



NGK BERYLCO

www.ngk-alloys.com

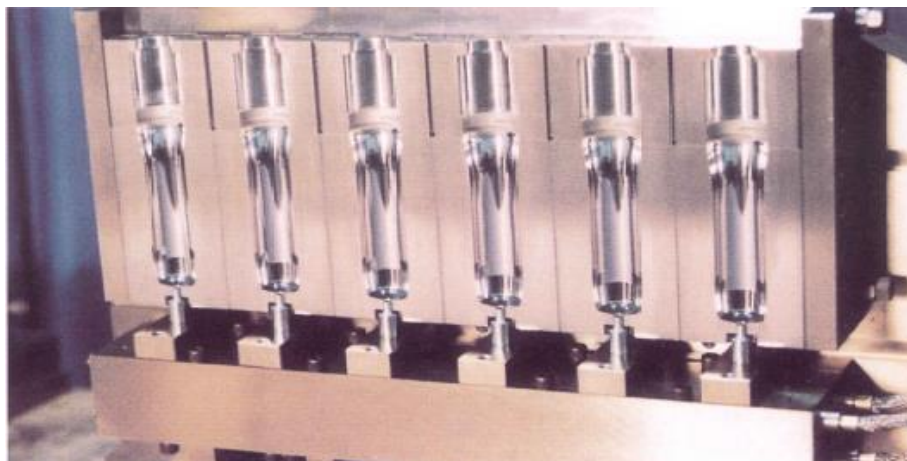
Beryllium Copper Rod and Plate For The Plastics Industry



World Class Quality For A Global Marketplace

NGK PLUS, SUPRA and ULTRA Performance Attributes

NGK PLUS, SUPRA and ULTRA Products are recognized as excellent mold alloys for the plastic industry as injection molds and tooling for blow molds. They are known to produce superior quality plastic parts with minimum total production costs over other competing mold materials.



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This is due to its optimum combination of hardness, wear resistance, thermal fatigue, and thermal conductivity. Plate products are available in three grades from two alloy systems:

- ▶ PLUS – A higher conductivity, lower hardness beryllium copper alloy.
- ▶ SUPRA – A medium conductivity, medium hardness beryllium copper alloy.
- ▶ ULTRA – A lower conductivity, higher hardness beryllium copper alloy.

| CHEMISTRY | | | |
|-------------------------------|-----------------|-------------------------------|---|
| Trade Name | UNS Designation | Chemistry (Wt.%) | |
| NGK PLUS | C17510 | Be Ni Cu | 0.20-0.6% 1.40-2.20% Balance |
| NGK SUPRA and NGK ULTRA | C17200 | Be Ni+Co Ni+Co+Fe Cu | 1.80-2.00% 0.20% min 0.60% max Balance |

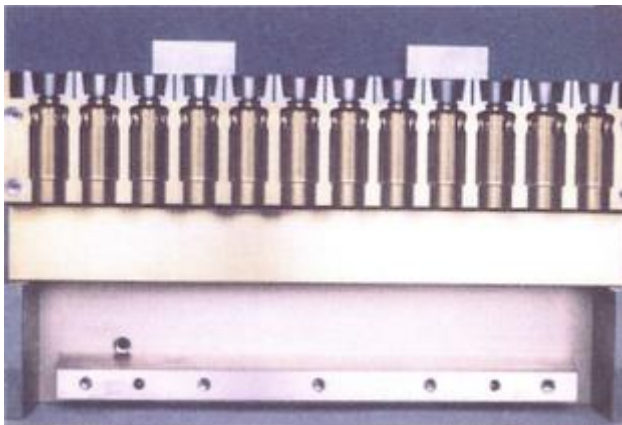
| TYPICAL PROPERTIES | | | | | | |
|--------------------|------------------------------------|---|--|---|---|-------------------|
| | Thermal Conductivity (W/m°C) | Coefficient of Thermal Expansion (/°C) | Modulus of Elasticity (N/mm ²) | Rockwell Hardness B or C scale | Tensile Strength (N/mm ²) | Elongation (%) |
| NGK PLUS | 245 | 17.6 x 10 ⁻⁶ | 132000 | B95-102 | 800 | 3 |
| NGK SUPRA | 131 | 17.8 x 10 ⁻⁶ | 127000 | C25-32 | 1100 | 15 |
| NGK ULTRA | 105 | 17.8 x 10 ⁻⁶ | 127000 | C36-42 | 1200 | 7 |

Typical Applications

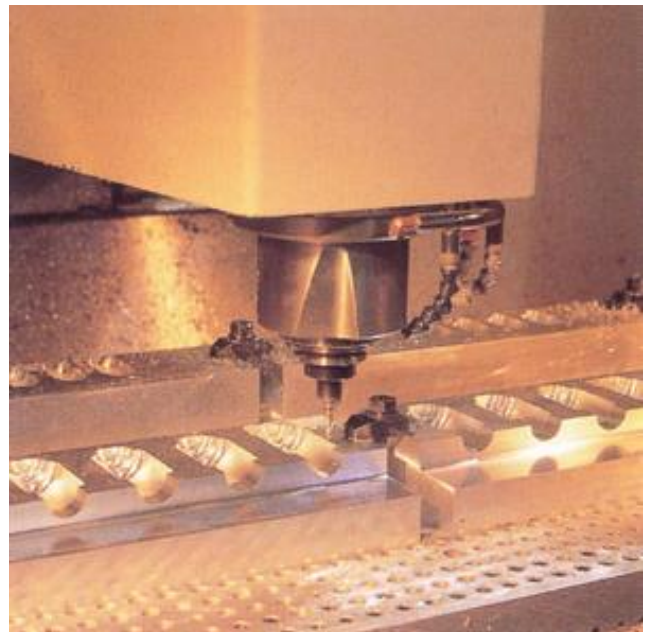
| PLUS | SUPRA & ULTRA |
|---|---|
| <ul style="list-style-type: none"> • Low pressure blow molds • Limited applications for injection molds • Inserts in steel & aluminum molds for higher cooling rates at critical areas • Sealing tools • Cooling inserts • Plungers for the die casting of light metals • Nozzles & needles for hot runner systems | <ul style="list-style-type: none"> • Injection molds & high pressure blow molds • Inserts in steel molds for higher cooling rates at critical areas • Inserts in aluminum molds for higher strength & wear resistance • Cooling inserts • Nozzles & needles for hot runner systems |

Performance

| PLUS | SUPRA | ULTRA |
|--|--|---|
| <ul style="list-style-type: none"> • Moderate in strength • Provides the best conductivity of all materials • Higher in strength than aluminum • Can be used as a total mold system or as an insert in other molds | <ul style="list-style-type: none"> • Provides good wear resistance • Improved machinability • Can be used as a total mold system or as an insert in other molds | <ul style="list-style-type: none"> • Higher hardness than SUPRA • Recommended where greater resistance and higher operating pressures are required • Can be used as a total mold system or as an insert in other molds |

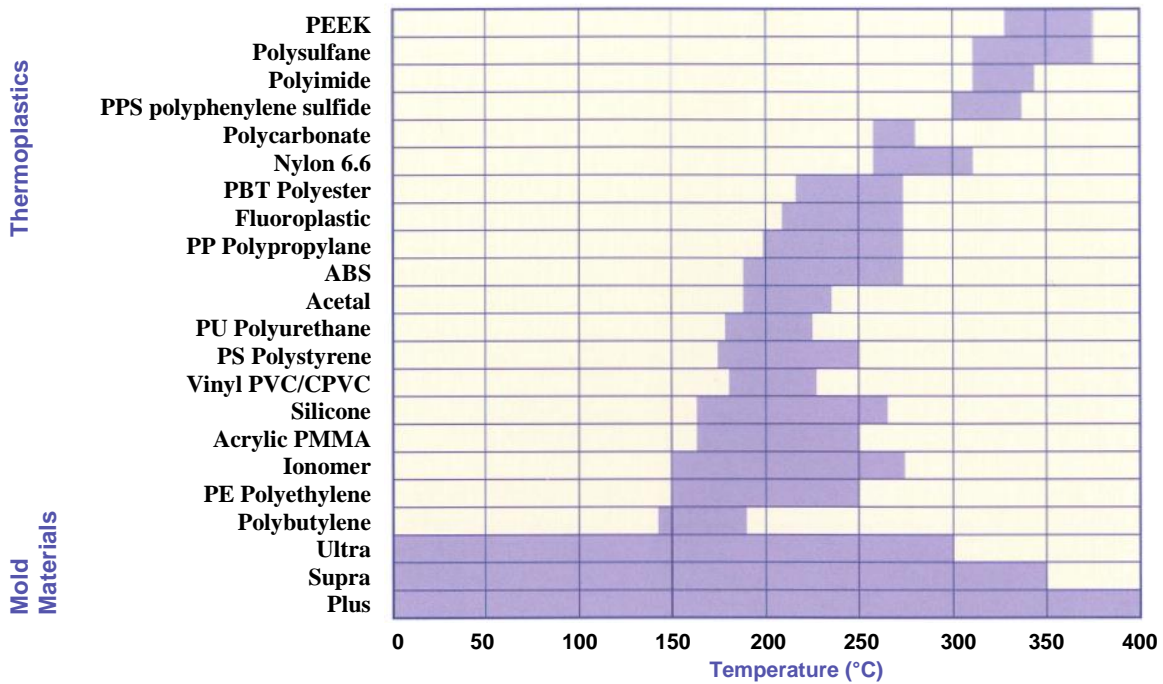


The machinability and polishability of NGK PLUS, SUPRA and ULTRA Plate are a must for cosmetic requirements.

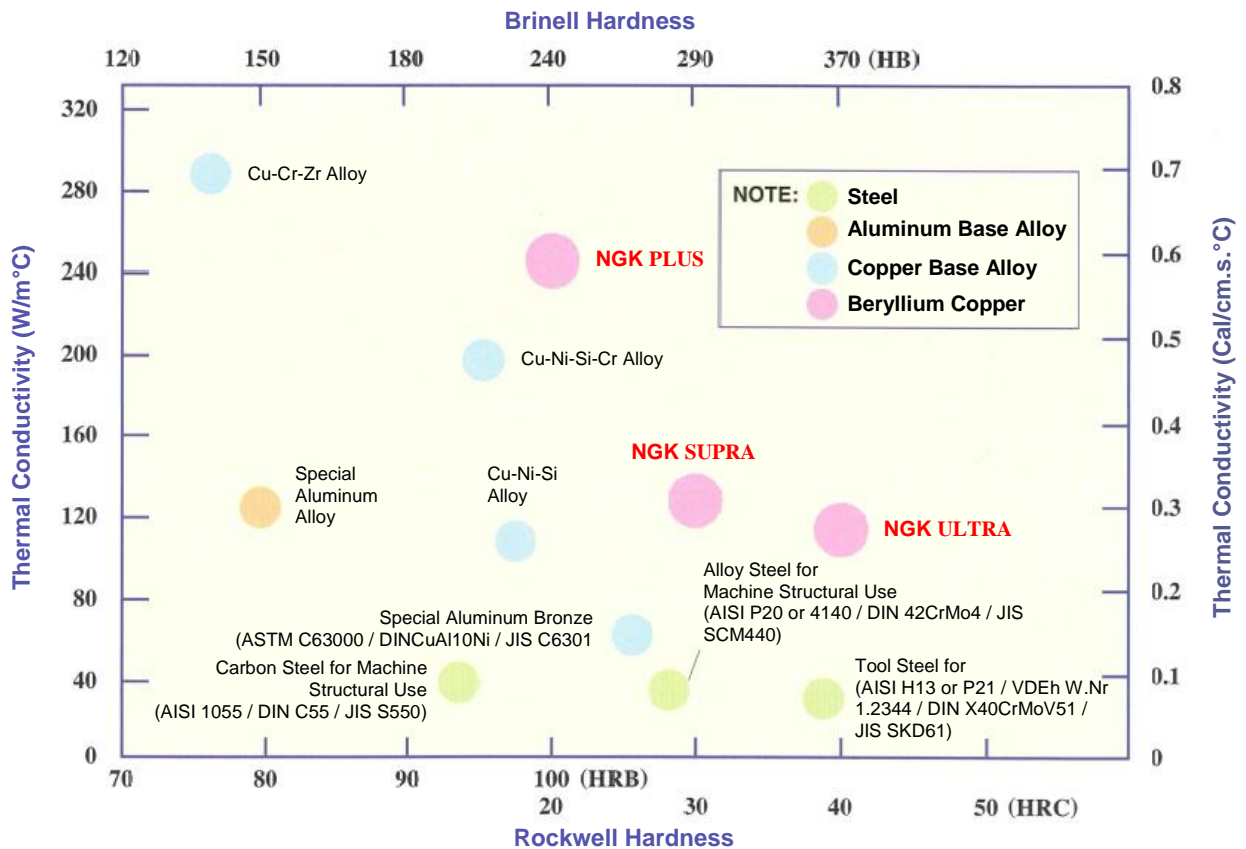


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Working Temperatures PLUS, SUPRA and ULTRA Plate and Plastic Processing Temperatures



Mold Material Comparison Thermal Conductivity - Hardness



Avaibility

■ Plates

| Thickness (mm) | Tolerance (mm) | Max. width (mm) | Max. length (mm) |
|----------------|----------------|-----------------|------------------|
| 20 – 300 | +1 / 0 | 500 | 2000 |

Other thickness can be made available as required.

■ Rods

Most alloys and tempers are available in sizes from 1mm diameter – 300mm diameter



© Photo courtesy of Compact Mould Ltd.

Machining Guidelines

| | Tool | Condition | NGK ULTRA | NGK SUPRA | NGK PLUS |
|----------------|------------------------------|---------------------|--------------|--------------|-------------|
| Rough turning | SANDVIK T-Max P | Speed (m/min) | 300-500 | | |
| | | Feed (mm/rev) | 0.2-0.4 | | |
| | | Cut (mm) | 1.0-1.5 | | |
| Finish turning | SANDVIK CoroTurn107 | Speed (m/min) | 300-500 | | |
| | | Feed (mm/rev) | 0.1-0.2 | | |
| | | Cut (mm) | 0.5 | | |
| End Milling | SANDVIK MaxBall | Speed (m/min) | 9000 | 10000 | 12000 |
| | | Feed (mm/tooth) | 0.2 | 0.2 | 0.2 |
| | | Table feed (mm/min) | 5400 | 6000 | 7200 |
| | | XY Cut (mm) | 0.3 | 0.3 | 0.3 |
| | | Z Cut (mm) | 0.3 | 0.3 | 0.3 |
| Drilling | SANDVIK Corodrill Delta C | Speed (m/min) | 100-200 | 100-200 | 150-200 |
| | | Feed (mm/rev) | 0.1-0.2 | 0.1-0.15 | 0.1-0.15 |

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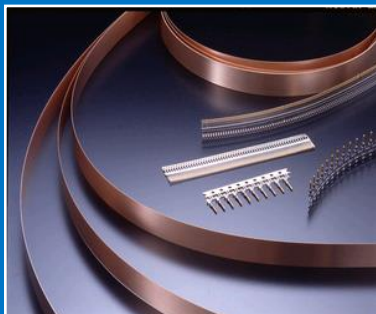
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