



# THE GUND COMPANY

MANUFACTURERS & FABRICATORS OF ENGINEERED MATERIAL SOLUTIONS

## TRANSFORMER MATERIAL COMPARATIVE DATA SHEET

| Product Grade                | The Gund Co          | Kraft Paper      | S2S Hardboard                      | Pressboard HD             | Pressboard LD             | Ranprex Laminated Wood   | HP1 Low Power Factor | G-10        | G-11H       | Threaded Rods & Nuts  | Nomex 410        | G-Flex™ Meta-Aramid Paper YT510 | Dogbone (Rod) NTR N155/N220       | GPO-3           | U205            | AP0-1           | N155                        | N220                        | Filament Wound Tube | Tapes (Intertape) |
|------------------------------|----------------------|------------------|------------------------------------|---------------------------|---------------------------|--------------------------|----------------------|-------------|-------------|-----------------------|------------------|---------------------------------|-----------------------------------|-----------------|-----------------|-----------------|-----------------------------|-----------------------------|---------------------|-------------------|
|                              | NEMA                 | --               | --                                 | --                        | --                        | --                       | HP1                  | G-10        | G-12        | G-12                  | --               | --                              | --                                | GPO-3           | GPO-5           | GPO-1           | GPO-1                       | GPO-1                       | --                  | --                |
|                              | IEC                  | --               | --                                 | IEC 60641-3-1 Type B 3.1A | IEC 60641-3-1 Type B 2.1A | C2R                      | --                   | EPGC 201    | EPGC 308    | EPGC 308              | --               | --                              | --                                | UPGM 203        | UPGM 205        | UPGM 202        | UPGM 201                    | UPGM 201                    | --                  | --                |
| Construction                 |                      | Cellulosic Paper | Compressed Wood Fiber (Cellulosic) | Cellulosic Board          | Cellulosic Board          | Densified Laminated Wood | Paper Phenolic       | Glass Epoxy | Glass Epoxy | Glass Epoxy           | Aramid Paper     | Aramid Paper                    | High - Temp Pultruded Glass Fiber | Glass Polyester | Glass Polyester | Glass Polyester | High - Temp Glass Polyester | High - Temp Glass Polyester | Glass Epoxy         |                   |
| Standard Thickness           | in.                  | 0.008 - 4.000    | 0.125, 0.187, 0.220                | 0.03 - 0.23               | 0.04 - 0.125              | 0.393 - 4.724            | 0.125 - 2.000        | .006 - 5.00 | .006 - 5.00 | --                    | .002 - .03       | .002 - .03                      | --                                | 0.118 - 2.000   | 0.118 - 2.362   | 0.031 - 2.000   | 0.031 - 2.000               | 0.031 - 2.000               | --                  |                   |
|                              | mm                   | 0.2 - 101.6      | 3, 4.75, 5.6                       | 0.8 - 6.0                 | 1.0 - 3.0                 | 10 - 120                 | 3.18 - 50.8          | 0.15 - 127  | 0.15 - 127  | M10 - 1.5 - M20 - 2.5 | 0.05 - 0.76      | 0.05 - 0.76                     | --                                | 3 - 50.8        | 3 - 60          | 0.79 - 50.8     | 0.79 - 50.8                 | 0.79 - 50.8                 | --                  |                   |
| Mechanical Properties        | Units                |                  |                                    |                           |                           |                          |                      |             |             |                       |                  |                                 |                                   |                 |                 |                 |                             |                             |                     |                   |
| Tensile Strength, Lengthwise | ksi                  | 14               | 6.6                                | 18                        | 13                        | --                       | 21                   | --          | 41          | 41                    | 12 <sup>1</sup>  | 12 <sup>1</sup>                 | 60                                | 9               | 21.75           | 9.5             | 12                          | 11                          | --                  |                   |
| Compressive Strength         | ksi                  | 30               | 12.7                               | --                        | --                        | 75                       | 45                   | --          | 70          | 70                    | --               | --                              | 45                                | 33              | 60              | 33              | 40                          | 32                          | 20                  |                   |
| Flexural Strength, LW        | ksi                  | 20               | 6.2                                | --                        | --                        | 160                      | 33                   | 80          | 80          | 80                    | --               | --                              | 80                                | 23              | 37.7            | 20              | 26                          | 32                          | --                  |                   |
| Shear Strength               | ksi                  | 12.8             | 6.4                                | --                        | --                        | --                       | --                   | 25          | --          | --                    | --               | --                              | 3                                 | 13              | --              | 13              | --                          | 12                          | --                  |                   |
| IZOD Impact Strength, LW     | ft.-lbs./in.         |                  | 1.6                                | --                        | --                        | 41                       | 2                    | 15          | 11          | --                    | --               | --                              | 40                                | 9.3             | 54.72           | 8.5             | 9.5                         | 11.0                        | --                  |                   |
| Electrical Properties        | Units                |                  |                                    |                           |                           |                          |                      |             |             |                       |                  |                                 |                                   |                 |                 |                 |                             |                             |                     |                   |
| Arc Resistance               | Seconds              | --               | --                                 | --                        | --                        | --                       | --                   | 130         | --          | --                    | --               | --                              | 180                               | 192             | --              | 180             | 150                         | 180                         | --                  |                   |
| Dielectric Strength          | ⌊ V/mil              | 700              | 362                                | 965                       | 825                       | 7000 - 20000             | 680                  | 485         | 485         | 485                   | 460 <sup>1</sup> | 406 <sup>1</sup>                | --                                | 550             | 331             | 450             | 450                         | 550                         | 250                 |                   |
| Breakdown Voltage            | kV                   | 40               | 44                                 | --                        | --                        | >80                      | 45                   | 50          | --          | > 45                  | --               | 0.81                            | 70                                | 50              | 38              | > 40            | 30                          | 50                          | --                  |                   |
| Physical Properties          | Units                |                  |                                    |                           |                           |                          |                      |             |             |                       |                  |                                 |                                   |                 |                 |                 |                             |                             |                     |                   |
| Specific Gravity             | lb./in. <sup>3</sup> | --               | 0.125                              | 0.0420                    | 0.0380                    | 0.025 - 0.050            | 0.0545               | 0.067       | 0.069       | 0.069                 | 0.026            | 0.028                           | 1.9                               | 0.065           | 1.9             | 0.066           | 0.066                       | 0.061                       | 0.065"- 0.72"       |                   |
| Thermal Properties           | Units                |                  |                                    |                           |                           |                          |                      |             |             |                       |                  |                                 |                                   |                 |                 |                 |                             |                             |                     |                   |
| Relative Temperature Index   | °C                   | 105              | 105                                | --                        | --                        | 105                      | 105                  | 130         | 180         | 180                   | 220              | 210                             | 155 - 220                         | 130             | 155             | 130             | 155                         | 210                         | 130,180             |                   |
| Flame Resistance             | Class                | UL 94 HB         | --                                 | --                        | --                        | --                       | --                   | UL 94 HB    | UL 94 HB    | UL 94 V-0             | UL 94 V-0        | VTM 0                           | --                                | UL 94 V-0       | UL 94 V-0       | UL94 HB         | UL 94 V-0                   | E323105                     | UL 94 HB            |                   |

1: Material property at 2mil thickness

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