ROGERS CORPORATION

Data Center Materials Design Guide

www.rogerscorp.com

Data Center Design Challenges

The convergence of IoT, artificial intelligence, big data, and edge/cloud computing has revolutionized data center growth. Product designers and engineers face many challenges and opportunities when creating the next generation of data center technologies. High-speed and high-volume storage data centers generate higher power requirements, demanding more reliable materials to minimize risk and improve efficiency.

Designed to meet your unique application requirements, Rogers' high-performance engineered materials deliver long-term solutions for the most challenging data center applications. We understand the criticality of improving energy efficiency, decreasing routine maintenance costs, and ensuring safety. Here are just a few challenges we have helped solve:

Safety and Reliability

- Flame-retardant
- RoHS compliancy

Data Processing

- Sound absorption
- Vibration isolation
- Low-attenuation signal transmission

Energy Efficiency

- Power saving
- Thermal management

Long Service Life

- Long-term performance
- Reduced maintenance costs

Product Overview

Rogers offers a portfolio of products specifically designed to meet all your data center requirements.

1 BISCO®

High-performance silicone foams, solids, and specialty materials.

2 PORON®

Durable microcellular polyurethane foam materials.

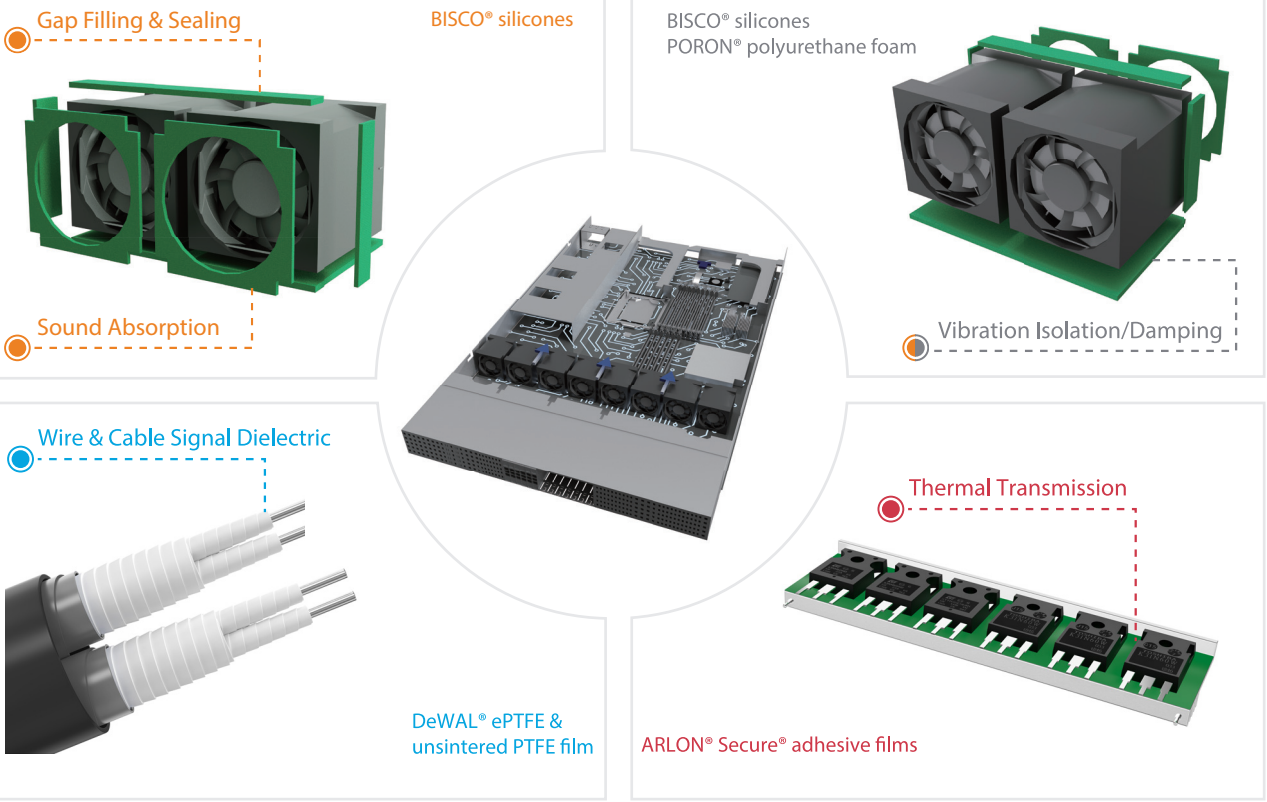
3 DeWAL®

Industry-leading polymer films and pressure-sensitive PTFE and UHMW tapes.

4 ARLON®

Customizable, high-quality silicone composites, fabrics,films, and foils.

Data Center Application Spotlight



Data Center Design Solution Portfolio

Application & Products	Features					Benefits
Sound Absorption	Highly Efficient Sound Absorption Coefficient	High Flammability	Low Density (Typical)	Halogen Free	Open-Cell Structure	Absorbs the sound vibration caused by high speed cooling fans to minimize HDD performance degradation Regulatory compliance Long service life
BISCO® BF-1000 Silicone Foam	0.55 (thickness 9.5mm)	Listed UL94 V-0 (RTI 150°C)	192kg/m³	√	√	
BISCO® MF1®-35, MF1®-55 Silicone Foam	0.94 (thickness 9.5mm)	UL94 V-0 meets at 3rd party lab	104kg/m³			
Gap Filling & Sealing	Superior Compression Set Resistance	High Flammability	High Temperature Resistance	Superior Stress Retention		Consistent spring force Long-term environmental sealing Long service life
BISCO® BF-2000, BF-1000, HT-800, HT-840 Silicone Foam	<5%	Listed UL94 V-0	200°C	50%		
PORON® 40 & 92 PU Foam	<10%	Listed UL94 HBF	90°C	60%		
Vibration Management	Superior Compression Set Resistance	Highly Compressibility		Low Natural Frequency (Typical)		Maximum HDD performance Used in space-constrained applications Minimizes tolerance stack up
BISCO® BF-2000, BF-1000, HT-800 & HT-870 Silicone Foam	<5%	70%		12Hz		
PORON® 40 & 92 PU Foam	<10%	80%		14Hz		
Thermal Transmission	Ultra Thin Construction	High Flammability	High Temperature Resistance	Dielectric Strength	Low Thermal Impedance	Long-term reliability and thermal management Simplification of design due to elimination of mechanical fasteners and fixtures Easy integration with automated production
ARLON® Secure® Adhesive Film	0.1mm	Listed UL94 V-0 (RTI 150°C)	204°C	39kV/mm	0.27 in²°C/W	
Wire and Cable Signal Dielectric	Low Density	Tensile Strength	Low Dielectric Constant	Wide Temperature Resistance		Consistent thickness enables low attenuation Stable data transmission
DeWAL® ePTFE & unsintered PTFE Film	0.3g/cc	15MPa	1.3@5GHz	-268°C to 260°C		

poron® ALWAYS THERE

bisco® TRUSTED TO THE EXTREME

ARLON® ENGINEERED FOR YOU

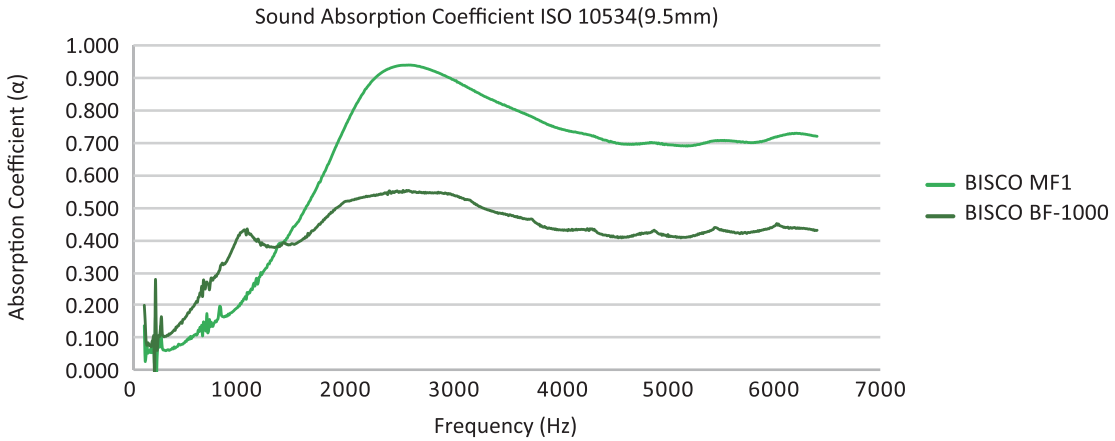
DeWAL® SHEER QUALITY

Rogers Global Application Lab and Technical Services

Rogers materials power mission-critical applications, so we know how important it is to have comprehensive safety and performance testing. That's why we have a dedicated Technical Service and Development team ready to meet your needs.

Below are a few examples of testing that have been completed. Reach out to your Rogers Sales Engineer to learn more about our testing capabilities.

Sound Absorption



Vibration Management

BISCO Silicones - Recommended Materials

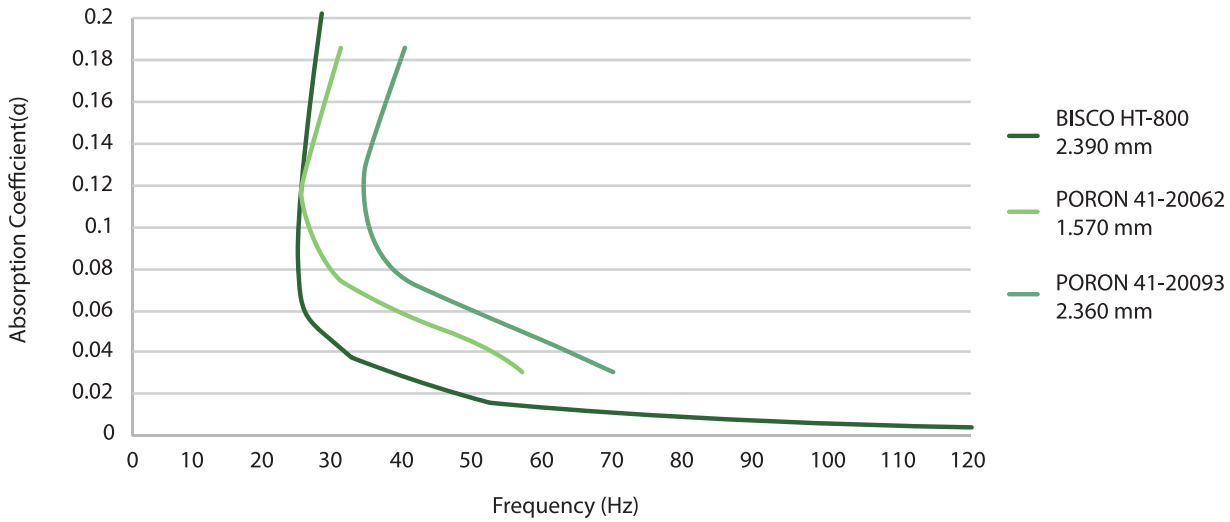
Product	Thickness	Isolation Efficiency	Natural Frequency
HT-800	2.390 mm	> 97.00%	29 Hz

PORON Polyurethanes - Recommended Materials

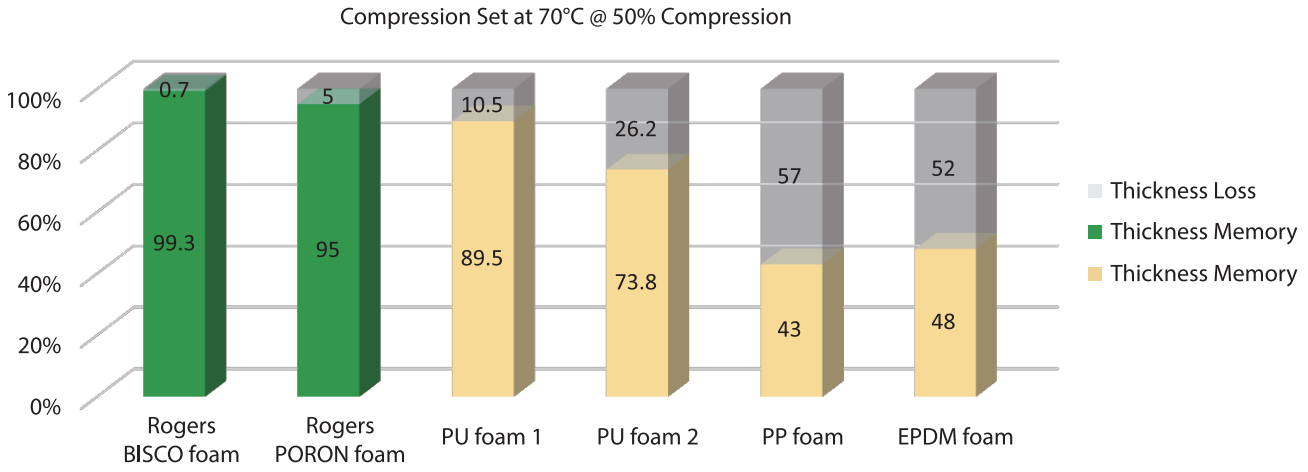
Product	Thickness	Isolation Efficiency	Natural Frequency
41-20062	1.570 mm	> 86.00%	37 Hz
41-20093	2.360 mm	> 86.00%	30 Hz

Natural Frequency Curves

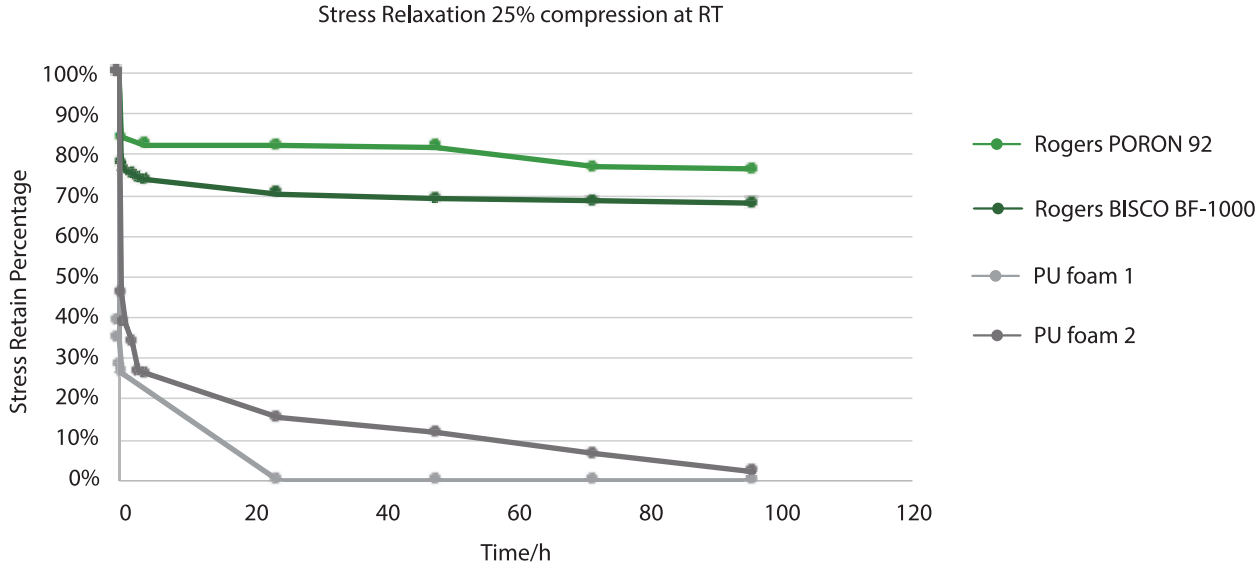
Natural frequency curves are shown below for each recommended material.
The green horizontal line shows where the system load is located on each natural frequency curve.



Gap Filling & Sealing

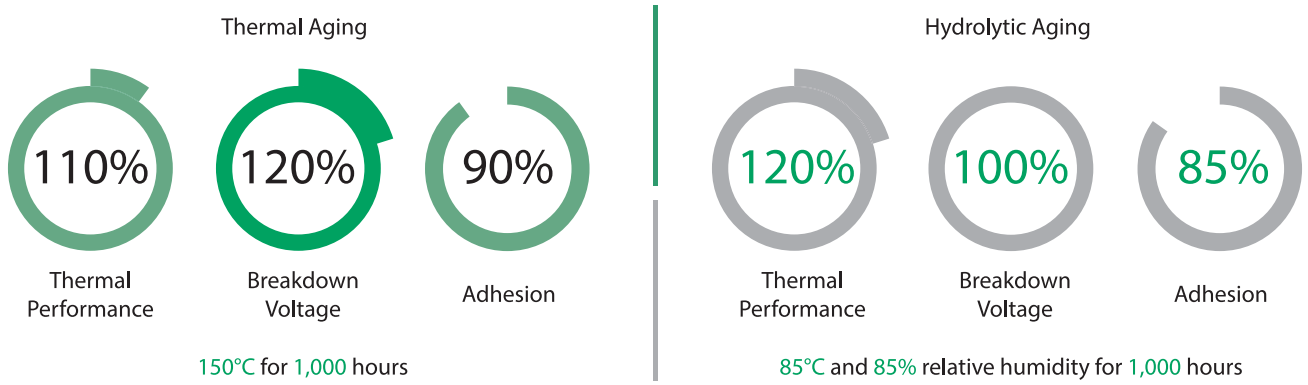


* Rogers material in green



* Rogers material in green

Thermal Transmission



Tested product: Rogers ARLON® Secure® Adhesive
110% presents the change after 150°C for 1000hrs by comparing with initial level of thermal performance.

Technical and Design Support Tools

Application Design Tool

The Tool will assist you in identifying the proper PORON Polyurethane and BISCO Silicone materials that best meet your design requirements.
https://tools.rogerscorp.com/ems/products/msg/index.aspx

Gap Filling Tool

The Gap Filling Tool guides users to a selection of the best PORON and BISCO materials for water, dust and environmental sealing applications.
https://tools.rogerscorp.com/ems/gapfilling/index.aspx

Vibration Isolation Tool

The Vibration Isolation Tool recommends the proper PORON polyurethane and BISCO silicone materials for your vibration mitigation applications.
https://tools.rogerscorp.com/ems/vibration/index.aspx

Compression Force Deflection Curve Tool

The CFD Curve Tool provides design help with both BISCO Silicone and PORON Polyurethane materials, using stress-strain data to meet engineering requirements. The tool provides a fast comparison of compression displacement data.
https://tools.rogerscorp.com/ems/cfdcurve/index.aspx

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