THE GUND COMPANY

MANUFACTURERS & FABRICATORS OF ENGINEERED MATERIAL SOLUTIONS

CRYO G-10 Advantages

Cryogenic Thermoset Composite Materials

G-10 Materials have played a critical role in the LNG market for years. For example, turboexpanders for natural gas came onto the market in the 1960s and G-10 properties enabled engineers to significantly improve equipment design and natural gas processing efficiencies. Since then, resins and composite technology have evolved to outperform those original materials. One material advancement is The Gund Company's CRYO G-10, which provides all of the traditional benefits of standard G-10 (such as machinability and cost-effectiveness) along with improved strength at cryogenic temperatures with dimensional stability.

A recent study at The Gund Company has demonstrated that the strength of new CRYO G-10 increases as temperatures decrease in the cryogenic region. Table 1 indicates the strength of CRYO G-10 at continuously lower temperatures.

TABLE 1

		ASTM/ISO		TYPICAL VALUES
	PROPERTIES (HPL from B Stage)	**Test Method**	**Units**	**CRYO G-10**
PHYSICAL	Glass Content from LOI		%	70.5
	Density		gm/c.c.	2.00
THERMAL	CTE: Perpendicular: Room Temperature	ISO 11359-2	10(E·6)/K	26.04
	CTE: Parallel: -196°C	ISO 11359-2	10(E·6)/K	8.08
	Thermal Conductivity: Room Temperature	ASTM C117 / ISO 8302	W/(m·K)	0.235
	Thermal Conductivity: -196°C	ASTM C117 / ISO 8302	W/(m·K)	0.28
MECHANICAL	IZOD Impact Strength: Room Temperature	ISO 180	KJ/m²	139
	Charpy Impact Strength: Room Temp	ISO 179	KJ/m²	131
	Charpy Impact Strength: -196°C	ISO 179	KJ/m²	148
	Compressive Strength: Room Temperature	ASTM D695	MPa	583
	Compressive Strength: -100°C	ASTM D695	MPa	826
	Compressive Strength: -196°C	ASTM D695	MPa	974
	Tensile Strength: Room Temperature	ISO 527-4	MPa	537
	Tensile Strength: 100°C	ISO 527-4	MPa	708
	Tensile Strength: 196°C	ISO 527-4	MPa	754
	Flexural Strength: Room Temperature	ISO 178	MPa	567
	Flexural Strength: -100°C	ISO 178	MPa	870
	Flexural Strength: -196°C	ISO 178	MPa	1,076

CRYO G-10

The Gund Company custom fabricates insulation materials to the exact specifications and drawings specified by our customers. We offer our customers the proper product for their specific application. A variety of dimensions and diameter sizes are available. Product colors vary according to material type. Additional data and samples are available on request.

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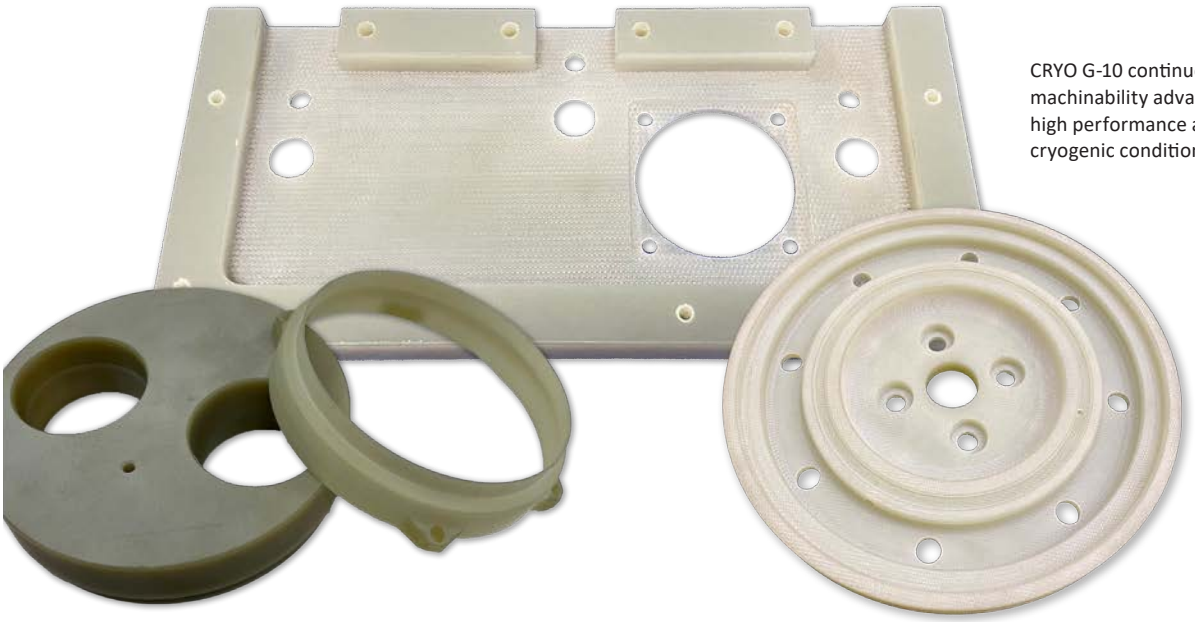
CRYO G-10 Advantages (cont.)



CRYO G-10 continues to provide the same machinability advantages of traditional G-10 with high performance and superior bond strength in cryogenic conditions.

IN SUMMARY, CRYO G-10 IS AN ADVANCEMENT IN TECHNOLOGY OVER TRADITIONAL G-10

There are many applications in the LNG industry where CRYO G-10 can be utilized for ultimate performance. G-10 has been used in designs for decades and has withstood the test of time for its thermal & electrical insulation, corrosion resistance, and low moisture absorption. Building on that reliability, CRYO G-10 can enhance those properties for added reliability with the same affordability compared to other exotic thermoplastics and materials such as PEEK.

CRYO G-10

Please contact The Gund Company today to see where Cryo G10 fits into your LNG applications.

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MANUFACTURERS & FABRICATORS OF ENGINEERED MATERIAL SOLUTIONS

MARKETS


Switchgear


Electronics


Power Generators


Motor Applications


Transformers


Metals Processing


Electric Vehicles


Military/Aerospace


Oil & Gas


Medical


Space

OUR EXPERTISE IS YOUR COMPETITIVE ADVANTAGE

The Gund Company provides a wide range of material solutions from rigid, glass epoxy composites to high-temperature, silicone sponges.

We take a consultative approach to understanding your application by working with your engineers and buyers to find materials that fit the application. By understanding the most important material properties, we often find cost-reduction opportunities. Our Application Engineering Teams have decades of material experience and look forward to working with you on your upcoming project.

Material Families:

- Thermoset Rigid Laminates and Composites
- Flexible Laminates, Papers, Films, and Felts
- Thermoplastic Materials
- Elastomeric Materials

Our Engineering Capabilities Include:

- Custom Material Development
- Resin Formulation
- Laboratory Testing
- Comparative Materials Evaluation

CRYO G-10

Our Manufacturing Capabilities Include:

- Compression Molding
- Pultrusion
- Filament & Convolute Wound Tube
- Infusion & B-Stage Composites Lay-up and Molding
- Injection Molding
- Extrusion of Thermoplastics

THE GUND COMPANY GLOBAL FOOTPRINT – LOCAL SERVICE