Grilamid TR 90
PAMACM12 EMS-GRIVORY | a unit of EMS-CHEMIE AG

Product Texts

Product designation according to ISO 1874:
PA MACM12, GT,14-020

Mechanical properties	dry / cond	Unit	Test Standard
Tensile Modulus	**1600 / 1600**	MPa	ISO 527-1/-2
Yield stress	**60 / 60**	MPa	ISO 527-1/-2
Yield strain	**6 / 6**	%	ISO 527-1/-2
Nominal strain at break	**>50 / >50**	%	ISO 527-1/-2
Charpy impact strength (+23°C)	**N / N**	kJ/m²	ISO 179/1eU
Charpy impact strength (-30°C)	**N / N**	kJ/m²	ISO 179/1eU
Charpy notched impact strength (+23°C)	**9 / 13**	kJ/m²	ISO 179/1eA
Charpy notched impact strength (-30°C)	**9 / 12**	kJ/m²	ISO 179/1eA

Mechanical properties (TPE)	dry / cond	Unit	Test Standard
Ball indentation hardness	**- / 90**	MPa	ISO 2039-1

Thermal properties	dry / cond	Unit	Test Standard
Glass transition temperature (10°C/min)	**155 / -**	°C	ISO 11357-1/-2
Temp. of deflection under load (1.80 MPa)	**115 / -**	°C	ISO 75-1/-2
Temp. of deflection under load (0.45 MPa)	**135 / -**	°C	ISO 75-1/-2
Coeff. of linear therm. expansion (parallel)	**90 / -**	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion (normal)	**90 / -**	E-6/K	ISO 11359-1/-2
Burning Behav. at thickness h	**HB / -**	class	IEC 60695-11-10
Thickness tested	**0.8 / -**	mm	IEC 60695-11-10
Max. usage temperature (long term)	**80 - 100**	°C	ISO 2578
Max. usage temperature (short term)	**120**	°C	EMS

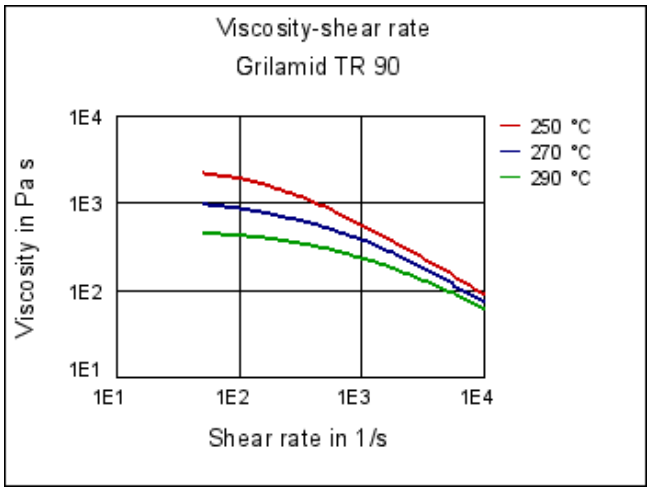
Electrical properties	dry / cond	Unit	Test Standard
Volume resistivity	**- / 1E11**	Ohm*m	IEC 60093
Surface resistivity	**- / 1E12**	Ohm	IEC 60093
Electric strength	**- / 34**	kV/mm	IEC 60243-1
Comparative tracking index	**- / 600**	-	IEC 60112

Other properties	dry / cond	Unit	Test Standard
Water absorption	**3 / -**	%	Sim. to ISO 62
Humidity absorption	**1.5 / -**	%	Sim. to ISO 62
Density	**1000 / -**	kg/m³	ISO 1183

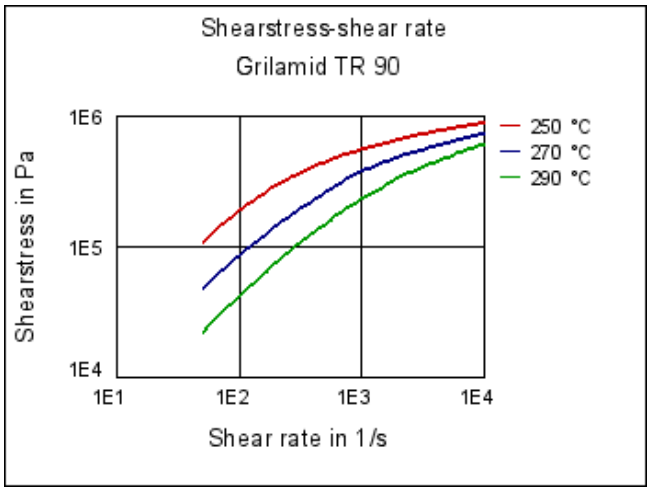
Rheo/Phys properties	dry / cond	Unit	Test Standard
Molding shrinkage (parallel)	**0.7 / -**	%	ISO 294-4, 2577
Molding shrinkage (normal)	**0.8 / -**	%	ISO 294-4, 2577

Diagrams

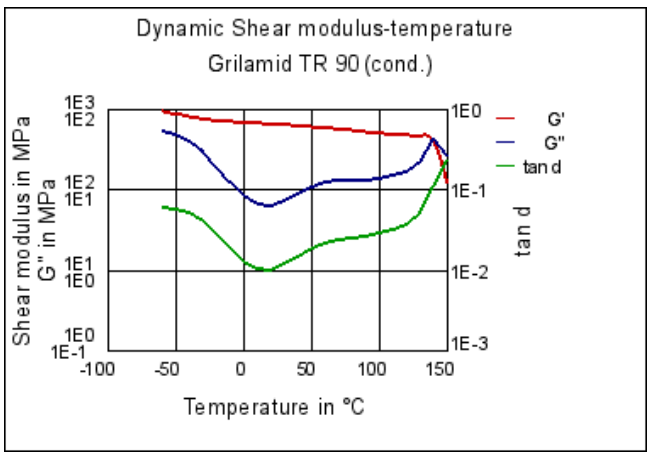
Viscosity-shear rate



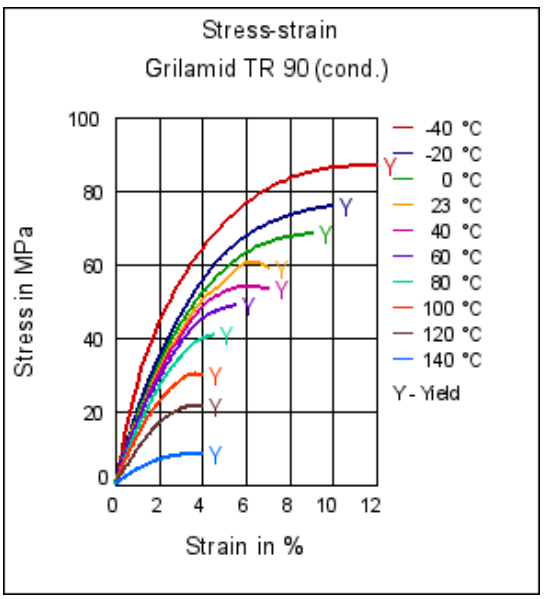
Shearstress-shear rate



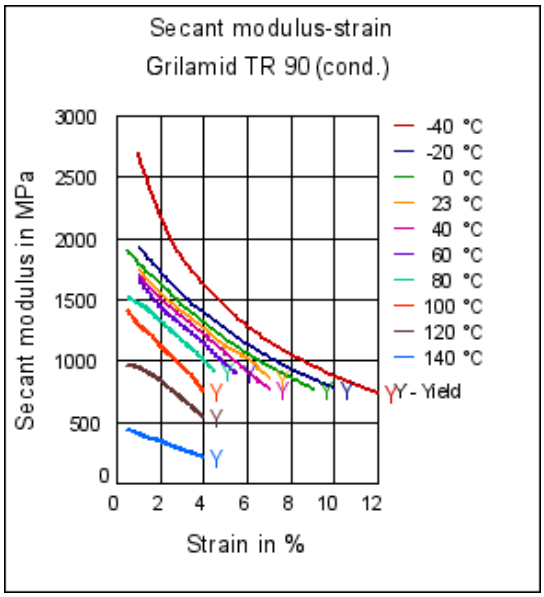
Dynamic Shear modulus-temperature



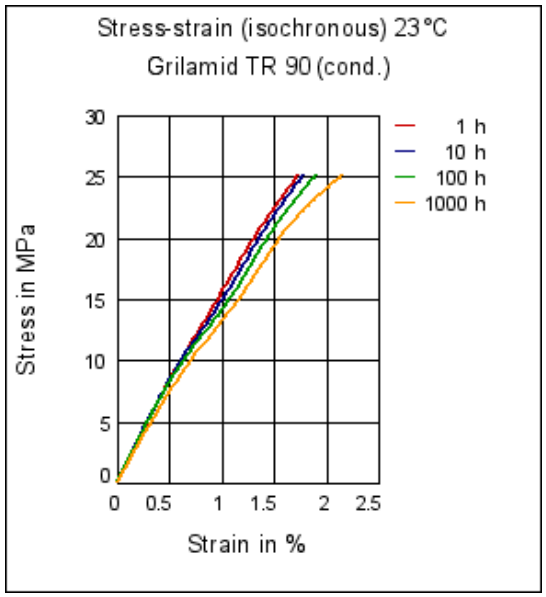
Stress-strain



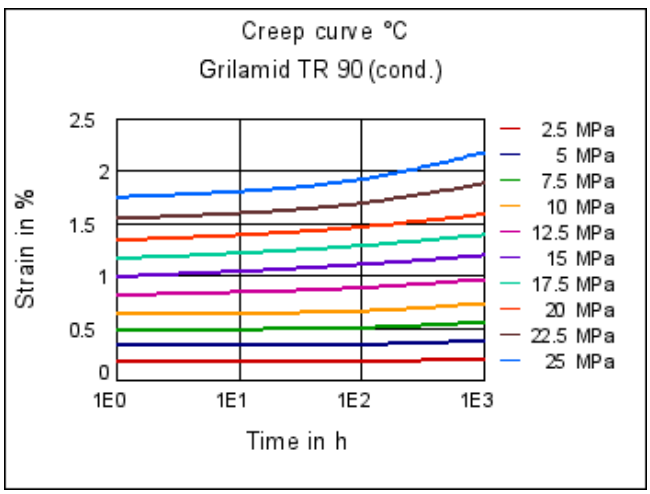
Secant modulus-strain



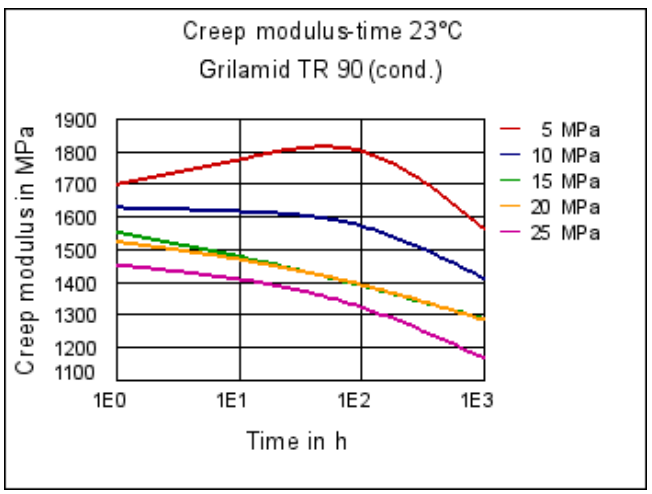
Stress-strain (isochronous) 23°C



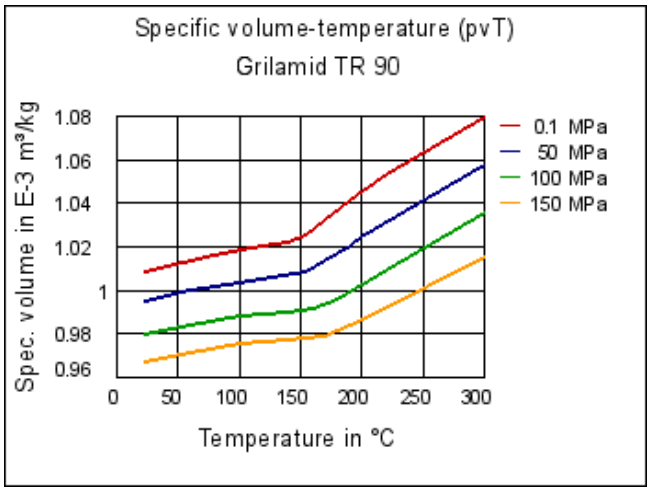
Creep curve °C



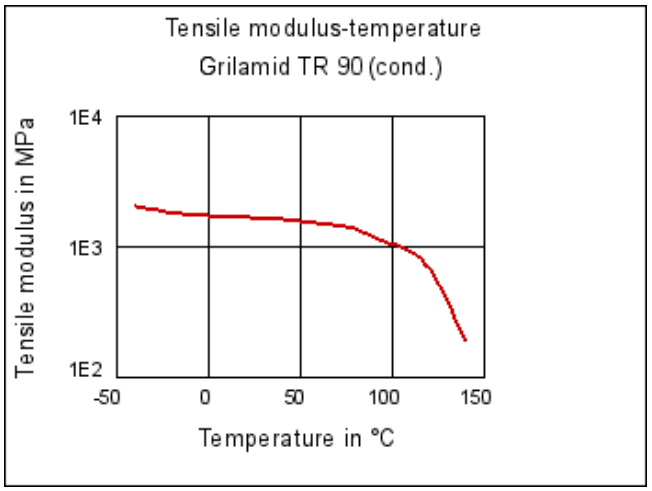
Creep modulus-time 23°C



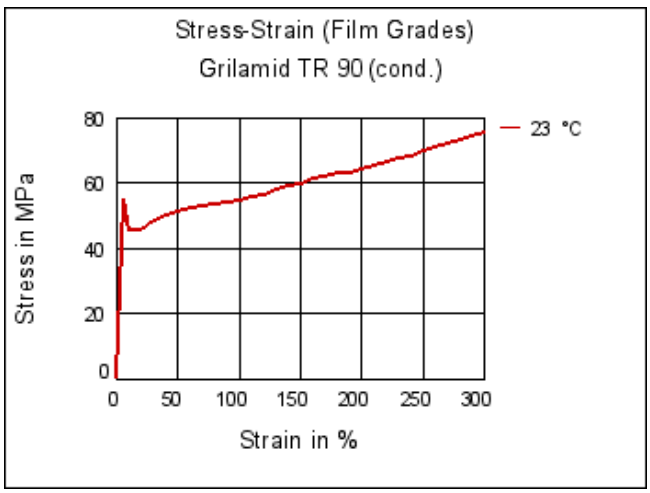
Specific volume-temperature (pvT)



Tensile modulus-temperature



Stress-Strain (Film Grades)



Characteristics

Processing

Injection Molding, Other Extrusion

Delivery form

Granules

Special Characteristics

Transparent

Regional Availability

North America, Europe, Asia Pacific, South and Central America, Near East/Africa

Industry & Consumer goods

Heating systems, Housewares, Hydraulics & Pneumatics, Mechanical Engineering, Medical devices, Power transmission, Sanitary, water and gas supply, Sports & Leisure, Tools & Accessories

Optics

Lenses, Optical components, Safety glasses, Sunglasses, Spectacle frames

Packaging

Non oriented film, Cosmetics / Personal care, Medical packaging

Food Contact

EU Requirements, FDA

Automotive

Automotive electr. and electronics, lighting, Cooling and climate control, Fuel systems, Powertrain and Chassis , Interior

Electricals & Electronics

Electrical appliances, Electrical equipment, Connectors, Lighting, Mobile phones and other portable devices

Biocompatibility

USP VI, ISO 10993

Potable Water Contact

NSF 61, KTW, WRAS, DVGW W270

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)
- Hydrochloric Acid (36% by mass) (23°C)
- Nitric Acid (40% by mass) (23°C)
- Sulfuric Acid (38% by mass) (23°C)
- Sulfuric Acid (5% by mass) (23°C)
- Chromic Acid solution (40% by mass) (23°C)

Bases

- Sodium Hydroxide solution (35% by mass) (23°C)
- Sodium Hydroxide solution (1% by mass) (23°C)
- Ammonium Hydroxide solution (10% by mass) (23°C)

Alcohols

- Isopropyl alcohol (23°C)
- Methanol (23°C)
- Ethanol (23°C)

Hydrocarbons

- n-Hexane (23°C)
- Toluene (23°C)
- iso-Octane (23°C)

Ketones

- Acetone (23°C)

Ethers

- Diethyl ether (23°C)

Mineral oils

- SAE 10W40 multigrade motor oil (23°C)
- SAE 10W40 multigrade motor oil (130°C)
- SAE 80/90 hypoid-gear oil (130°C)
- Insulating Oil (23°C)

Standard Fuels

- ISO 1817 Liquid 1 (60°C)

- ISO 1817 Liquid 2 (60°C)
- ISO 1817 Liquid 3 (60°C)
- ISO 1817 Liquid 4 (60°C)
- Standard fuel without alcohol (pref. ISO 1817 Liquid C) (23°C)
- Standard fuel with alcohol (pref. ISO 1817 Liquid 4) (23°C)
- Diesel fuel (pref. ISO 1817 Liquid F) (23°C)
- Diesel fuel (pref. ISO 1817 Liquid F) (90°C)
- Diesel fuel (pref. ISO 1817 Liquid F) (>90°C)

Salt solutions

- Sodium Chloride solution (10% by mass) (23°C)
- Sodium Hypochlorite solution (10% by mass) (23°C)
- Sodium Carbonate solution (20% by mass) (23°C)
- Sodium Carbonate solution (2% by mass) (23°C)
- Zinc Chloride solution (50% by mass) (23°C)

Other

- Ethyl Acetate (23°C)
- Hydrogen peroxide (23°C)
- DOT No. 4 Brake fluid (130°C)
- Ethylene Glycol (50% by mass) in water (108°C)
- 1% nonylphenoxy-polyethyleneoxy ethanol in water (23°C)
- 50% Oleic acid + 50% Olive Oil (23°C)
- Water (23°C)
- Deionized water (90°C)
- Phenol solution (5% by mass) (23°C)