



Argosy International Inc.

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VR Fibers

-- Advanced fibers for demanding applications

VR Fiber has superior technical characteristics comparing to E-glass fiber and can be used as a substitute. Due to its comparatively low price, it could be a good replacement for carbon and aramide fibers in some applications. VR fibers can be coated with a sizing treatment which makes them highly compatible with epoxy and phenolic resins.

- ❖ Provides both, fire protection and 300°C higher heat resistance than E-glass materials; is less expensive than high silica.
- ❖ Provides very low thermal conductivity and can withstand continuous working temperatures in excess of 1500°F (816°C). Compared to regular E-glass, our VR fibers show 15-20% higher tensile strength and modulus, better chemical resistance and greater operational temperature range, compared to more expensive high strength and corrosion resistant fibers.

Thermal Properties Comparison:

Properties	Unit	VR Fiber	Fiberglass	Silica Filament
Maximum application temperature	°C	982	650	1100
Operating temperature	°C	700	400	1000
Minimum operating temperature	°C	-200	-60	-170
Thermal conductivity	W/m K	0.031-0.038	0.029-0.035	0.035-0.04
Melting temperature	°C	1450	1120	1550
Thermal expansion coefficient	ppm/°C	8.0	5.4	0.05



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Physical/Mechanical Properties Comparison:

Properties	Unit	VR Fiber	Fiberglass	Silica Filament
Density	g/cm ²	2.8	2.57	2.15
Filament diameter	μm	13-20	9-13	9-15
Tensile Strength	MPa	4840	3450	4750
Elastic Modulus	Gpa	89	77	66
Elongation at Break	%	3.15	4.7	1.2
Linear expansion coefficient	×10/K	5.5	5	0.5
Absorption of humidity (65% RAH)	%	<0.1	<0.1	<0.1
Stability at tension (20°C)	%	100	100	100
Stability at tension (200°C)	%	95	92	94
Stability at tension (400°C)	%	82	52	80

Acoustics Properties Comparison:

	Unit	VR Fiber	Fiberglass	Silica Filament
Sound absorption coefficient	%	0.9-0.99	0.8-0.93	0.85-0.95



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Electrical Properties Comparison:

Properties	Unit	VR Fiber	Fiberglass	Silica Filament
Specific volume resistance	Ohm.m	1*10 ¹²	1*10 ¹¹	1*10 ¹¹
Loss angle tangent frequency	1 MHz	0.005	0.0047	0.0049
Relative dielectric permeability	1 MHz	2.2	2.3	2.3

Chemical Resistance Comparison:

Properties	Unit	VR Fiber	Fiberglass	Silica Filament
% weight loss after 3 hrs boiling in H ₂ O	%	0.2	0.7	0.05
2n NaOH (Sodium Hydroxide)	%	5.0	6.0	5.0
2n HCL (Hydrochloric acid)	%	2.2	38.9	15.7



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Products of VR fibers

- After exposure to 750 °F, the VR fibers lose only 20% of their initial strength compared to a 50+% strength loss for E-glass under the same conditions.
- VR fibers have better sound insulation properties than glass fibers. Interiors based on VR fibers will provide greater comfort.

VR roving

VR roving is an untwisted bundle of VR continued filaments. In the manufacturing process it is treated with special binders (sizing) that provide proper adhesion with applied environment.

Argosy offers a broad range of VR roving and yarns for non-woven and textile fabrics. Our products can be dressed for different resin system including epoxy, vinyl ester and polyester.

Technical data

- ❖ Filament diameter 13-20 microns
- ❖ Titer 60-4800 tex
- ❖ Tensile strength 30-50 Gs/tex
- ❖ Density 2.8g/cm³
- ❖ Elongation 4.5 -8%
- ❖ Sizing: different recipes available according to final application environment



Applications:

- high pressure vessels
- CNG cylinders
- waste water filters
- corrosion resistant tank & pipes



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VR chopped strand

VR chopped fiber is continuous filament cut to predetermined length to suit a particular application. The appropriate sizing is also used while chopped roving is being produced. This makes chopped roving compatible with other materials with which it has to co-exist in applied environments.

Technical data

- ❖ Filament diameter 13-20 microns
- ❖ Length 3-60mm, step 5 mm or 6mm
- ❖ Moisture 12% or less
- ❖ Sizing: different recipes available according to final application environment

Applications

- BMC parts for automotive industry
- friction materials
- surface finishing for fire protection
- fiber reinforced concrete



VR non-woven and roving fabrics

VR non-woven fabrics can be produced from different linear density roving compatible with different resin systems for a variety of applications. Unidirectional VR roving fabrics can be used in a broad spectrum of applications and for closed molding technologies like RTM and vacuum infusion. The low price of VR non-woven fabrics – nearly the same as E-glass fabrics – allows significant reduction of construction weight while keeping the cost at the level as E-glass materials.

Applications

- Blades for wind power generators
- Boat hulls



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VR yarn, woven fabrics

Argosy can provide various types of VR yarns and woven fabrics. Argosy's design engineers are open for collaboration in manufacturing of special design fabrics and braided sleeves. Our R&D team is ready to work and satisfy various customer requirements.

Applications:

- Heat and sound insulations
- Fire protection.





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Properties of VR Fabrics		
Product No.	AVR-T18	
Filament diameter (µm)	9	
Sizing type:	Paraffin emulsion	
Sizing content:	2 %	
Weave:	Plain	
Width:	37 in	960mm
Weight:	22.11 oz/yd ²	750 g/ m ²
Abrasion resistance (ISO12947-2(1998)cycles)	20,000 (Coated side)	
Moisture content (%)	0.1	
Melting temperature	2300 □	1250 □

Applications:

- Fire protection / containment oil refinery
- Welding protection
- Industrial and domestic furnaces
- Radiation-proof materials
- Chemical resistant materials



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Properties of VR Fabrics		
Product No.	AVR-T05	
Filament diameter (μm)	9	
Sizing type	Paraffin emulsion	
Size content:	2 %	
Weave	Plain	
Width:	37 in	960mm
Density:	6.48 oz/ sq.yd	200 g/sq.m
Abrasion resistance (ISO12947-2(1998)cycles)	20,000 (Coated side)	
Moisture content (%)	0.1	
Melting temperature	2300 □	1250 □

Applications:

- Fire protection / containment oil refinery
- Welding protection
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VR Fibers

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Properties of VR Fabrics		
Product No.	AVR-T09	
Filament diameter (μm)	9	
Sizing type	Paraffin emulsion	
Size content:	2 %	
Weave	Plain	
Width:	37 in	960 mm
Density:	11.06 oz/yd ²	375g/m ²
Abrasion resistance (ISO12947-2(1998)cycles)	20,000 (Coated side)	
Moisture content (%)	0.1	
Melting temperature	2300	1250

Applications:

- Fire protection / containment oil refinery
- Welding protection
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- Radiation-proof materials
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Properties of VR Fabrics

Product No#:	AVR-F05	
Chemical Treatment	Compatible with epoxy resin	
Weave	Plain	
Width:	37 in	960 mm
Thickness:	0.007 in	0.18 mm
Weight:	6.19 oz/sq.yd	210 ±5 g/sq.m
Tensile strength:	Warp	> 41 kg/25.4 cm
	Fill	>35 kg/25.4 cm
Melting temperature:	1200 □	650 □

Applications:

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Properties of VR Fabrics

Properties	Value	
Product No#:	AVR-U06	AVR-U09
Yarn diameter	13 um	
Weight:	200g/m ² (6 oz/yd ²)	300g/m ² (6 oz/yd ²)
Yarn density	2.65 g/cm ³	
Width:	600 mm	
Thickness:	0.105 mm	0.107 mm
Tensile strength	2300 MPa	
Elastic modulus	93 Mpa	
Elongation at break	3.21%	

Applications:

- Fire protection / containment oil refinery
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- Chemical resistant materials
- Radiation-proof materials



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Properties of VR Fabrics		
Properties	Value	
Product No#:	AVR-TAL08	
Coating type:	Al Coating (single side)	
Yarn diameter	9 um	
Weight with coating:	260 g/m ²	7.67 oz/yd ²
Weight of raw fabric	230 g/m ²	6.78 oz/yd ²
Fabric Width:	1000 mm	39 in
Thickness:	0.18mm	0.0017in

Applications:

- Fire protection / containment oil refinery
- Welding protection
- Industrial and domestic furnaces
- Chemical resistant materials
- Radiation-proof materials