Celanese
The chemistry inside innovation™

# GUR® 4012 F

UHMW-PE powder grade for battery separators
HMW-PE powder grade for battery separators

## Product information

| | | | |
|---|---|---|---|
| Average molecular weight | 1.7E6 | g/mol | Margolies' equation |
| Average particle size, D50 | 115 | µm | laser scattering |

## Rheological properties

| | | | |
|---|---|---|---|
| Melt mass-flow rate, Temperature | 190 | °C | |
| Melt mass-flow rate, Load | 21.6 | kg | |
| Viscosity number | 1100 | $cm^3/g$ | ISO 307, 1157, 1628 |
| Intrinsic viscosity | 1000 | | ISO 307, 1157, 1628 |

## Typical mechanical properties

| | | | |
|---|---|---|---|
| Tensile Modulus | 900 | MPa | ISO 527-1/-2 |
| Yield stress, 50mm/min | 22 | MPa | ISO 527-1/-2 |
| Yield strain, 50mm/min | 9 | % | ISO 527-1/-2 |
| Stress at 50% strain | 19 | MPa | ISO 527-1/-2 |
| Stress at break, 50mm/min | 42 | MPa | ISO 527-1/-2 |
| Nominal strain at break | 550 | % | ISO 527-1/-2 |
| Elongational stress, 150/10 | 0.04 | MPa | ISO 21304-2 |
| Charpy double notched impact strength, 23°C | 190 | $kJ/m^2$ | ISO 21304-2 |
| Shore D hardness, 15s | 60 | | ISO 48-4 / ISO 868 |

## Tribological properties

| | | | |
|---|---|---|---|
| Relative Wear (based on GUR 4120=100), sandslurry method | 140 | | Internal |

## Thermal properties

| | | | |
|---|---|---|---|
| Temp. of deflection under load, 1.8 MPa | 41 | °C | ISO 75-1/-2 |
| Vicat softening temperature, 50°C/h, 50N | 80 | °C | ISO 306 |

## Electrical properties

| | | | |
|---|---|---|---|
| Volume resistivity | >1E12 | Ohm.m | IEC 62631-3-1 |
| Surface resistivity | >1E12 | Ohm | IEC 62631-3-2 |

## Other properties

| | | | |
|---|---|---|---|
| Density | 940 | $kg/m^3$ | ISO 1183 |
| Bulk density | 450 | $kg/m^3$ | ISO 60 |

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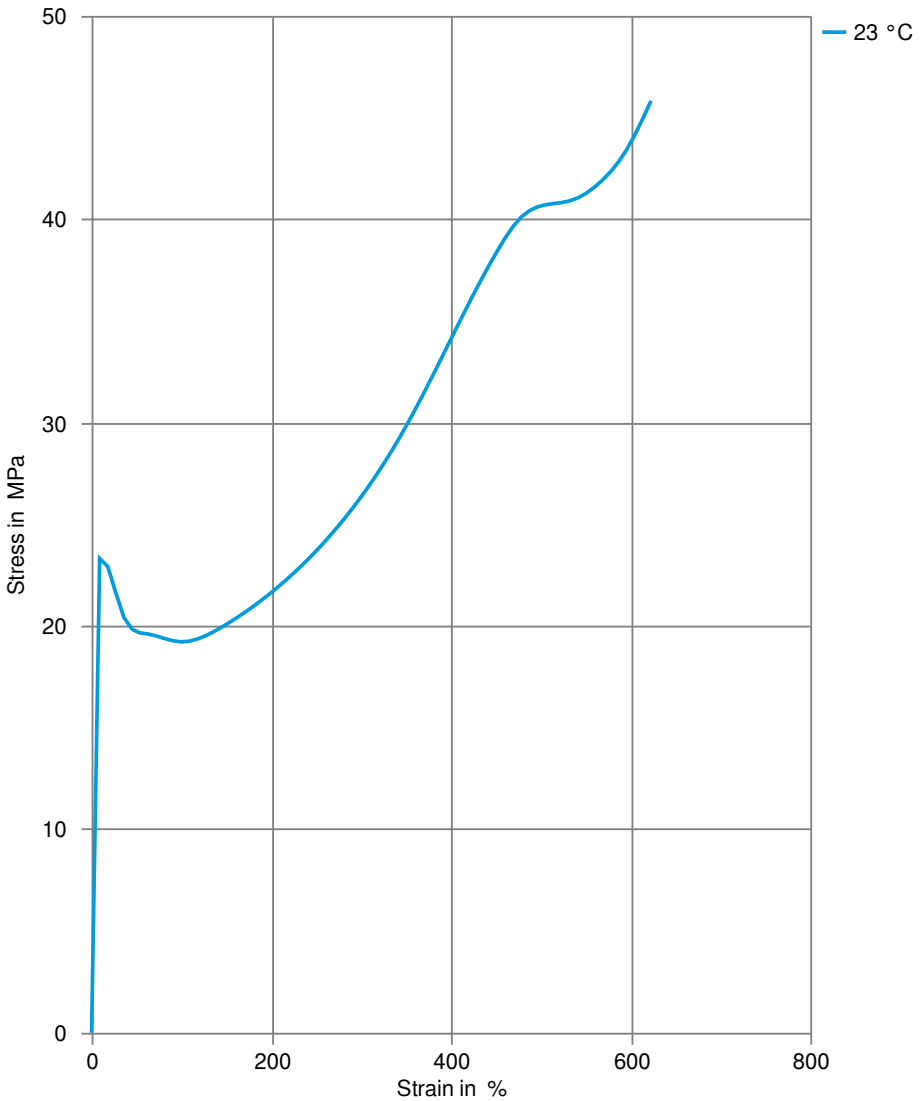
## Characteristics

| | |
|---|---|
| Food contact | FDA 21 CFR |

## Stress-strain



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## Secant modulus-strain