest compressive properties of any material in the series.

## MELDIN® 2021

A multi-purpose bearing grade for high temperature and high load applications, MELDIN® 2021 maintains its strength and rigidity at elevated temperatures.

## MELDIN® 2030

The MELDIN® 2030 bearing compound operates with extremely low friction in both dynamic and static applications, and provides thermal and electrical insulation.

## MELDIN® 2211

MELDIN® 2211 offers the balanced properties of low friction, high strength and resistance to compressive creep.

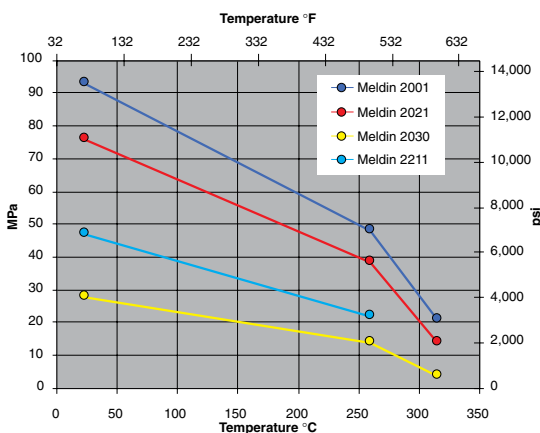
### Product availability:

- Basic shapes
- Finished parts

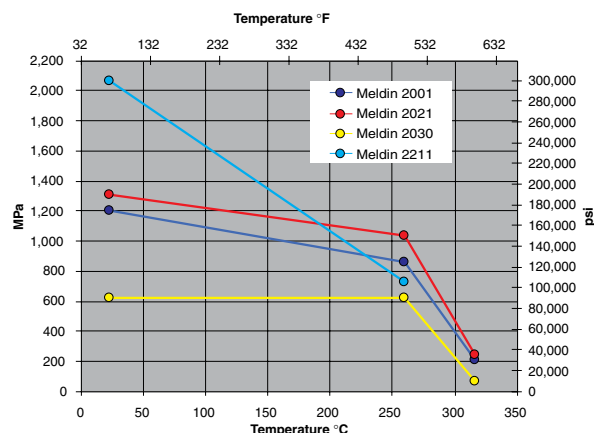
### Manufacturing processes:

- Compression molding
- Injection molding
- Direct forming
- Machined parts

Meldin 2000 Series - Tensile Strength



Meldin 2000 Series - Tensile Modulus

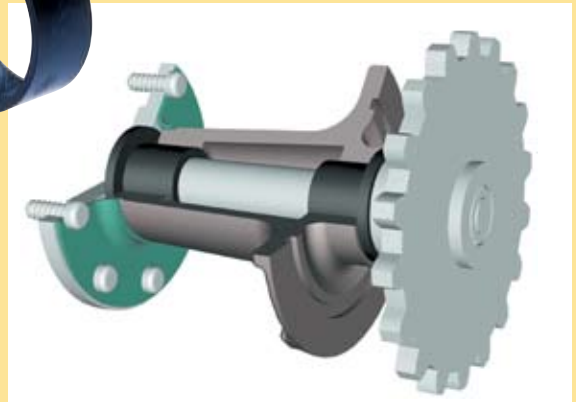


# Applications of MELDIN® 2000



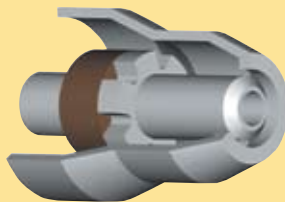
## Glass Handling Equipment

In glass bottle production, MELDIN® take-out inserts and grippers are used for mold removal and transfer of red-hot bottles. MELDIN® components improve bottle quality and production yield. Due to their low thermal conductivity, they reduce microcracking caused by rapid, non-uniform cooling.



## Bearing Applications

MELDIN® materials can be used for very demanding bearing applications in motors, general industrial equipment and machinery, and business machines.



## Welding or Plasma Cutting Equipment

Because of their high temperature capabilities, MELDIN® materials improve wear life of welding and plasma cutting equipment.

# Typical Properties of MELDIN® 2000

PROPERTY	TEST METHOD	ENGLISH (METRIC)	MELDIN® 2001	MELDIN® 2021	MELDIN® 2030	MELDIN® 2211
<b>MECHANICAL @ RT</b>						
Tensile Strength Ultimate	ASTM D638	psi (MPa)	13,500 (93)	11,000 (75.8)	4,000 (27.5)	6,800 (46.8)
Tensile Modulus	ASTM D638	psi x 10 <sup>5</sup> (GPa)	1.75 (1.2)	1.90 (1.3)	.90 (0.6)	3.00 (2.0)
Elongation Ultimate	ASTM D638	%	8.0	5.0	4.0	4.0
Flexural Strength Ultimate	ASTM D790	psi (MPa)	21,000 (144.7)	12,500 (86.1)	7,000 (48.2)	11,500 (79.2)
Flexural Modulus	ASTM D790	psi x 10 <sup>5</sup> (GPa)	6.50 (4.4)	5.75 (3.9)	3.90 (2.6)	5.50 (3.8)
Compressive Strength Ultimate	ASTM D695 modified	psi (MPa)	40,000 (275.7)	33,000 (227.5)	20,000 (137.8)	
Compressive Strength @ 10% Strain	ASTM D695 modified	psi (MPa)	34,000 (234.4)	30,000 (206.8)	17,000 (117.2)	
Compressive Modulus	ASTM D695 modified	psi x 10 <sup>5</sup> (GPa)	4.00 (2.7)	4.00 (2.7)	2.00 (1.3)	
Deformation @ 2000 psi, 24 hrs mold direction	ASTM D621	%	0.10	0.09	0.35	0.10
Izod Impact Strength (notched)	ASTM D256	Ft-lb/in (J/m)	0.53 (28.3)	0.38 (20.3)	0.34 (18.2)	0.37 (19.8)
<b>THERMAL</b>						
Coefficient of Thermal Expansion	ASTM E831-93	in/in/°F (m/m/°C) x 10 <sup>-5</sup>	2.95 (5.3)	2.7 (4.9)	3.3 (5.9)	3.2 (5.8)
Thermal Conductivity	C518/C177	BTU in/hr ft² °F (W/m°C)	3.0 (0.43)	4.3 (0.62)	2.4 (0.35)	2.8 (0.40)
<b>ELECTRICAL</b>						
Volume Resistivity	ASTM D257	Ohm/cm	10 <sup>15</sup>	10 <sup>15</sup>	10 <sup>15</sup>	10 <sup>15</sup>
Surface Resistivity	ASTM D257	Ohm	10 <sup>16</sup>	10 <sup>15</sup>	10 <sup>15</sup>	10 <sup>15</sup>
Dielectric Constant 10 <sup>2</sup> Hz	ASTM D150	—	3.40	12.65	3.03	5.56
Dielectric Constant 10 <sup>4</sup> Hz	ASTM D150	—	3.39	12.41	3.02	5.53
Dielectric Constant 10 <sup>6</sup> Hz	ASTM D150	—	3.35	11.92	2.98	5.47
Dielectric Strength	ASTM D149	V/mil (MV/m)	400 (15.8)	200 (7.9)	500 (19.7)	
Dissipation Factor 10 <sup>2</sup> Hz	ASTM D150	—	.0016	.0067	.0012	.0019
Dissipation Factor 10 <sup>4</sup> Hz	ASTM D150	—	.0030	.0096	.0031	.0028
Dissipation Factor 10 <sup>6</sup> Hz	ASTM D150	—	.0039	.0190	.0049	.0035
<b>GENERAL</b>						
Specific Gravity	ASTM D792	—	1.39	1.48	1.57	1.53
Hardness Shore D	ASTM D2240	—	92	90	80	85
Water Absorption	ASTM D570	%	0.13	0.13	0.62	0.18
<b>OTHER</b>						
Outgassing	ASTM E5955	% TML	1.63	1.38	1.25	1.19
Outgassing	ASTM E55955	%CVCVM	.01	.00	.00	.02
Outgassing	ASTM E595	%WVR	1.04	.69	1.15	.5
<b>500°F (260°C)</b>						
Tensile Strength Ultimate	ASTM D638	psi (MPa)	7,000 (48.2)	5,600 (38.6)	2,000 (13.7)	3,200 (22)
Tensile Modulus	ASTM D638	psi x 10 <sup>5</sup> (GPa)	1.25 (0.8)	1.50 (1.0)	.90 (0.6)	1.05 (0.7)
Elongation Ultimate	ASTM D638	%	7.0	3.5	2.8	3.0
Compressive Strength Ultimate	ASTM D695 modified	psi (MPa)	29,500 (203.3)	14,500 (100)	8,000 (55.1)	
Compressive Strength Yield	ASTM D695 modified	psi (MPa)	11,000 (75.8)	9,000 (62)	5,500 (38)	
Compressive Strain Yield	ASTM D695 modified	%	7.0	7.0	7.0	
Compressive Modulus	ASTM D695 modified	psi x 10 <sup>5</sup> (GPa)	1.75 (1.2)	1.90 (1.3)	0.80 (0.5)	
<b>600°F (316°C)</b>						
Tensile Strength Ultimate	ASTM D638	psi (MPa)	3,000 (20.6)	2,000 (13.7)	500 (3.4)	
Tensile Modulus	ASTM D638	psi x 10 <sup>5</sup> (GPa)	0.30 (0.2)	0.35 (0.2)	0.10 (0.06)	
Elongation Ultimate	ASTM D638	%	25	12	4.0	
Compressive Strength Ultimate	ASTM D695 modified	psi (MPa)	25,000 (172.3)	8,500 (58.6)	5,000 (34.4)	
Compressive Strength Yield	ASTM D695 modified	psi (MPa)	7,000 (48.2)	5,000 (34.4)	3,200 (22)	
Compressive Strain Yield	ASTM D695 modified	%	7.0	7.0	6.0	
Compressive Modulus	ASTM D695 modified	psi x 10 <sup>5</sup> (GPa)	1.00 (0.6)	0.75 (0.5)	0.55 (0.3)	