# Zytel® HTN52G35EF BK420

## HIGH PERFORMANCE POLYAMIDE RESIN

Zytel® HTN high performance polyamide resins feature high retention of properties upon exposure to elevated temperature, to high moisture, and to harsh chemical environments. Polymer families and grades of Zytel® HTN are tailored to optimize performance as well as processability.

Typical applications with Zytel® HTN include demanding applications in the automotive, electrical and electronics, domestic appliances, and construction industries.

Zytel® HTN52G35EF BK420 is a 35% glass reinforced, heat stabilized, lubricated high performance polyamide resin that can be molded in water heated molds, developed for electrical and electronics applications. It is also a PPA resin.

## Product information

| | | |
|---|---|---|
| Resin Identification | PA6T/66-GF35 | ISO 1043 |
| Part Marking Code | >PA6T/66-GF35< | ISO 11469 |
| Part Marking Code | >PPA-GF35< | SAE J1344 |
| ISO designation | ISO 16396-PA6T/66,GF35,M1CGHR,S10-120 | |
| TGA curve | available | ISO 11358-1 |

## Rheological properties

| | dry/cond. | | |
|---|---|---|---|
| Viscosity number | 3320 / * | in³/lb | ISO 307, 1628 |
| Molding shrinkage, parallel | 0.3 / - | % | ISO 294-4, 2577 |
| Molding shrinkage, normal | 0.9 / - | % | ISO 294-4, 2577 |

## Typical mechanical properties

| | dry/cond. | | |
|---|---|---|---|
| Tensile modulus | 1.74E6 / 1.74E6[DS] | psi | ISO 527-1/-2 |
| Tensile stress at break, 5mm/min | 30500 / 26100 | psi | ISO 527-1/-2 |
| Tensile strain at break, 5mm/min | 2.6 / 2.6 | % | ISO 527-1/-2 |
| Flexural modulus | 1.51E6 / - | psi | ISO 178 |
| Flexural strength | 42100 / - | psi | ISO 178 |
| Charpy impact strength, 23°C | 28.5 / - | ftlb/in² | ISO 179/1eU |
| Charpy notched impact strength, 23°C | 4.76 / - | ftlb/in² | ISO 179/1eA |

[DS]: Derived from similar grade

## Thermal properties

| | dry/cond. | | |
|---|---|---|---|
| Melting temperature, 10°C/min | 597 / * | °F | ISO 11357-1/-3 |
| Melting temperature, first heat | 590 / * | °F | ISO 11357-1/-3 |
| Glass transition temperature, 10°C/min | 194 / 113 | °F | ISO 11357-1/-3 |
| Temperature of deflection under load, 1.8 MPa | 545 / * | °F | ISO 75-1/-2 |
| Coefficient of linear thermal expansion (CLTE), parallel | 0.11 / * | E-4/°F | ISO 11359-1/-2 |
| Coefficient of linear thermal expansion (CLTE), normal | 0.361 / * | E-4/°F | ISO 11359-1/-2 |
| Thermal conductivity of melt | 0.24 | W/(m K) | ISO 22007-2 |

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### Flammability

| | dry/cond. | | |
|---|---|---|---|
| Oxygen index | 23 / * | % | ISO 4589-1/-2 |
| Glow Wire Flammability Index, 3.0mm | 1760 / - | °F | IEC 60695-2-12 |
| Glow Wire Ignition Temperature, 3.0mm | 1470 / - | °F | IEC 60695-2-13 |
| FMVSS Class | B | | ISO 3795 (FMVSS 302) |
| Burning rate, Thickness 1 mm | 1.73 | in/min | ISO 3795 (FMVSS 302) |

### Electrical properties

| | dry/cond. | | |
|---|---|---|---|
| Relative permittivity, 100Hz | 4.3 / - | | IEC 62631-2-1 |
| Relative permittivity, 1MHz | 4.2 / - | | IEC 62631-2-1 |
| Dissipation factor, 1MHz | 147 / - | E-4 | IEC 62631-2-1 |
| Volume resistivity | >1E13 / - | Ohm.m | IEC 62631-3-1 |
| Surface resistivity | * / >1E15 | Ohm | IEC 62631-3-2 |
| Electric strength | 787 / 762 | kV/in | IEC 60243-1 |
| Comparative tracking index | 600 / - | | IEC 60112 |
| Dielectric Constant, 1 GHz | 3.82 / -[OT] | | ASTM D 2520 B |
| Dielectric Constant, 23°C, 10 GHz | 3.92 / -[OT] | | ASTM D 2520 B / IPC-TM-650 |
| Dissipation Factor, 1 GHz | 124 / -[OT] | E-4 | ASTM D 2520 B |
| Dissipation Factor, 23°C, 10 GHz | 113 / -[OT] | E-4 | ASTM D 2520 B / IPC-TM-650 |

[OT]: One time tested

### Physical/Other properties

| | dry/cond. | | |
|---|---|---|---|
| Humidity absorption, 2mm | 2 / * | % | Sim. to ISO 62 |
| Water absorption, Immersion 24h | 0.4 / *[DS] | % | Sim. to ISO 62 |
| Density | 0.0523 / - | lb/in³ | ISO 1183 |
| Density of melt | 68.7 | lb/ft³ | |

[DS]: Derived from similar grade

### Injection

| | | |
|---|---|---|
| Drying Recommended | yes | |
| Drying Temperature | 212 | °F |
| Drying Time, Dehumidified Dryer | 6 - 8 | h |
| Processing Moisture Content | ≤0.1 | % |
| Melt Temperature Optimum | 617 | °F |
| Min. melt temperature | 608 | °F |
| Max. melt temperature | 626 | °F |
| Mold Temperature Optimum | 203 | °F |
| Min. mold temperature | 185 | °F |
| Max. mold temperature | 221 | °F |
| Hold Pressure Time<br>(h is the max. wall thickness of the part in mm) | $h^2$+2 | s |
| Ejection temperature | 504 | °F |

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## Automotive

| OEM | STANDARD | ADDITIONAL INFORMATION |
|---|---|---|
| Hyundai | MS941-03 Type N-4 | |
| Renault-Nissan | UB23, No Spec, Special Part Approval, See Your CE Account Manager. | |
| Stellantis | B62 0300 / 61/223E-217M | 01378_19_02658 |

## Characteristics

| | |
|---|---|
| Processing | Injection Molding |
| Additives | Release agent |
| Special characteristics | Heat stabilized or stable to heat |

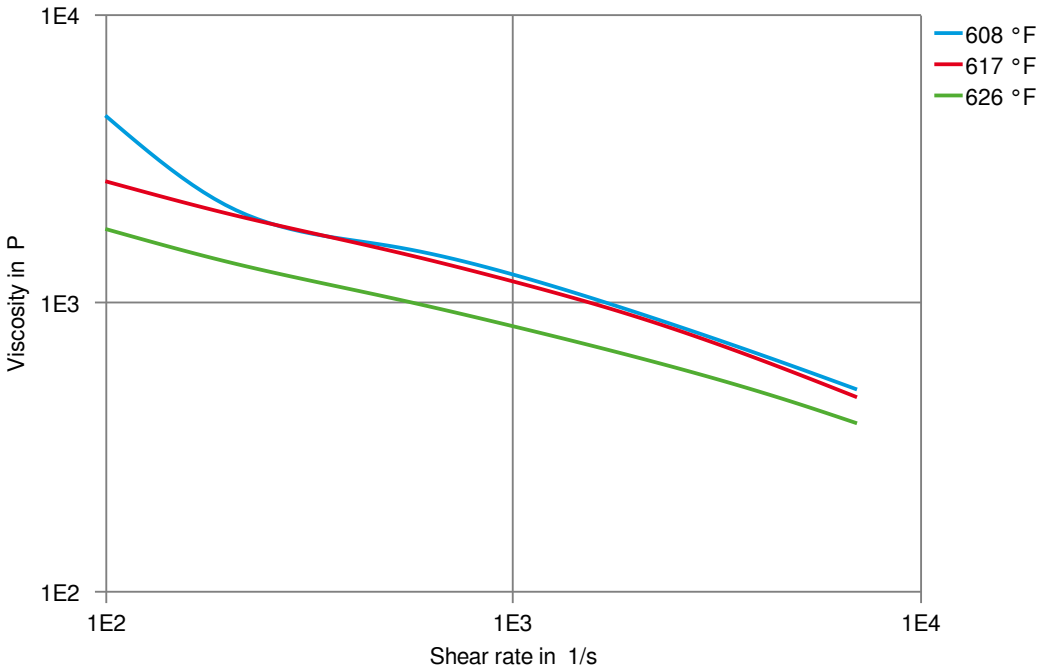
## Additional information

| | |
|---|---|
| Injection molding | During molding, use proper protective equipment and adequate ventilation. Avoid exposure to fumes and limit the hold up time and temperature of the resin in the machine. Purge degraded resin carefully with HDPE. |

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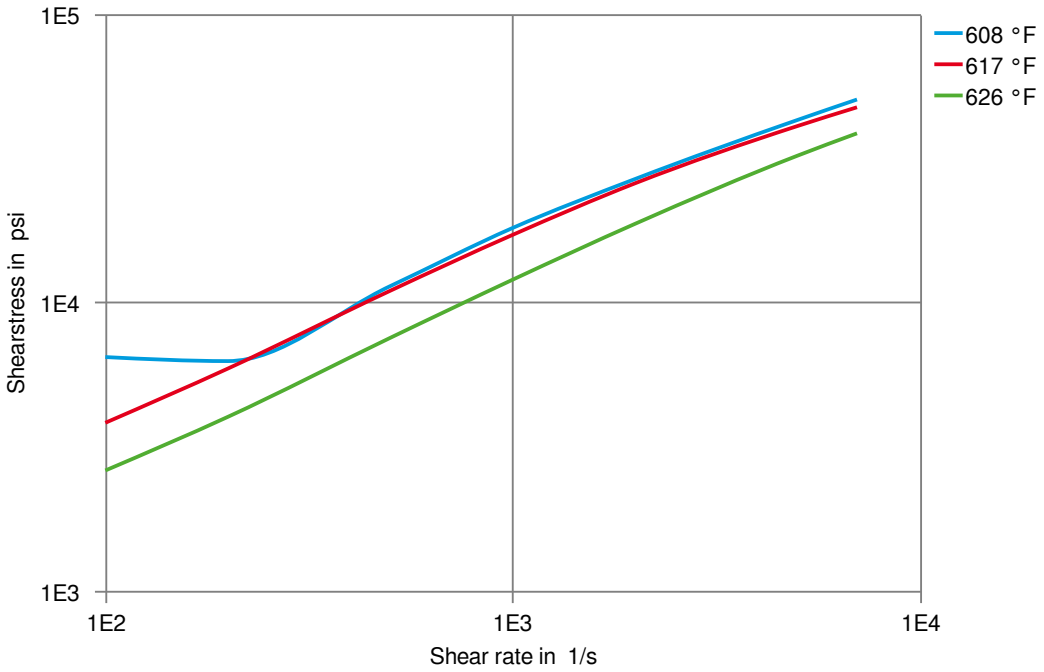
### Viscosity-shear rate



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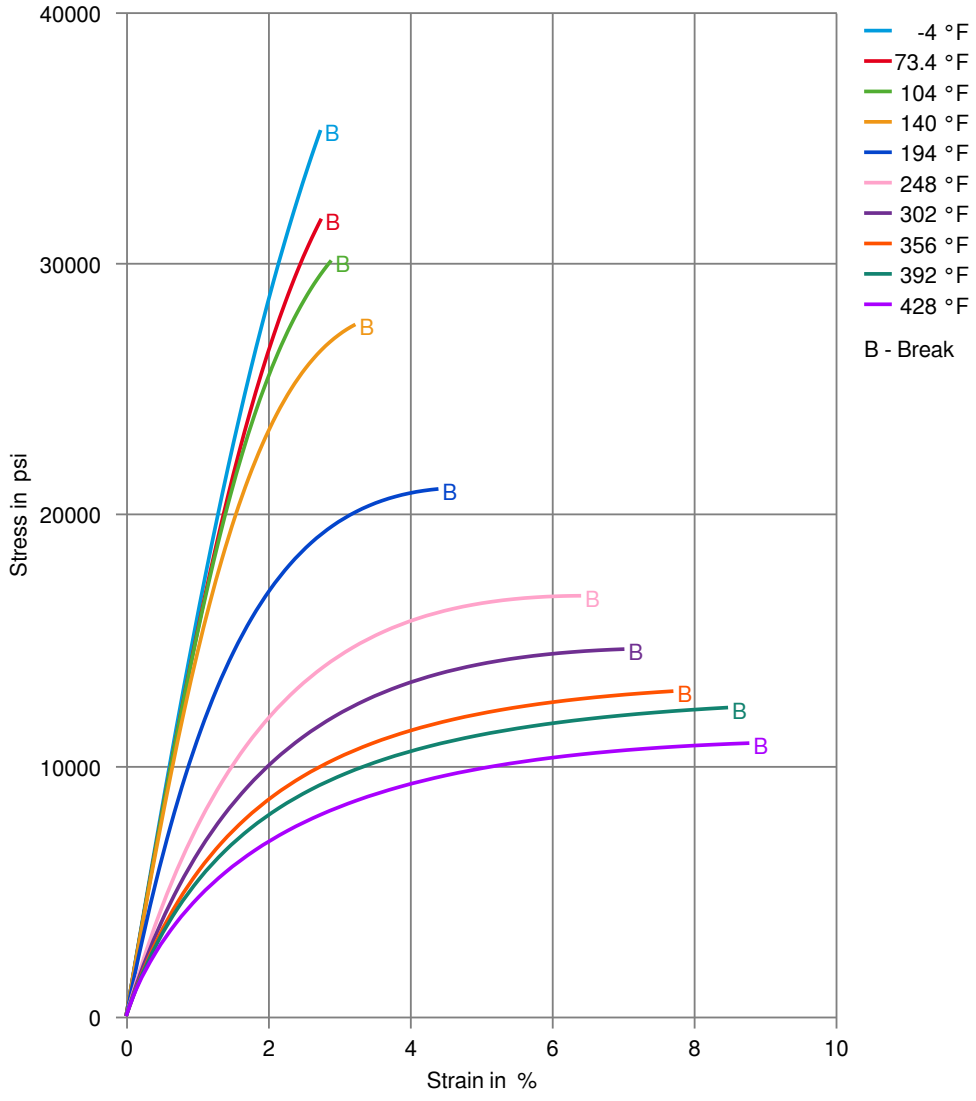
### Shearstress-shear rate



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### Stress-strain (dry)



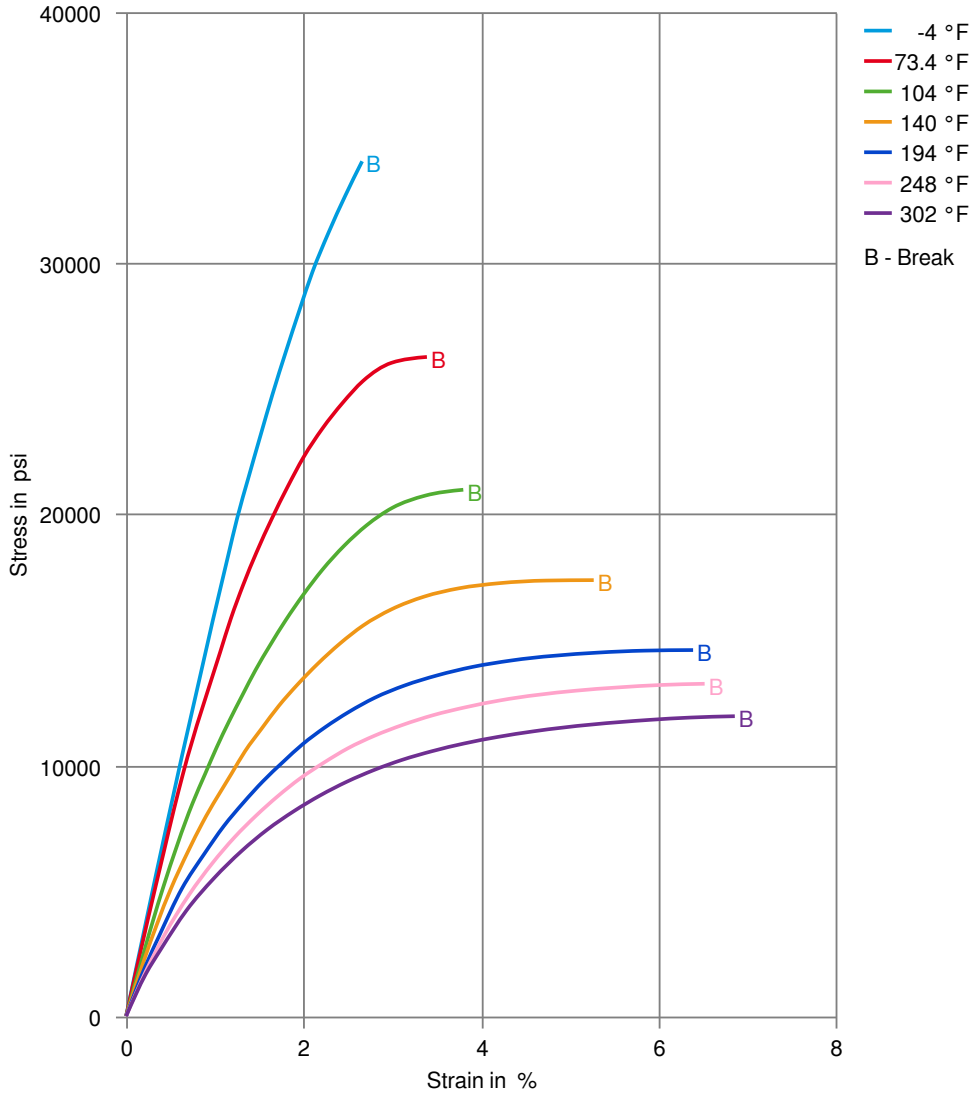



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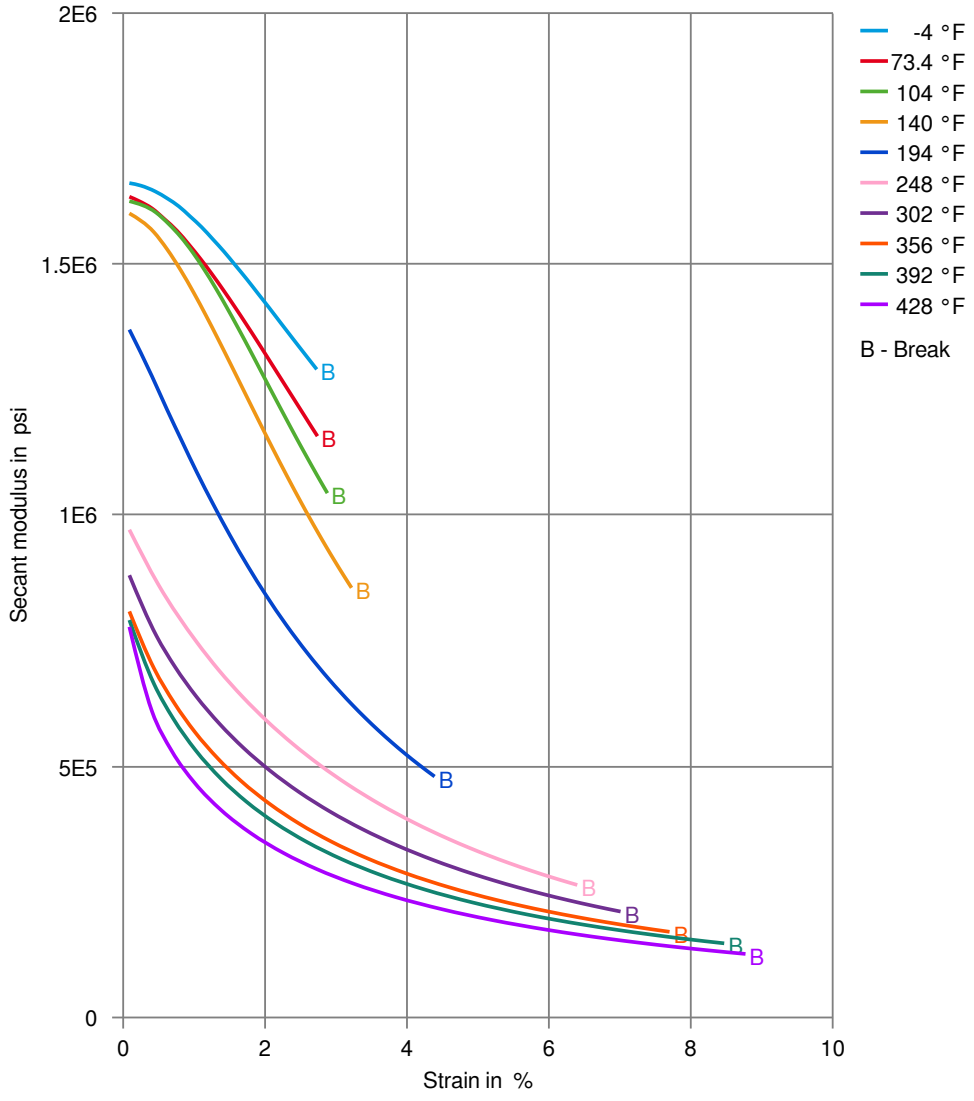
### Stress-strain (cond.)



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## Secant modulus-strain (dry)



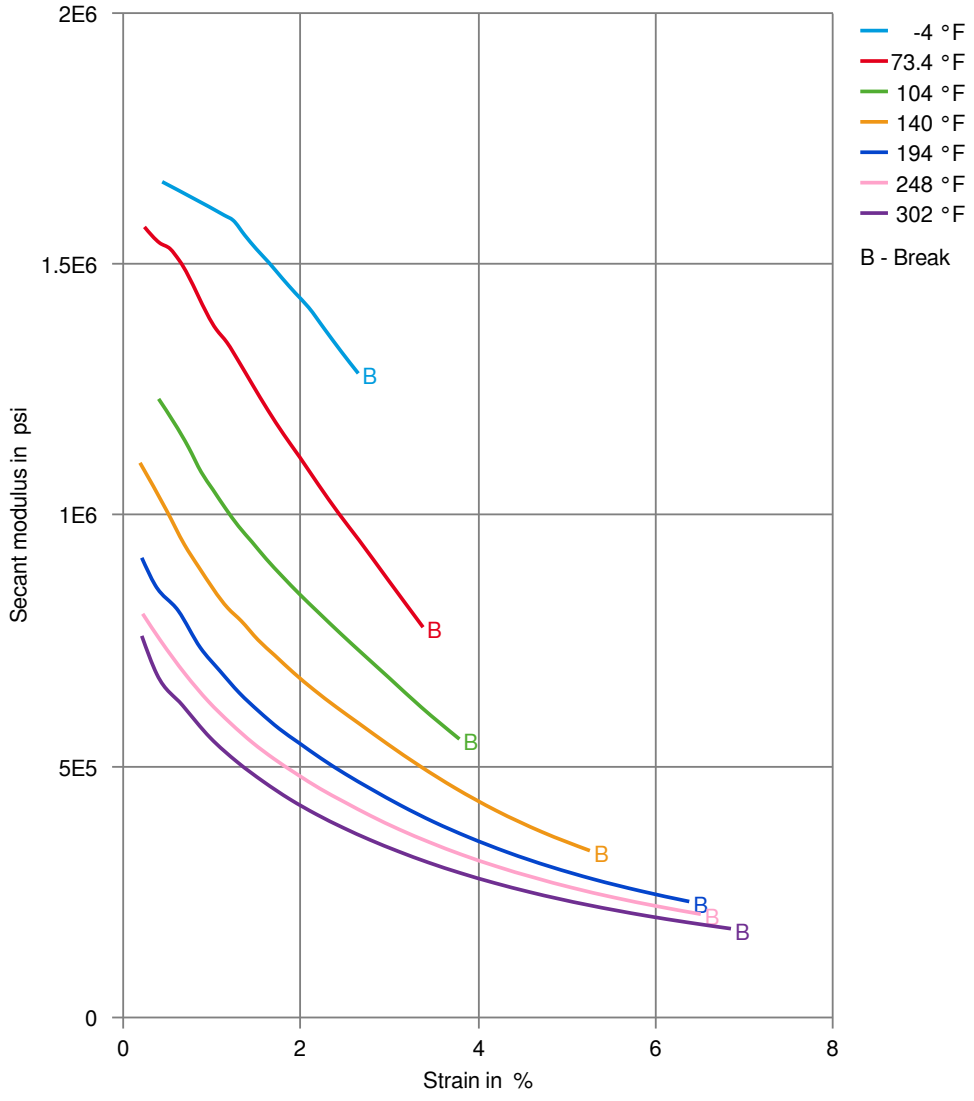



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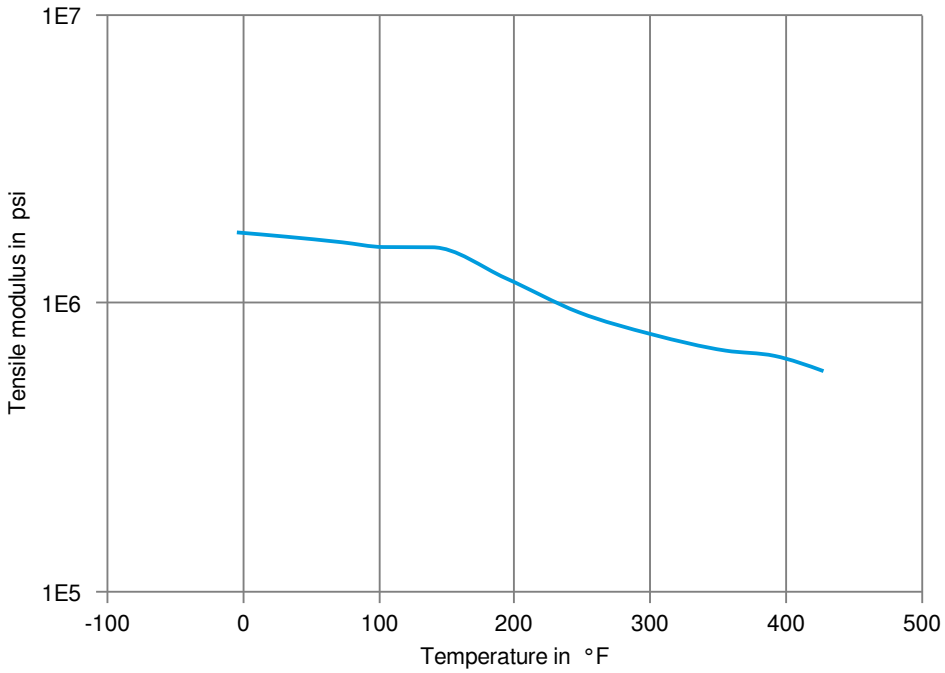
### Secant modulus-strain (cond.)



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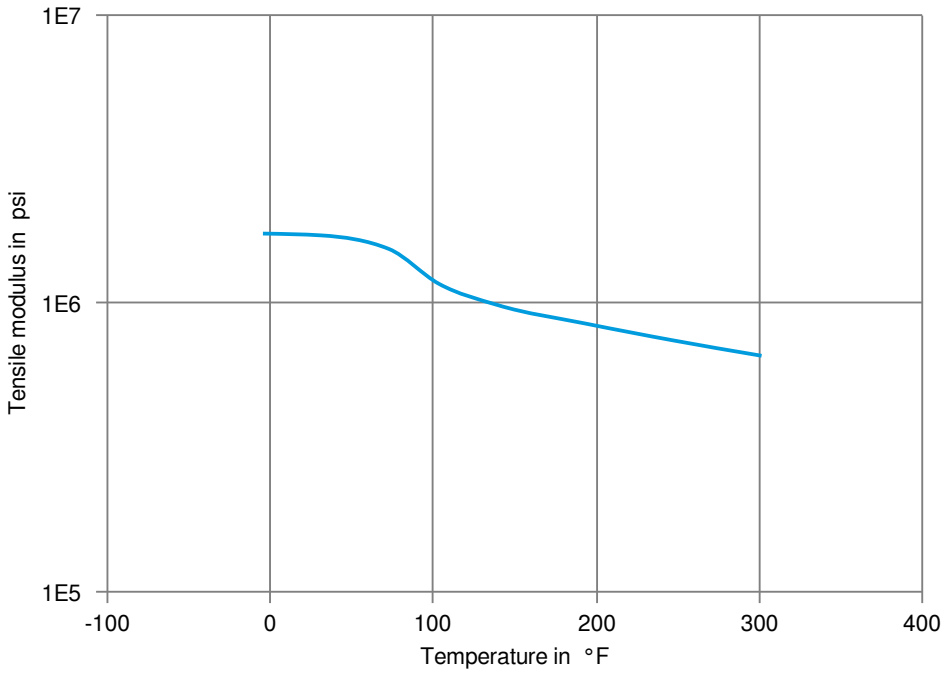
## Tensile modulus-temperature (dry)



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## Tensile modulus-temperature (cond.)



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## Chemical Media Resistance

### Acids

- ✔ Acetic Acid (5% by mass), 23°C
- ✔ Citric Acid solution (10% by mass), 23°C
- ✔ Lactic Acid (10% by mass), 23°C

### Other

- ✔ Ethylene Glycol (50% by mass) in water, 108°C
- ✔ Water, 23°C
- ✔ Water, 90°C
- ✔ Coolant Glysantin G48, 1:1 in water, 125°C
- ✔ Urea solution (32.5% by mass), 23°C

**Symbols used:**

✔ possibly resistant
Defined as: Supplier has sufficient indication that contact with chemical can be potentially accepted under the intended use conditions and expected service life. Criteria for assessment have to be indicated (e.g. surface aspect, volume change, property change).

✘ not recommended - see explanation
Defined as: Not recommended for general use. However, short-term exposure under certain restricted conditions could be acceptable (e.g. fast cleaning with thorough rinsing, spills, wiping, vapor exposure).



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