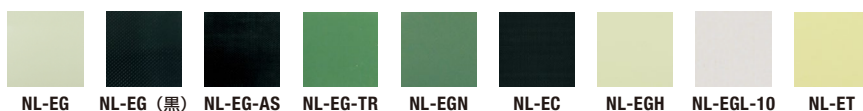


## エポキシ樹脂積層板

## Epoxy Resin Laminated Sheets



一般にエポキシ樹脂は、絶縁性、耐湿性、寸法安定性、耐薬品性、接着性が良く、特に耐アルカリ性に優れています。ガラス布基材の製品には一般品(G-10)に加え、難燃タイプ(FR-4)と耐熱タイプ(G-11)があり、機械強度、電気特性、低吸水性、耐薬品性に優れています。また、耐トラッキング性や耐静電特性、軽量化等、用途に応じた様々な特性を付加したのもラインアップしています。カーボンクロス基材のものは、強度、弾性に優れ、またテロン布基材のものは耐水性、高周波依存性、打ち抜き性、耐摩耗性に優れています。電装部品や重電機部品(トランス・発電機)などに使用されています。

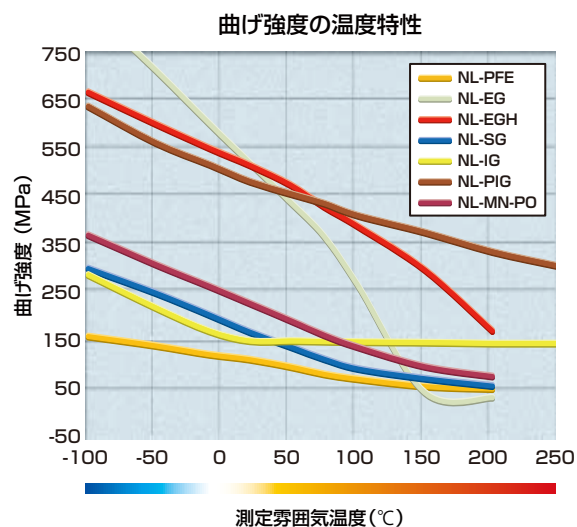
Generally, epoxy resin has excellent insulation performance, moisture resistance, dimensional stability, chemical resistance, adhesion properties, and especially alkaline resistance. In addition to general epoxy resin product with glass fiber cloth (G-10), we also have flame resistant grade (FR-4) and heat resistant grade (G-11). These products have excellent mechanical strength, electrical performance, low water absorption and chemical resistance. The products made with carbon cloth have excellent strength and elasticity; while the products made with tetron cloth have excellent water resistance, high frequency dependence, punching quality, abrasion resistance and SF6 gas resistance. They have applications such as electric equipment and heavy electric machinery (e.g. transformers, dynamos).

### ● 低温・加熱時の曲げ強さのグラフ

### Chart of flexural strength at low temperature and high temperature

各雰囲気温度での曲げ強度のグラフです。一般的に低温域では温度が下がるほど強度は上がり、結露等に注意すれば絶縁材として-100℃でも使用は可能です。特にエポキシ系、ポリイミド系の積層板は機械的強度に優れています。ただ、200℃を超える高温域では材質により強度の低下もあり、シリコン系や無機質系の積層板をお勧めします。高温域では材質により強度の低下が大きいものもあり注意が必要です。

This chart shows flexural strengths at each ambient temperature. In general, the lower the temperature drops, the stronger the mechanical strength becomes at low-temperature range. It can be used at -100 degrees Celsius as long as you pay attention to dew condensation. Our products, especially laminated sheets with epoxy resin system and polyimide resin system, have outstanding mechanical strength. However, the mechanical strengths of these materials decrease at 200 degrees Celsius or higher. We recommend the products with silicone resin system or inorganic resin system at high-temperature range. Caution should be used in some of the materials at high-temperature range as their mechanical strengths decrease drastically.



### ● UL・耐燃性について

### UL / Flame resistant properties

UL(UNDERWRITERS LABORATORIES,INC)は、米国の火災保険業者によって1894年に設立された試験機関です。材料や部品の耐燃性に関する規格で、事故防止や安全管理の観点から、積層板に関しても、家電製品や電子機器、重電設備に採用されるには、その認定が重要な条件となっております。規定の燃焼試験での試験片の燃焼時間や燃焼距離により、耐燃性は認定されます。弊社でもUL94V-0認定の積層板を多数そろえておりますので、各種の用途に応じご利用ください。また、弊社製品ではJISや鉄道車両用燃焼試験の耐燃性相当品も取り揃えております。

UL (UNDER WRITERS LABORATORIES INC.) is a global safety consulting and certification company headquartered in USA, established in 1894. One of their notable certificates is specific standard for flame resistant properties of material or parts. The certification is very important precondition to be accepted as parts for electrical devices and components in the context of accident prevention and safety control. The flame resistant is certified by satisfying certain standard of the flame test regarding burning time and burning distance of specimen. We have wide range of UL94V-0 certified laminated-sheet products to meet your various requisitions. Also, we have products equivalent to JIS flame resistant or flame resistant test of Japan railway rolling stock & machinery.