



Trade name and logo:



Echocel[®] Polyurethane

Uses

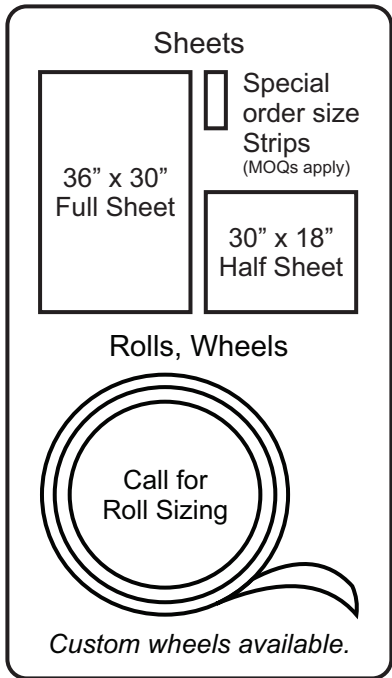
Cushioning layers in foot orthotics, elbow pads, knee pads, orthopedic braces.





Description

The Echocel[®] Family of Urethanes provides cost-effective solutions for your performance urethane requirements. Four distinct categories of foam enable the end-user to optimize material selection based on performance, cost, and competitive advantage.

All products are offered in standard 60" wide rolls with full sheets, half sheets, custom strips and wheels available, all slit to meet Acor's thickness tolerances. Fabrics, vinyls, top covers and foam composites are available utilizing our custom lamination capabilities, enhancing product design and performance.

For footwear, medical devices, orthopedic soft goods, automotive, electronics, aerospace, protective equipment and beyond, Echocel[®] is the technological, cost-effective solution.



	PRO	PERFORMANCE		
	Professional	High Rebound	Impact	Slow Rebound
	 Blue, Tan and Black 1.5, 3.0, 6.0 mm	 Spring Green 3.0 mm	 Vivid Yellow 3.0 mm	 Deep Red 3.0 mm
Target Density	18 pcf	20 pcf	15 pcf	10 pcf
Compression Set 50%	3 max	3 max	3 max	3 max
Tensile Strength (PSI)	110 min	70 min	70 min	50 min
Elongation %	130 min	130 min	170 min	190 min
Resilience %	32	55	8	6

Typical Properties of EchoCel® Professional

Polymer	EchoCel® Professional Urethane			Compare to PORON®
Physical Property	Test Method	Result (US Units)	Result (Metric Units)	Result (Metric Units)
Density	ASTM D3574	15 – 21 pcf	240.2- 336.4 kg/m ³ =	240-320 kg/m ³
Compression Deflection 25%	ASTM D1056	12 - 18 psi	82.7 – 124.1 kPa ✓	41-97 kPa
Compression Set 50%	ASTM D1056	3% Max	3% Max	Not published
Compression Set 50%	ASTM D3574	5% Max	5% Max	Not published
25% CFD	ASTM D3574	10.5 psi	72.3 kPa ✓	41-97 kPa
Tensile Strength	ASTM D3574	110 psi	758.4 kPa ✓	448 kPa
Elongation	ASTM D3574	130%	130% ✓	100%
Tear Strength	ASTM D624	14.7 lb./in	2.57 kN/m ✓	0.9 kN/m
Resilience	ASTM D2632	32% ✓		25%
Flammability	FMVSS-302	Pass @ .063" or Thicker		Not published
Service Temperature		-40 to 250 F		Not published

Characteristics

- **Breathable**
- **Excellent High Temperature Compression Set**
- **Superb Compression Fatigue Properties**
- **Dimensionally Stable**

Disclaimer: This information is furnished as a guide for selecting materials. Acor Orthopaedic, LLC. makes no warranties, expressed or implied, of merchantability with respect to the goods or that such goods are fit for any particular purpose. It is the customer's responsibility to obtain and test samples when determining suitability of material for a particular application. Poron® comparison data from Rogers Corporation 0315-PDF, Publication #10-017.

ACOR'S FAMILY OF PERFORMANCE URETHANES

Typical Properties of EchoCel® High Rebound

Polymer	Polyurethane		
Physical Property	Test Method	Result (US Units)	Result (Metric Units)
Density	ASTM D3574	17 – 23 pcf	272.3 - 368.4 kg/m ³
Compression Deflection 25%	ASTM D1056	12 – 18 psi	82.7 – 124.1 kPa
Compression Set 50%	ASTM D1056	3% Max	3% Max
Compression Set 50%	ASTM D3574	10% Max	10% Max
25% CFD	ASTM D3574	15 psi	103.4 kPa
Tensile Strength	ASTM D3574	70 psi	482.6 kPa
Elongation	ASTM D3574	130%	130%
Tear Strength	ASTM D624	14lb./in	2.45 kN/m
Resilience	ASTM D2632	55 %	55 %

Characteristics

- **Breathable**
- **Superb Compression Fatigue Properties**
- **Excellent Stress Relaxation Resistance**
- **Low Compression Set**
- **Low Hysteresis Loss**
- **Dimensionally Stable**

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ACOR'S FAMILY OF PERFORMANCE URETHANES

Typical Properties of EchoCel® Impact

Polymer	Polyurethane		
Physical Property	Test Method	Result (US Units)	Result (Metric Units)
Density	ASTM D3574	13 – 18 pcf	208.2- 288.3 kg/m ³
Compression Force Deflection 25%	ASTM D3574	4 – 9 psi	27.5 – 62 kPa
Compression Set 50%	ASTM D1056	3% Max	3% Max
Compression Set 50%	ASTM D3574	5% Max	5% Max
Tensile Strength	ASTM D3574	70 psi	482.6 kPa
Elongation	ASTM D3574	170%	170%
Tear Strength	ASTM D624	12 lb./in	2.1 kN/m
Resilience	ASTM D2632	8%	8%
Service Temperature	-40 to 250 F		

Characteristics

- Impact Resistant
- Breathable
- Low Compression Set
- High Stretch
- Dimensionally Stable
- Low Resiliency
- Exceptional Compression Fatigue

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ACOR'S FAMILY OF PERFORMANCE URETHANES

Typical Properties of EchoCel® Slow Rebound

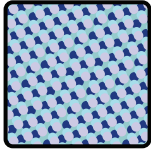
Polymer	Polyurethane		
Physical Property	Test Method	Result (US Units)	Result (Metric Units)
Density	ASTM D3574	8 – 12 pcf	128.1- 192.2 kg/m ³
Compression Force Deflection 25%	ASTM D3574	1 – 4 psi	6.9 – 27.5 kPa
Compression Set 50%	ASTM D1056	3% Max	3% Max
Compression Set 50%	ASTM D3574	5% Max	5% Max
Tensile Strength	ASTM D3574	50 psi	344.7 kPa
Elongation	ASTM D3574	190%	190%
Tear Strength	ASTM D624	8 lb./in	1.4 kN/m
Resilience	ASTM D2632	6%	6%
Service Temperature	-40 to 250 F		

Characteristics

- Impact Resistant
- Breathable
- Low Compression Set
- High Stretch
- Dimensionally Stable
- Low Resiliency
- Exceptional Compression Fatigue

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ACOR'S FAMILY OF PERFORMANCE URETHANES

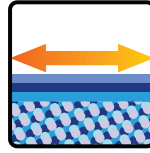


Density - the degree of compactness of a substance.

Density, as it pertains to soft foam sheet goods, describes the amount of material versus air in any given sample. Generally, the higher the density, the more firm and compact the material will be.

- EchoCel® density measures comparable to industry soft supporting urethane.

EchoCel® = 240.2 - 336.4 kg/m³



Tensile Strength - the resistance of a material to deformation across its surface.

Tensile strength, surface tension strength or durometer describes a materials resistance to deformation in any direction when stretched. The higher the tensile strength, the more force required to deform or break the material's surface.

- EchoCel® tensile strength outperforms industry soft supporting urethane.

EchoCel® = 758.4 kPa

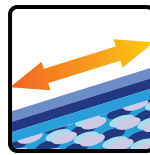


Compression Deflection - the measure of a material's resistance to force applied to its surface.

This metric represents how much the material will "push back" when a force is applied. The higher the Compression Deflection, the better the rebound.

- EchoCel® outperforms industry soft supporting urethane's compression deflection.

EchoCel® = 82.7 - 124.1 kPa

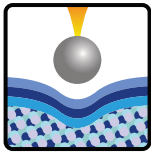


Elongation - the amount of extension of a surface or object under stress.

Expressed as a percentage of original length, elongation describes how much a material can stretch before it degrades, deforms, tears or breaks. The higher the percentage, the more expandable, reformable and workable the material will be.

- EchoCel® outperforms industry soft supporting urethane in elongation under stress.

EchoCel® = 130%

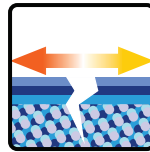


Compression Set - the residual amount of deformation of a material after removal of compression stress.

Compression set describes how much the material will remain deformed after being pressed down upon. The lower the compression set, the less the material remains deformed.

- EchoCel® shows very little compression set under two different standard lab tests.

EchoCel® = 3% - 5%

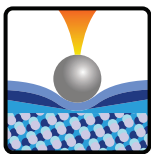


Tear Strength - the energy required to propagate a crack or tear in a material per a standard geometry.

Tear strength is a measure of how much energy is required to tear the surface of any given material. The higher the tear strength number, the stronger and more durable the material is under stress.

- EchoCel® outperforms industry soft supporting urethane in tear strength under stress.

EchoCel® = 2.57 kN/m

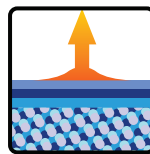


25% CFD - the amount of force necessary to produce a 25% total compression over a surface.

Compression Set Deflection (CFD) at 25% measures how much resistance to force a material can produce. The higher the CFD, the more force it takes to compress or deform the material.

- EchoCel® outperforms industry soft supporting urethane in 25% CFD testing.

EchoCel® = 72.3 kPa



Resilience - the ability of a substance or material to return to its original shape after deformation; elasticity.

The resilience of a material describes its ability to maintain its original shape after repeated and intentional deformation. The higher the resilience factor, the less likely a material is to retain compaction over time.

- EchoCel® outperforms industry soft supporting urethane under resilience lab testing.

EchoCel® = 32%

Safety Data Sheet

Section 1: Product Identification

Trade Name: Echocel®
C.A.S. #: N/A
Company Name: Acor Orthopaedic, LLC
Street Address: 18530 South Miles Parkway
City, State and Zip Code: Cleveland, OH 44128
Telephone number: 800-237-2267
Emergency Telephone Number: 216-662-4500

Section 2: Hazard Identification

According to OSHA 29 CFR 1910.1200 HCS

Classification of the Material: N/A
Labeling Requirements: N/A
Effects of Overexposure: None with normal handling. Cutting and other finishing operations may create dust. Proper ventilation and PPE should be used.
Inhalation: Inhaling dust may cause respiratory irritation. Remove to fresh air and seek medical attention if necessary.
Eye Contact: Dust may cause eye irritation. Rinse eyes with water and seek medical attention if necessary.
Skin Contact: Dust may cause irritation. Wash with soap and water.
Ingestion: No known hazards.
Chronic: IARC has listed carbon black as a Class 2B suspected human carcinogen based on tests in laboratory animals.

Other Information



Section 3: Composition/Information on Ingredients

This material defined as an “article” in 20 CFR 1910.1200 and Regulation (EC) N° 1907/2006 and Therefore exempt from the Hazard Communication Standard and REACH.

Chemical Name	% by Wt.
Polyurethane Polymer	99-100 %

Section 4: First-Aid Measures

Description of first-aid measures

Inhalation:	Move victim to fresh air. Seek medical attention if condition does not improve.
Eye Contact:	Flush eyes with large amounts of water for 15 to 20 minutes. Seek medical attention if condition does not improve.
Skin Contact:	Remove contamination clothing and flush with water for 15 to 20 minutes. Seek medical attention if condition does not improve.
Ingestion:	N/A

Section 5: Fire-Fighting Measures

Flash Point:	N/A
Autoignition Temperature:	N/A
Flammability Limits (LEL):	N/A
Flammability Limits (UEL):	N/A
Extinguishing Media:	Water, regular foam, carbon dioxide, dry chemical
Special Fire-Fighting Procedures:	Decomposition in a fire may produce toxic fumes. Firefighters should be equipped with self-contained breathing apparatuses.
Unusual Fire and Explosion Hazards:	Polyurethane materials may generate dense smoke in a fire.

Section 6: Accidental Release Measures

Personal Precautions:	None needed.
Environmental Precautions:	None needed.
Cleaning Methods:	Sweep dust into appropriate container for disposal. Avoid creation of nuisance dust.

Section 7: Handling and Storage

Handling:	Cutting operations should have proper ventilation to prevent exposure to dust. Hot wire cutting operations should be exhausted to prevent exposure to irritating fumes. Wear suitable PPE.
Storage:	Keep in a cool, ventilated area.

Section 8: Exposure Controls/Personal Protection

Respiratory Protection:	None needed under normal use.
<u>Ventilation</u>	
Local:	Recommended for use in cutting/finishing operations and hot wire cutting operations.
General:	Recommended for all industrial operations.
<u>Personal Protection</u>	
Hands:	Gloves to avoid skin contact if desired.
Eyes:	Safety glasses with side shields are recommended for industrial operations.
Skin:	N/A
Other:	Safety showers/eye wash areas if desired.

Section 9: Physical and Chemical Properties

Appearance:	Varies
Odor:	Slight
Physical State:	Solid
Boiling Point (°C):	N/A
Melting Point (°C):	N/A
Freezing Point (°C):	N/A
Flash Point (°C):	N/A
Water Solubility:	None

Vapor Density:	N/A
Vapor Pressure:	N/A
Specific Gravity:	0.08 – 0.5
Partition Coefficient:	N/A
Evaporation Rate:	N/A
Relative Density:	N/A
Viscosity:	N/A
Auto-Ignition Temperature (°C):	N/A
Decomposition Temperature (°C):	N/A
pH:	N/A
Flammability:	N/A

Section 10: Stability and Reactivity

Reactivity:	This product is stable under normal conditions of use.
Chemical Stability:	Stable under normal temperatures and pressures.
Possibility of Hazardous Reactions:	Hazardous polymerization will not occur.
Conditions to Avoid:	High temperatures, sparks, open flames.
Incompatible Materials:	None known.
Hazardous Decomposition products:	CO, CO ₂ , Oxides of nitrogen, HCN, and traces of incompletely burned carbon compounds.

Section 11: Toxicological Information

Reactivity:	IARC has listed carbon black as a Class 2B suspected human carcinogen based on tests with laboratory animals.
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Section 12: Ecological Information

Ecotoxicity:	Material data lacking.
Persistence and Degradability:	Material data lacking.
Bioaccumulative Potential:	Material data lacking.
Mobility in Soil:	Material data lacking.
Other Adverse Effects:	Material data lacking.
Other information:	No data is available on the adverse effects of this material on the environment.

Section 13: Disposal Consideration

Product Waste:	Dispose of content and/or container in accordance with local, regional, national and/or international regulations.
Packaging Waste:	Dispose of content and/or container in accordance with local, regional, national and/or international regulations.

Section 14: Transport Information

UN Number:	Not regulated
UN Proper Shipping Name:	Not regulated
Hazard Class (ES):	Not regulated
Packing Group:	Not regulated
Environmental Hazards:	Not regulated

Section 15: Regulatory Information

Canadian (DSL/NDSL):	N/A
China (SEPA):	Article - exempt
REACH Directive:	Material is classified as an Article.
EU Directive 2011/65/EC (RoHS):	Does not contain any intentionally added substances mentioned by the RoHS directive.
European Symbol:	Not classified according to directive 1999/45/EC & 2001/60/EC (dangerous preparations)
R-Phrases:	N/A
S-Phrases:	N/A
TSCA (Toxic Substance Control Act):	All materials are listed or exempt from TSCA listing.
Sara Title III:	N/A
311/312 Hazard Categories:	N/A

This product contains no chemicals subject to the reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and 40 CFR 372.

Section 16: Other Information

N/A = Not Applicable

Date Prepared: 1/6/2020

Last Revision Date: 1/6/2020

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