**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.

**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:**

<table>
<thead>
<tr>
<th><strong>OPEN EDGE</strong></th>
<th><strong>PINCH SEAL EDGE</strong></th>
<th><strong>EPOXY FILLED EDGE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamination extends beyond conductor farther than pinched or epoxy filled edges, and uses less tooling, which:</td>
<td>Lamination extends past conductor with 100% sealed edges that:</td>
<td>Lamination extends less than other options to reduce footprint and:</td>
</tr>
<tr>
<td>• lowers costs</td>
<td>• is good for harsh environments</td>
<td>• edges are 100% epoxy sealed by hand</td>
</tr>
<tr>
<td>• maintains minimal creepage</td>
<td>• is limited by the thickness and number of conductors</td>
<td>• are good for harsh environments</td>
</tr>
<tr>
<td>• has less robust edges</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
INDUSTRIES AND APPLICATIONS

INDUSTRIAL
Motor drives
Motor controls
Welding
Elevator systems
Switch gear
HVAC

POWER CONVERSION
Power supplies
UPS systems
Alternative energy
Inverters

TELECOMMUNICATIONS
Routers
Backplanes
Switches
Cellular base stations
Battery back-up

COMPUTERS
Mainframes
Servers
Cabinet power

MEDICAL
CAT scan
MRI

TRANSPORTATION
Hybrid vehicles
Electric vehicles
Rail
Shipboard
Heavy equipment

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.

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.

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. *

<table>
<thead>
<tr>
<th>Insulation Materials</th>
<th>Continuous Use Temp. C°</th>
<th>Dielectric Constant ASTM D150</th>
<th>Dielectric Strength ASTM D149</th>
<th>Flammability Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epoxy Glass (FR4)</td>
<td>140°C</td>
<td>4.3</td>
<td>1250</td>
<td>UL 94 V-0</td>
</tr>
<tr>
<td>Mylar (PET)</td>
<td>105°C</td>
<td>3.3</td>
<td>3500</td>
<td>UL 94 VTM-0</td>
</tr>
<tr>
<td>Tedlar (PVF)</td>
<td>105°C</td>
<td>11.0</td>
<td>3500</td>
<td>UL 94 HB</td>
</tr>
<tr>
<td>Teonex (PEN)</td>
<td>160°C</td>
<td>3.4</td>
<td>5000</td>
<td>UL 94 VTM-0</td>
</tr>
<tr>
<td>Nomex</td>
<td>220°C</td>
<td>1.6</td>
<td>430-845</td>
<td>UL 94 V-0</td>
</tr>
<tr>
<td>Kapton</td>
<td>200°C</td>
<td>3.7</td>
<td>5000</td>
<td>UL 94 VTM-0</td>
</tr>
<tr>
<td>Epoxy Powder Coating</td>
<td>130°C</td>
<td>4.0</td>
<td>800</td>
<td>UL 94 V-0</td>
</tr>
</tbody>
</table>

* Note: Values may vary based on application

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Responsive Manufacturing