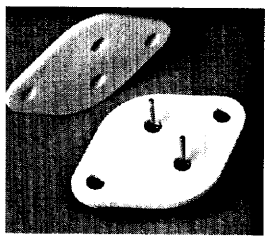


# BERYLLIUM OXIDE CERAMIC

Beryllium oxide insulators have a high dielectric strength, which allows safe operating voltages of 1500 volts or more. For applications involving high frequency or high pulse rate circuitry, the inherent low electrical capacitance of these insulators prevents circuit detuning and loss of signal power.

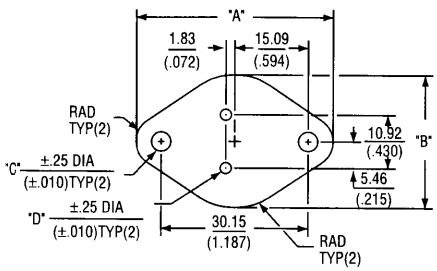
Beryllium oxide insulators have a dielectric strength of approximately 22.8 x $10^3$ volts/mm for .81 mm material (580 volts/mil for .032" material), and 17.7 x $10^3$ volts/mm for 1.57 mm material (450 volts/mil for .062 material). The thermal conductivity of beryllium oxide is 221.94 $Wm^{-1}°C^{-1}$ (128.2 Btu/hr·ft·°F).

Beryllium oxide is chemically inert and completely safe to use in its fired state. Handling of finished parts presents absolutely no health hazards.

Beryllium oxide, however, is toxic when dust, mist, or fumes containing particles small enough to enter the lungs are inhaled. Therefore, grinding, sanding, and pulverizing the material should be avoided.

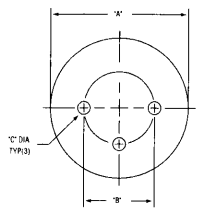
## FOR TO-3

**PART NO. 4003 THICKNESS .062 (1.57)**
**PART NO. 4003-1 THICKNESS .032 (.81)**



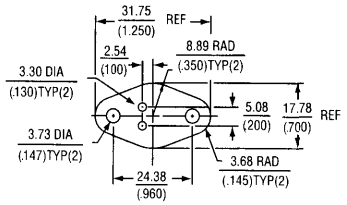

## FOR TO-5 AND TO-18

| Part No. | A | B | C | Thickness |
|---|---|---|---|---|
| 4005 (TO-5) | 9.14 (.360) | 5.08 (.200) | 1.02 (.040) | .76 (.030) |
| 4005-15 (TO-5) | 9.14 (.360) | 5.08 (.200) | 1.02 (.040) | .38 (.015) |
| 4018 (TO-18) | 5.59 (.220) | 2.54 (.100) | 1.02 (.040) | .76 (.030) |



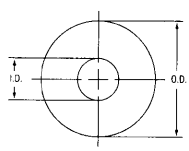

## FOR TO-66

**PART NO. 4066 THICKNESS .062 (1.57)**




## MOUNTING WASHERS

| Part No. | O.D. | I.D. | Thickness |
|---|---|---|---|
| B-250-130-62 | 6.35 ± .13 (.250 ± .005) | 3.30 ± .13 (.130 ± .005) | 1.57 ± .25 (.062 ± .010) |
| B-375-120-30 | 9.52 ± .13 (.375 ± .005) | 3.05 ± .13 (.120 ± .005) | .76 ± .13 (.030 ± .005) |
| B-375-120-62 | 9.52 ± .13 (.375 ± .005) | 3.05 ± .13 (.120 ± .005) | 1.57 ± .25 (.062 ± .010) |
| B-470-235-40 | 11.94 ± .13 (.470 ± .005) | 5.97 ± .13 (.235 ± .005) | 1.02 ± .13 (.040 ± .005) |
| B-510-200-40 | 12.95 ± .25 (.510 ± .010) | 5.08 ± .25 (.200 ± .010) | 1.02 ± .13 (.040 ± .005) |
| B-800-260-30 | 20.32 ± .25 (.800 ± .010) | 6.60 ± .13 (.260 ± .005) | .76 ± .08 (.030 ± .003) |
| B-800-260-62 | 20.32 ± .25 (.800 ± .010) | 6.60 ± .13 (.260 ± .005) | 1.57 ± .13 (.062 ± .005) |




## BERYLLIUM OXIDE

| PROPERTY | TYPICAL VALUE | TEST METHOD |
|---|---|---|
| | ***CHEMICAL*** | |
| BeO Content | 99.5% min. | Spectrographic Analysis (100%-% by wt. of total metallic impurity) |
| | ***ELECTRICAL*** | |
| Dielectric Constant 25°C (77°F) | 6.5 (1 MHz)<br>6.6 (10 GHz) | ASTM D150<br>ASTM D2520 |
| Dissipation Factor 25°C (77°F) | 0.0004 (1 MHz)<br>0.0004 (10 GHz) | ASTM D150<br>ASTM D2520 |
| Electrical Resistivity (25°C (77°F) | >$10^{15}$ ohm-cm | ASTM D257-61 |
| Dielectric Strength | 22.8 x $10^3$ volts/mm (.81mm) [580 volts/mil (.032")] | ASTM D149-64 |
| | ***PHYSICAL*** | |
| Density | 2.85 $g/cm^3$ (min.)<br>177.93 $Lb/ft^3$ (min.) | ASTM C373-56<br>ASTM F77-67T |
| Hardness | 60 minimum<br>(Rockwell 45 N) | ASTM E-18-67 |
| | ***MECHANICAL*** | |
| Flexural Strength 25°C (77°F) | 2.27 x $10^8$ Pa(min.)<br>( 33,000 psi min.) | ASTM Microbar 8D25<br>ASTM D2442-70, A3 |
| Modulus of Elasticity | 3.45 x $10^{11}$ Pa (50 x $10^6$ psi) | ASTM D2442-70, A4 |
| Poisson's Ratio | 0.26 | ASTM D2442-70, A4 |
| Tensile Strength 25°C (77°F) | 1.52 x$10^8$ Pa(22,000 psi) | ASTM 565-65T |
| Compressive Strength 25°C (77°F) | 1.55 x $10^9$ Pa (225,000 psi) | ASTM C528 |
| | ***THERMAL*** | |
| Coefficient of Thermal Expansion | 9.0 x $10^{-6}$/° C<br>5.0 x $10^{-6}$/°F | ASTM E-228<br>ASTM C-372-56<br>ASTM C-327-56 |
| Thermal Conductivity | 251.26 $Wm^{-1}°C^{-1}$ (25° C) [145.14 Btu/hr·ft·°F(77°F)]<br>188.44 $Wm^{-1}°C^{-1}$ (100° C) [108.86 Btu/hr·ft·°F(212°F)]<br>146.57 $Wm^{-1}°C^{-1}$ (150° C) [84.67 Btu/hr·ft·°F(302°F)] | ASTM C-408-62 |
| Specific Heat | 1.0 x$10^{-3}$KJ/Kg·°C(2.5 x $10^{-4}$ Btu/Lb·°F) | ASTM C-351-61 |
| Melting Point | 2552° C(4625° F) | |
| Maximum Temperature for Continuous Use | 2149° C(3900° F) | |