



strength in materials

L-Glass[®] Yarn

Low Loss Glass Fiber Yarn for High Speed PCB Applications

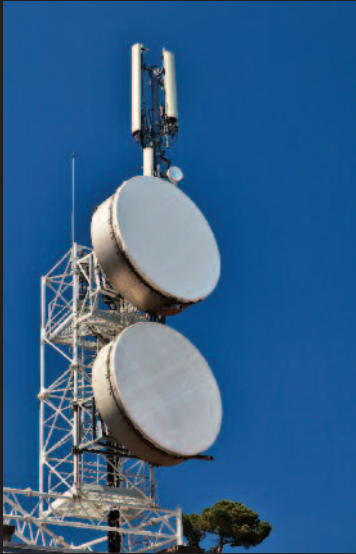
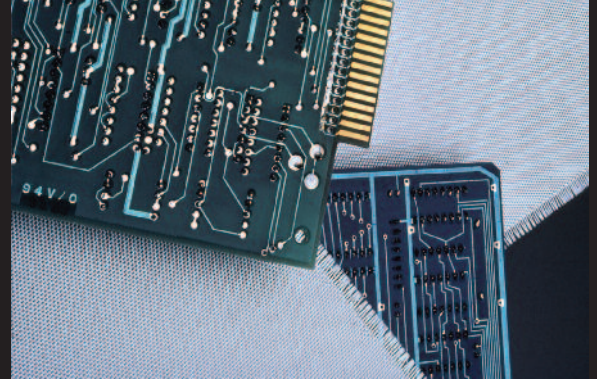
AGY's L-Glass[®] yarns are specifically designed to meet the demanding performance requirements of PCBs used in high speed digital communications.

Product Application

The continuing exponential growth of mobile data traffic requires data handling systems to operate at higher speeds and frequencies. PCB laminates made with L-Glass yarns enable higher processing speeds while minimizing signal loss for critical devices such as high speed routers and servers, and mobile communications infrastructure. L-Glass yarns can also be deployed to offset increases in dielectric constant (Dk) and dissipation factor (Df) often seen when switching to halogen-free resin systems.

Product Description

L-Glass yarns are produced using a proprietary patented glass composition designed for the specific requirements of low Dk and low Df. L-Glass yarns are available in a wide range of fiber micronage and yield/tex, allowing production of low loss fabrics analogous to most all standard PCB fabrics.



Features	Benefits
Low Dk, low Df: <ul style="list-style-type: none"> • Dk = 4.8 @ 10 GHz • Df = 0.003 @ 10 GHz 	<ul style="list-style-type: none"> • Enables higher signal speeds while minimizing signal loss. • Offsets Dk/Df increases when switching to halogen-free resins. • Minimizes skew effect
CTE = 3.9 ppm/OC	Minimizes CTE mismatch with silicon chips for use in IC substrates
Low hollow fibers	Excellent conductive anodic filamentation (CAF) resistance
Wide range of fiber micronage and yield/tex	Allows production of most standard PCB fabrics.
Treated with electronics grade starch/oil sizing	Fabric surface smoothness with high speed air jet weaving

PRODUCT INFORMATION

AGY L-Glass® Fiber

Low-loss laminates for high-speed applications have traditionally been produced in one of two ways. In one method, a higher performing epoxy resin system is used in conjunction with E-Glass. This approach limits the achievable Dk and Df properties.

The second method combines very low Dk/Df resins, such as PTFE, with ceramic filler and a much lower E-Glass content. While these systems can achieve much lower Df/Dk properties, they suffer from high material and processing costs. The low glass loading also reduces the dimensional stability of the laminate.

The use of L-Glass fiber overcomes these limitations by allowing epoxy resin systems to achieve much lower Dk/Df properties, and the PTFE-based systems to use a higher glass loading.

At 10G Hz L-Glass fiber has a dielectric constant of 4.8 and a dissipation factor as low as 0.0028, whereas E-Glass has a dielectric constant of 6.81 and a dissipation factor of 0.0060. The coefficient of thermal expansion (CTE) of L-Glass fiber is 3.9 ppm/°C compared to 5.4ppm/°C for E-Glass. This makes

PROPERTIES

	Units	L-Glass®	E-Glass
Dielectric Constant, ϵ' , (Dk)	@1 GHz	4.8	7.0
	@10 GHz	4.8	6.9
Dissipation Factor, $\tan \delta$, (Df)	@1 GHz	< 0.001	0.005
	@10 GHz	0.003	0.007
Density	g/cm ³	2.30	2.54
Softening Point	°C	850	846
Coefficient of Thermal Expansion	ppm/°C	3.9	5.4
Tensile Load to Failure (D450 fiber)	N	8.5	8.9
Tensile Modulus	GPa	62	75

AVAILABLE PRODUCTS AND TYPICAL USES

YARN		Typical IPC Fabric Styles
US Units	SI Units	
LCE255 1/0 1.0Z	LC7-19 1x0 Z40	2116
LCDE340 1/0 1.0Z	LC6-15 1x0 Z40	3313
LCD510 1/0 1.0Z	LC5-10 1x0 Z40	1078, 1080
LCD1020 1/0 1.0Z	LC5-4.9 1x0 Z40	106, 1067
LCC1360 1/0 1.0Z	LC4.5-3.7 1x0 Z40	1037
LCBC1700 1/0 1.0Z	LC4-2.9 1x0 Z40	1027

All products with sizing 620-1 on 7636 bobbin

L-Glass fiber an attractive material for use in IC packaging, where CTE mismatches with silicon are magnified due to the thermal environment and can cause defects.

AGY's L-Glass fibers are available in a variety of yarn counts, allowing

production of low-loss fabrics analogous to styles 1027, 1037, 106, 1067, 1078, 1080, 1280, 2113/2313, 3313, and 2116. Additional yarn counts can be produced as needed to meet market demands.



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