

## TLP Lowest Loss, High Volume Laminates

**TLP** laminates are constructed with a woven matrix of fiberglass fabric coated with PTFE that is more mechanically stable and has a more uniform dielectric constant than traditional non-woven products. The exceptionally low dissipation factor extends the usefulness of this product to 35 GHz and above.

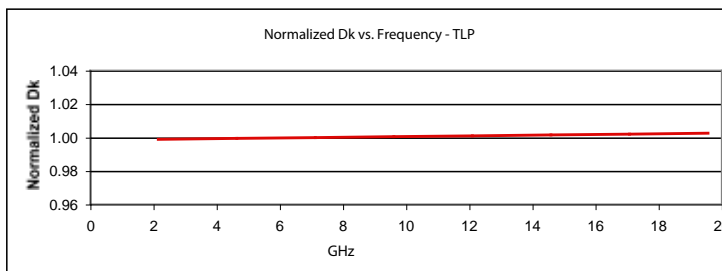
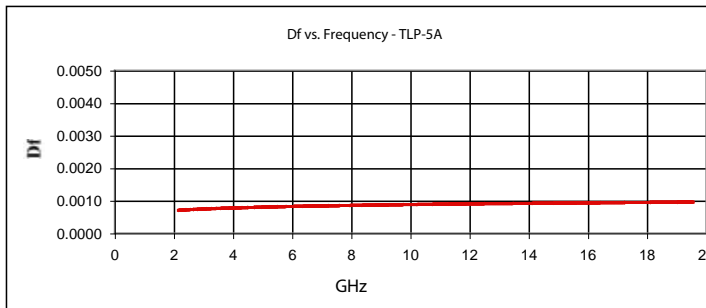
TLP laminates offer a cost effective solution for low loss antenna and radar applications. These laminates can be sheared, drilled, milled and plated using the accepted methods for PTFE/woven fiberglass laminates. The laminates are dimensionally stable and are resistant to the solvents and reagents used during fabrication.

Taconic is a world leader in RF laminates and high speed digital materials, offering a wide range of high frequency laminates and prepregs. These advanced materials are used in the fabrication of antennas, multilayer RF and high speed digital boards, interconnections and devices.

### Benefits & Applications:

- Dimensionally Stable
- Low Loss
- High Peel Strength
- Low Moisture Absorption
- Uniform, Consistent Dk

- Automotive Radar
- Low Loss Antennas
- Collision Avoidance Systems



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# TLP Lowest Loss, High Volume Laminates

| TLP Typical Values           |                  |                  |                     |                   |                     |
|------------------------------|------------------|------------------|---------------------|-------------------|---------------------|
| Property                     | Test Method      | Unit             | Value               | Unit              | Value               |
| Dk @ 10 GHz                  | IPC-650 2.5.5.5  |                  | 2.17 - 2.33 +/-0.03 |                   | 2.17 - 2.33 +/-0.03 |
| Df @ 10 GHz                  | IPC-650 2.5.5.5  |                  | 0.0009              |                   | 0.0009              |
| Moisture Absorption          | IPC-650 2.6.2.1  | %                | <0.02               | %                 | <0.02               |
| Dielectric Breakdown         | IPC-650 2.5.6    | Kv               | >60                 | Kv                | >60                 |
| Volume Resistivity           | IPC-650 2.5.17.1 | Mohms/cm         | 10 <sup>7</sup>     | Mohms/cm          | 10 <sup>7</sup>     |
| Surface Resistivity          | IPC-650 2.5.17.1 | Mohms            | 10 <sup>7</sup>     | Mohms             | 10 <sup>7</sup>     |
| Arc Resistance               | IPC-650 2.5.1    | seconds          | >180                | seconds           | >180                |
| Flex strength (MD)           | IPC-650 2.4.4    | lbs./inch        | >12,000             | N/mm <sup>2</sup> | >83                 |
| Flex strength (CD)           | IPC-650 2.4.4    | lbs./inch        | >10,000             | N/mm <sup>2</sup> | >69                 |
| Peel Strength (CH)           | IPC-650 2.4.8    | lbs./linear inch | 10.0                | N/mm              | 1.75                |
| T <sub>d</sub> (2% Wt. Loss) |                  | ° F              | >932                | ° C               | >500                |
| Melt Point                   |                  | ° F              | 620                 | ° C               | 327                 |
| Thermal Conductivity         | ASTM F 433       | W/m/K            | 0.22                | W/m/K             | 0.22                |
| CTE (X-Y axis)               | ASTM D 3386      | ppm/°C           | 20                  | ppm/°C            | 20                  |
| CTE (Z axis)                 | ASTM D 3386      | ppm/°C           | 280                 | ppm/°C            | 280                 |

| Designation | Dk            |
|-------------|---------------|
| TLP-5A      | 2.17 +/-0.03  |
| TLP-5       | 2.20 +/- 0.03 |
| TLP-3       | 2.33 +/- 0.03 |

| Typical Thicknesses <sup>1</sup> |      |
|----------------------------------|------|
| Inches                           | mm   |
| 0.0050                           | 0.13 |
| 0.0100                           | 0.25 |
| 0.0200                           | 0.51 |
| 0.0310                           | 0.78 |

| Available Sheet Sizes <sup>2</sup> |            |
|------------------------------------|------------|
| Inches                             | mm         |
| 12 x 18                            | 304 x 457  |
| 16 x 18                            | 406 x 457  |
| 18 x 24                            | 457 x 610  |
| 16 x 36                            | 406 x 914  |
| 24 x 36                            | 610 x 914  |
| 18 x 48                            | 457 x 1220 |

<sup>1</sup>Other thicknesses may be available. Please call for information.

<sup>2</sup>Our standard sheet size is 36" x 48" (457 mm x 610 mm). Please contact our customer service department for availability of other sizes.

| Available Copper Cladding |                          |                  |        |                              |        |                                     |
|---------------------------|--------------------------|------------------|--------|------------------------------|--------|-------------------------------------|
| Designation               | Weight                   | Copper Thickness |        | R <sub>MS</sub> Treated Side |        | Description                         |
| CVH (CH)                  | 1/2 oz / ft <sup>2</sup> | ~0.0007"         | ~18 μm | 27 μin                       | 0.7 μm | Very low profile / Electrodeposited |
| CVI (C1)                  | 1 oz / ft <sup>2</sup>   | ~0.0014          | ~35 μm | 25 μin                       | 0.6 μm | Very low profile / Electrodeposited |

Heavy metal claddings (aluminum, brass & copper) may also be available upon request. Please call for information.

An example of our part number is: TLP-005-CVH/CVH - 18" x 24" (457 mm x 610 mm)



All reported values are typical and should not be used for specification purposes. In all instances, the user shall determine suitability in any given application.