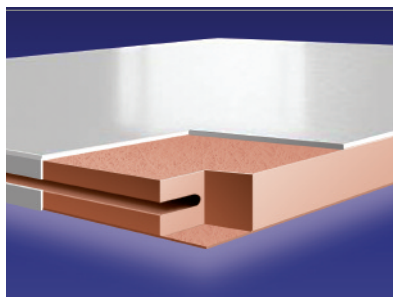


arcoplast[®]

architectural wall and ceiling panels are designed for highly specialized facilities with strict requirements for environment control. They are tremendously innovative, versatile, maintenance free and cost effective—remarkable advantages over the materials and methods which have traditionally been used in containment facility construction.

Architectural panels for sterile environments



Arcoplast panels are composed of a solid glass and resin composite matrix,

with a smooth, high gloss antimicrobial gel coat. They have a beautiful, ultramodern appearance. Panels are extremely rigid, impervious to microorganisms, impermeable from the front and back, unaffected by moisture or temperature and cannot be attacked by insects or vermin. Arcoplast's finishing compound, which is equally as impermeable, is used to create smooth, seamless seals between panels that will not crack or deteriorate.

Arcoplast products meet and exceed USDA, FDA, cGMP, GLSP, NIH, CDC, BMBL and USP 797 Compliant specific guidelines for maximum containment facilities.

- Human and animal health care
- Pharmaceutical
- Nutraceutical
- Food and beverage processing
- Research laboratories



Composite Surfaces for Sterile Environments

www.arcoplast.com



Solid Glass and Resin Matrix Composite Panels

performance

Versatile

Arcoplast panels are available in a variety of thicknesses and dimensions up to 10'W x 40'L. They can be used with traditional steel studs and furring channels, or attached to existing walls and ceilings. Arcoplast panels may be assembled in virtually any configuration, providing the ultimate in design flexibility and allowing for cost-effective "box-within-a-box" construction. Modular panels allow for additional design versatility.

Maintenance Free

Arcoplast panels are designed to outlast the life of the facility.

- Impact, corrosion and chemical resistant
- Made to withstand vigorous decontamination procedures or daily sanitation regimen
- Permanent finish will not decay, dent or fade
- Impermeable throughout with unequaled aesthetics

This prevents expensive business interruptions and risks generated by the restoration and moving equipment in and out of the area.

Cost Effective

Arcoplast panels provide substantial cost savings over traditional methods and materials because of their design flexibility, simple installation, maintenance-free characteristics and guaranteed effectiveness. Arcoplast projects move along at quicker pace, producing lower overall costs. And, when other traditional methods fail, the cost to resurface, repair or restore, along with the associated down time, can be exorbitant. With Arcoplast, you don't have to worry about failure.



Composite Surfaces for Sterile Environments

1873 Williamstown Drive, St. Peters, Missouri 63376
Phone 636-978-7781, Fax 636-978-7782
www.arcoplast.com

Physical Properties

Data Summary for Arcoplast Solid Glass and Resin Matrix Composite 9.5 mm Panel

ASTM D 638	Tensile Strength	10,141
ASTM D 638	Tensile Modulus	10.07
ASTM D 790	Flexural Strength	21,101
ASTM D 790	Flexural Modulus	1.227
ASTM D 695	Compressive Strength	15,920
ASTM D 695	Compressive Modulus	1.467
ASTM D 2538	Barcol Hardness	56.8
ASTM D 523	Gloss Property	99.7
	Light Source @ 85 Deg	
ASTM D 696	Coefficient of Linear	
	Thermal Expansion	27.5x10 ⁻⁶ In/In°F
ASTM E 96-05	Water Vapor	
	Transmission Less Than	0.01 perms
Mils 1073.2	Impact Resistance	
	A 2 lb. Steel Ball Dropped from up to 18'0"	
	Causes No Damage on Impact	
Weight Per Sq. Ft.	9.5 mm Thickness	3 lbs

Surface Burning Characteristics of Materials

ASTM E 84	Flame Spread	5*
ASTM E 84	Smoke Development	100*

* Per Test Number 101545909SAT-001A

New York City Approval #MEA 414-04-M

Toxicity When tested in accordance with the combustion toxicity protocol developed at the university of Pittsburgh, the Arcoplast Composite Panel meets the requirement for interior finish material as defined by Title 27, Chapter 1, Subchapter 5, Article 5, on the Building Code of the City of New York.

Authorized Arcoplast Distributor



**Solid Glass
and Resin Matrix
Composite
Sealed Systems**

arcoplast BSL-3 and BSL-4

High Containment Facilities

High containment facilities constructed with Arcoplast wall and ceiling systems for sterile environments meet exacting regulatory requirements for commissioning, validation and qualification, up to and including BSL-4. Arcoplast wall and ceiling systems are designed for clinical, diagnostic, research and production facilities in new or existing buildings.



Composite Surfaces for Sterile Environments

www.arcoplast.com

Solid Glass and Resin Matrix Composite Sealed Systems

Product Information

Versatility for BSL-3 and BSL-4 Environments

When constructed with Arcoplast solid glass and resin matrix composite panels and components, a containment shell does not require costly concrete and steel liners. This reduces construction time and costs without compromising quality, security and environmental integrity. Containment facilities constructed with Arcoplast components form a sealed inner shell, meet air pressure decay standards, and comply with decontamination procedure requirements.

Containment facilities using Arcoplast wall and ceiling systems erected with conventional steel stud techniques are lightweight and meet BSL-3 and BSL-4 requirements, including USDA, FDA, NIH, CDC and NIAID construction, design and surface finish requirements for good manufacturing practices. They can provide the primary barrier for USDA ARS 242.1 BSL-3Ag applications.

Arcoplast contamination controlled environments are designed for high containment applications such as infectious disease research, aerobiology, biosecurity, animal testing and cleanrooms. Because they are leak-tight and easily cleaned, Arcoplast systems help protect both people and the environment when biosafety is vital.

Benefits

Sealed internal shells constructed with Arcoplast components:

- Offer maximum containment. Arcoplast components support monolithic designs through a seamless finish that ensures containment integrity.
- Provide hermetically sealed barriers. Arcoplast systems are dimensionally stable under extreme positive and negative pressures, very resistant to impacts and chemical resistant.
- Are super-hygienic. The Arcoplast surface for sterile environments is a permanent, extremely smooth, high-gloss, non-porous and impervious finish designed to withstand rigorous decontamination procedures.
- Meet specific facility requirements. Arcoplast fiber reinforced panel composite systems fulfill a wide range of construction needs, including wall liner panels, free standing partitions, wall resurfacings, walk-on ceilings and accessible ceiling panels.





Qualifications

Surface Burning Characteristics	ASTM E 84	Flame Spread - 22.5 Smoke Development - 39.9
Toxicity	New York City Approval # MEA 414-04-M	When Testing in Accordance with the Combustion Toxicity Protocol Developed at the University of Pittsburgh, the Arcoplast Cement Core Sandwich Panel Meets the Requirement for Interior Finish Material as Defined by Title 27, Chapter 1, Subchapter 5, Article 5, or the Building Code of the City of New York.
Water Vapor Transmission	ASTM E 96	Less Than 0.01 Perms
Light Reflectance/Gloss Property	ASTM D 523	99.7 from Light Source at 85 Degrees
Air Pressure Decay Test	ASTM E 2178	Pass - 4 In. W.C. (Negative/Positive)
Testing of Nuclear Air Treatment Systems	ASME N510	Pass - 1000 Pa
Air Pressure Decay Test on Arcoplast face plate for Electrical Box Mounted on Arcoplast Surfaces	ASME N510	Pass - 1000 Pa
Air Pressure Decay Test on Penetrations 12" Stainless Steel Duct Mounted and Sealed with Arcoplast Finishing Compound	ASME N510	Pass - 1000 Pa
Decontamination Test Procedure on:	Paraformaldehyde Gas Decontamination	Arcoplast Panels Not Effected by Procedures
	Vapor-Phase Hydrogen Peroxyde	
	Chlorine Dioxide	

Applications

- BSL-3 and BSL-4 Laboratories
- BSL-3 Ag
- ABSL-3 and ABSL-4 Laboratories
- Biocontainment
- Nanotechnology Laboratories
- Vivarium/Vivaria
- Necropsy
- Surgery Suite
- Small and Large Animal Holding Rooms
- Cleanrooms

Installations

Arcoplast systems are in use at major research, clinical and production facilities, including:

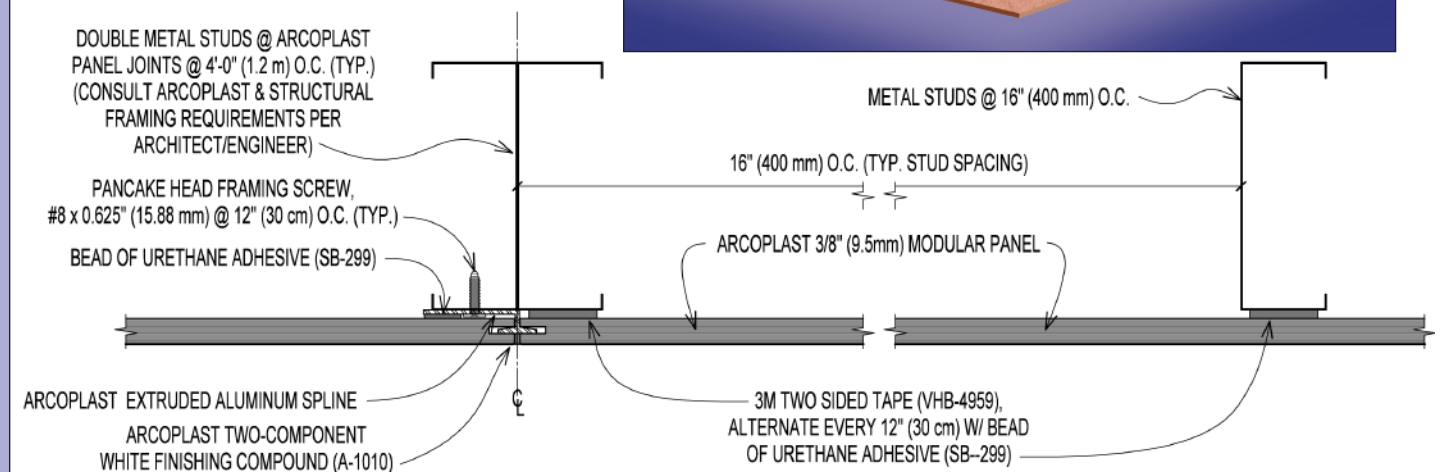
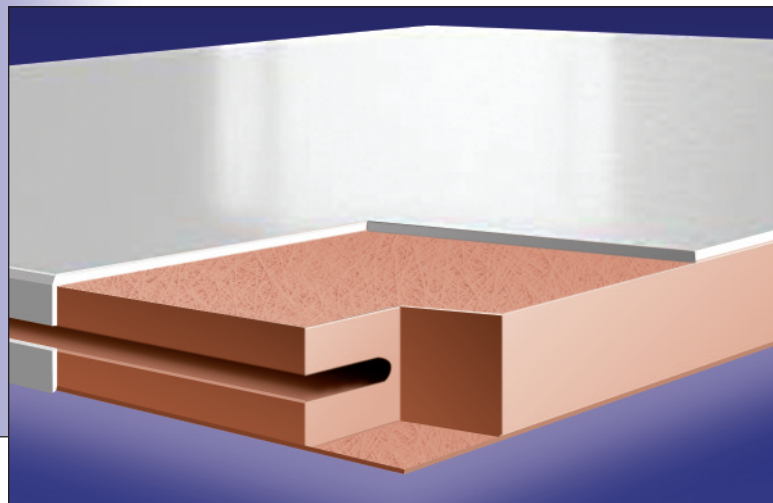
- Johns Hopkins Applied Physics Laboratory
- Perrigo Company
- Pfizer Inc.
- University of Alberta
- University of California, Berkely
- University of California, Irvine
- University of California, San Francisco
- University of Pittsburgh
- Utah State University
- Warnex Inc.

BSL-3 and BSL-4

Solid Glass and Resin Matrix Composite Sealed System

High Containment Facilities

BSL-3 and BSL-4 containment shells constructed with Arcoplast wall and ceiling systems and Arcoplast components use conventional steel stud construction. Arcoplast systems are easily integrated with windows, doors and mechanical penetrations to form a sealed inner shell.



CEILING AND WALL LINER FLUSH JOINT, SPLINE ATTACHMENT ASSEMBLY

Authorized Arcoplast Distributor



Composite Surfaces for Sterile Environments

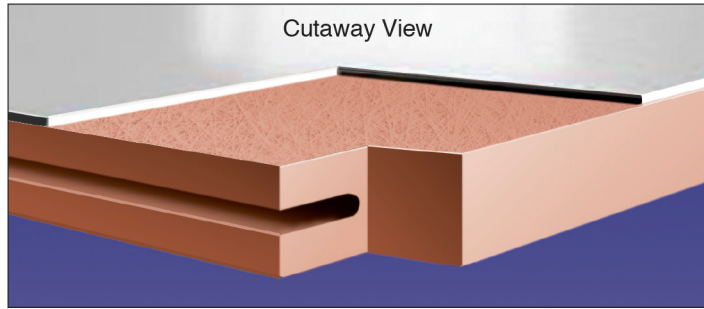
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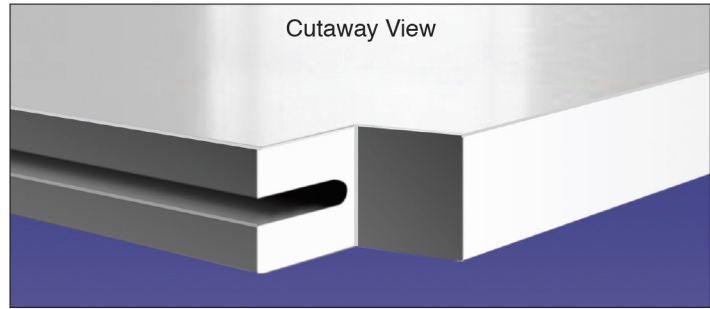
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Arcoplast Fiberglass Composite Panel - Arcoplast Engineered Polymer Panel Properties

The Arcoplast Fiberglass Composite 9.5 mm Panel



Arcoplast Engineered Polymer 12 mm Panel



		ORIGINAL Fiberglass Composite 9.5mm Panel	NEW Engineered Polymer 12mm Panel
Mechanical Properties	Joint Peel Strength Test - Interior Corner Assembly	55 lbf	92.78 lbf
	Seismic Shear Strength Test Panel - Spline Joint Assembly	396 lbf	380 lbf
	Seismic Shear Strength Test Lateral Movement - Corner Section Assembly	330 lbf	791 lbf
	Seismic Shear Strength Load Test (Peak Load) Solid Panel	556 lbf	629 lbf
	Pull-out Strength Of Variable Fasteners - Ex. #6 x 25 mm Pan Phillips SDS	573 lbs	733 lbs
	Partition Load Bearing Test	✓	✓
	Walk-On Ceiling System Load Test	✓	✓
	Arcoplast FEA Report on Structural Analysis - Seismic Loading Compliance	Pass	Pass
Physical Properties	Sound Absorption Test ASTM C 423-09a / E 795-05	0.05	0.05
	Sound Transmission Loss Test ASTM E 90-09 / E 413-10	57	59
	Specular Gloss Test ASTM D 523	99.7	97.8
	Impact Resistance Test - Mil 1073.2	18' x 2 lbs	11' x 2 lbs
	Barcol Test Indentation Hardness Test ASTM D 2583	56.8	58
	Flexural Properties For Reinforced Plastics Test ASTM D 790-03	10318 psi	7504 psi
	Compressive Strength Properties Test ASTM D 695-02a	15920 psi	12502 psi
	Tensile Properties Test ASTM D 638-03	10141 psi	3490 psi
	DTUL - Deflection Temperature Under Load ASTM D 648	185°F	200°F
	Coefficient of Linear Thermal Expansion ASTM D 696-03	27.5 x 10 ⁻⁶ in/in°F	22.43 x 10 ⁻⁶ in/in°F
	R-Value ASTM D177 Thermal Conductivity	0.1	0.8
	Water Vapor Transmission Test ASTM E 96-05	0.01	0.04
	Water Absorption ASTM D 570 (24 hrs)	0.01	0.01
	Surface Profile & Surface Finish Analysis ISO 10012-1	Pc750	Pc750
	Resistance to Mold on the Surface Test ASTM D3273	Pass	Pass
	Degree of Surface Disfigurement by Fungal/Algal Growth ASTM D3274	Pass	Pass
	Resistance to Bacteria ISO 846A-B-C	Pass	Pass
Fire and Smoke Development	ISO 9705 Annex B Full Scale Room Fire Test	Pass	Pass
	Classification of Reaction to Fire Performance in accordance with EN 13501-1 - Europe, Asia	B-s1-d0	B-s1-d0
	UL S-102 Test On Surface Burning Characteristics (Must be on full composite construction - Canada)	18,9 FS- 63, 4SD	10.8FS - 6.1SD
	UL 94 - 5VA - 500W Vertical Burning Test	Pass	Pass
	ASTM E-84 Test On Surface Burning Characteristics (Must be on full composite construction - USA)	20FS - 145SD	10FS - 0SD
	Toxicity Test - Measurement Of Acute Lethality Decomposition Products - UPITT Protocol	MEA 414-04-M	MEA 64-96-M (Solid Colors)
Barrier Performance	Air Pressure Decay Test ASME N510 Nuclear Air Treatment Systems	Pass	Pass
	Air Pressure Decay Test Small Chamber BSL-3, BSL-4	Pass	Pass
	Air Pressure Decay Test On Accessories Relating to MEP	Pass	Pass
	Air Pressure Decay Test On Screw Penetrations	Pass	Pass
	Air Pressure Decay Test On Expansion Joint & Electrical Face Plates	Pass	Pass
	Supplemental Helium Leak Testing	Pass	Pass
Coloration Fastness	Window Panel Pressure Decay Test Report	Pass	Pass
	Coloration Test on Formaldehyde Gas Decontamination Procedure	Pass	Pass
	Coloration Test on Hydrogen Peroxide Vapor Decontamination Procedure	Pass	Pass
	Coloration Test on Chlorine Dioxide Decontamination Procedure	Pass	Pass
	UV Exposure Cycles Test	Pass	Pass
	Arcoplast surface and sealant chemical compatibility tests ISO 2812-4	Pass	Pass
Compliance	Arcoplast surface and sealant chemical compatibility tests ASTM D 1308-02	Pass	Pass
	Arcoplast cleanability & stain resistance ISFA 2-01	Pass	Pass
	USDA, FDA, NIH, CDC, NIAID, CANADA AGRICULTURE Compliant	✓	✓
	Product Guide Specification Written According To (CSI) 3-Part Format	✓	✓
	City of New York Department of Buildings MEA 414-04-M	✓	✓
	Determination of Extractives Residue according to US FDA 21 CFR 177.2600	✓	✓
	Living Building Challenge 3.0 Red List		✓



Arcoplast Fiberglass Composite Panels and the Sealant/Finishing Compound Chemical / Stain Resistance ISO 2812-4:2007

Chemical reagents were placed on the surface for 72 hours*. After the 72 hour period, reagents were removed using the cleaning methods described in each referenced standard. There were twelve chemicals to which the test panels showed resistance.

These include chromic acid (10%), chromic acid (30%), hydrochloric acid (36.5-38.0%), BIRKO - FOMACID -10043, nitric acid (10%), nitric acid (100%), sodium hydroxide (10%), sodium hydroxide (40%), sodium hypochlorite (10%), sulfuric acid (30%), STERIS - Coverage Plus NPD, and Steris - SPOR KLENZ. Of these only nitric acid (100%) showed blistering while the rest showed some degree of discoloration or change in gloss. Some of the discoloration were very faint, and seen only under certain lighting, more indicative of a change in gloss/finish.

Chemical & Stain Resistance - Arcoplast	Arcoplast Panel Defects	Arcoplast Sealant Defects
Acetic Acid (10%)	none	none
Acetic Acid (Glacial)	none	none
Acetone	none	none
Ammonium Carbonate (10%)	none	none
Ammonium Chloride (10%)	none	none
Ammonium Hydroxide (28-30%)	none	none
Benzene	none	none
Calcium Chloride (10%)	none	none
Carbon Tetrachloride	none	none
Chlorine Dioxide	none	none
Chloroform	none	none
Chromic Acid (10%)	Degree of change in gloss 1 (S2); Intensity 1	Degree of discoloration 2 (S4); Intensity 5
Chromic Acid (30%)	Degree of change in gloss 1 (S2); Intensity 1	Degree of discoloration 2 (S4); Intensity 5
Diethyl Ether	none	none
Diethyl Phthalate	none	none
Ethyl Acetate	none	none
Ethyl Alcohol (30%)	none	none
Ethyl Alcohol (95%)	none	none
Ethylene Dichloride	none	none
Ethylene Glycol	none	none
Formaldehyde	none	none
Formalin	none	none
Glycerin	none	none
Hexane	none	none
Hydrochloric Acid (36.5-38%)	Degree of discoloration 1 (S5); Intensity 2	none
Hydrogen Peroxide (6%)	none	none
BIRKO - FOAM CHLOR 535 - 102588	none	none
BIRKO - FOMACID - 100043	none	Degree of discoloration 2 (S4); Intensity 3
BIRKO - LIQUIK 5 - 100138	none	none
Isopropyl Alcohol	none	none
Lactic Acid (10%)	none	none
Lacquer Thinner	none	none
Liquid Formalin (10%)	none	none
Methyl Alcohol (30%)	none	none
Methyl Alcohol (100%)	none	none
Methyl Ethyl Ketone	none	none
Methylene Chloride	none	none
Microchem (10%)	none	none
Nitric Acid (10%)	Degree of discoloration 1 (S2); Intensity 2	Degree of discoloration 1 (S2); Intensity 2
Nitric Acid (100%)	Degree of blistering 5 (S3); Intensity 5	Degree of blistering 5 (S3); Intensity 5
Peracetic Acid (5%)	none	none
Phenol (5%)	none	none
Sodium Chloride	none	none
Sodium Hydroxide (10%)	Degree of discoloration 1 (S5); Intensity 3	none
Sodium Hydroxide (40%)	Degree of discoloration 1 (S5); Intensity 3	none
Sodium Hypochlorite (10%)	Degree of change in gloss 1 (S4); Intensity 1	none
Sulfuric Acid (3%)	none	none
Sulfuric Acid (30%)	none	Degree of change in gloss 1 (S4); Intensity 1
Toluene	none	none
Trichloroethylene	none	none
Turpentine	none	none
Ultra Pure Water	none	none
Wescodyne - ppm	none	none
Xylene	none	none
STERIS - Coverage plus NPD	Degree of change in gloss 1 (S4); Intensity 1	none
STERIS - LPH	none	none
STERIS - SPOR KLENZ	Degree of change in gloss 1 (S4); Intensity 1	none

Chemical reagents were placed on the surface for 72 hours*. After the 72 hour period, reagents were removed using the cleaning methods described in each referenced standard.

Reagent	Stain Resistance - Arcoplast Panel	Stain Resistance - Arcoplast Sealant
Blood (Beef)	2*	2*
Butter	1*	1*
Iodine	2*	2*
Mustard	2*	3*
Potato	1*	1*
Red Cabbage	1*	1*
Tea	1*	1*
Coffee	1*	1*
Tomato Acid	1*	1*
Red Wine	1*	1*

***Stain Resistance Ranking Legend**

- 1 = Unaffected = wipes off easily with damp and mild soad, no color or surface change
- 2 = Superficial = stain removed easily with water and / or mild abrasive
- 3 = Considerable = stain no completely removable

Rating - Quantity of Defects

- 0 - None, i.e. no detectable defects
- 1 - Very few, i.e. small, barely significant number of defects
- 2 - Few, i.e. small but significant number of defects
- 3 - Moderate number of defects
- 4 - Considerable number of defects
- 5 - Dense pattern of defects

Rating - Size of Defects

- 0 - Not visible under x10 magnification
- 1 - Only visible under magnification up to x10
- 2 - Just visible with normal corrected vision
- 3 - Clearly visible with normal corrected vision (up to 0.5mm)
- 4 - 0.5mm to 5mm
- 5 - Larger than 5mm

Rating - Intensity of Change

- 0 - Unchanged, i.e. no perceptible change
- 1 - Very slight, i.e. just perceptible change
- 2 - Slight, i.e. clearly perceptible change
- 3 - Moderate, i.e. very clearly perceptible change
- 4 - Considerable, i.e. very clearly perceptible change
- 5 - Very marked change