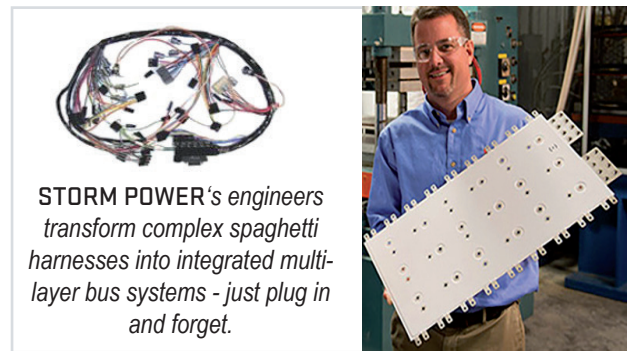


# MULTI-LAYER LAMINATED BUS BAR

## LAMINATED BUS BAR

reduce inductance by alternating the positive and negative bus bar layers between multi-conducting layers of thin dielectric insulation. Multi conductor connectors of all makes and sizes, including IGBTs and capacitors, are connected to the structure. Inductance is reduced, electromagnetic interference is eliminated, and systems switch faster and cleaner, with less energy loss.



STORM POWER's engineers transform complex spaghetti harnesses into integrated multi-layer bus systems - just plug in and forget.

## INDUCTANCE, CAPACITANCE, and IMPEDANCE in LAMINATED BUS ASSEMBLIES

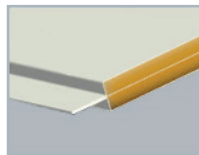
Advantages of laminated bus products are to locate, shape, and route conducting points in a way that ensures the multi-layered current can flow in opposite directions and in equal strength. The key aspect of this design concept, is to generate opposing voltages proportional to the rate of current change in a circuit, which in-turn, enables the opposing magnetic fields to cancel each other's ticket. This eliminates a free ride for extra inductance.

### EDGE FILL OFFERED BY STORM POWER COMPONENTS:



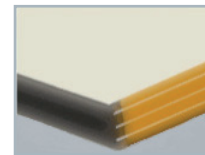
**OPEN EDGE** - Lamination extends beyond conductor farther than pinched or epoxy filled edges, and uses less tooling, which:

- lowers costs
- maintains minimal creepage
- has less robust edges



**PINCH SEAL EDGE** - Lamination extends past conductor with 100% sealed edges that:

- is good for harsh environments
- is limited by the thickness and number of conductors



**EPOXY FILLED EDGE** - Lamination extends less than other options to reduce footprint and:

- edges are 100% epoxy sealed by hand
- are good for harsh environments





# MULTI-LAYER LAMINATED BUS...(CON'T)

## INDUSTRIES AND APPLICATIONS

### INDUSTRIAL

Motor drives  
 Motor controls  
 Welding  
 Elevator systems  
 Switch gear  
 HVAC

### COMPUTERS

Mainframes  
 Servers  
 Cabinet power

### MEDICAL

CAT scan  
 MRI

### POWER CONVERSION

Power supplies  
 UPS systems  
 Alternative energy  
 Inverters

### TRANSPORTATION

Hybrid vehicles  
 Electric vehicles  
 Rail  
 Shipboard  
 Heavy equipment

### TELECOMMUNICATIONS

Routers  
 Backplanes  
 Switches  
 Cellular base stations  
 Battery back-up

## DESIGN CONSIDERATIONS

With the guidance from our Lamination Center team, engineers can be confident that they will make the right choice of insulating material and conductor (raw or plated) thickness. You will be able to explore design considerations from material to edge seals.

## TESTING CRITERIA



A hi-pot test is performed to make sure the finished coating has no defects, such as pin holes, voids, or thin areas near sharp corners or edges.



All surfaces are scanned at twice the operating voltage plus 1,000 volts as standard procedure, unless otherwise specified.



Storm Power Components also offers insulation resistance testing (leakage current) and partial discharge testing at our facility.

## LAMINATED BUS BAR - Insulation Materials Table

Selection of the proper internal dielectric insulations can depend on capacitance, inductance, voltage potentials, and operating environment. The following table lists the most common insulating materials. \*

Insulation Materials	Continuous Use Temp. C°	Dielectric Constant ASTM D150	Dielectric Strength ASTM D149	Flammability Rating
<b>Epoxy Glass (FR4)</b> Superior mechanical and dimensional stability properties	140°C	4.3	1250	UL 94 V-0
<b>Mylar (PET)</b> Cost effective; tear, chemical, and moisture resistant	105°C	3.3	3500	UL 94 VTM-0
<b>Teonex (PEN)</b> Higher dielectric strength and continuous use temperature	160°C	3.4	5000	UL 94 VTM-0
<b>Nomex</b> Flame resistant; durable	220°C	1.6	430-845	UL 94 V-0
<b>Kapton</b> High temperature rating and range stability	200°C	3.7	5000	UL 94 VTM-0
<b>Epoxy Powder Coating</b> Flame, moisture resistant; ideal for multiple shapes	130°C	4.0	800	UL 94 V-0

\* Note: Values may vary based on application



**STORM** POWER COMPONENTS  
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