

**Grivory GV-4H**

PA\*-GF40

EMS-GRIVORY | a unit of EMS-CHEMIE AG

**Product Information**

Product designation according to ISO 1874:

PA66+PA6I/X, MH, 14-140, GF40

Mechanical properties	dry / cond	Unit	Test Standard
Tensile Modulus	<b>14000 / 13000</b>	MPa	ISO 527-1/-2
Stress at break	<b>230 / 210</b>	MPa	ISO 527-1/-2
Strain at break	<b>3 / 3</b>	%	ISO 527-1/-2
Charpy impact strength (+23°C)	<b>90 / 90</b>	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy impact strength (-30°C)	<b>70 / 70</b>	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy notched impact strength (+23°C)	<b>13 / 13</b>	kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength (-30°C)	<b>11 / 11</b>	kJ/m <sup>2</sup>	ISO 179/1eA

Mechanical properties (TPE)	dry / cond	Unit	Test Standard
Ball indentation hardness	<b>255 / 230</b>	MPa	ISO 2039-1

Thermal properties	dry / cond	Unit	Test Standard
Melting temperature (10°C/min)	<b>260 / -</b>	°C	ISO 11357-1/-3
Temp. of deflection under load (1.80 MPa)	<b>235 / -</b>	°C	ISO 75-1/-2
Temp. of deflection under load (8.0 MPa)	<b>145 / -</b>	°C	ISO 75-1/-2
Coeff. of linear therm. expansion (parallel)	<b>15 / -</b>	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion (normal)	<b>90 / -</b>	E-6/K	ISO 11359-1/-2
Burning behav. at thickness h	<b>HB / -</b>	class	IEC 60695-11-10
Thickness tested	<b>0.8 / -</b>	mm	IEC 60695-11-10
Max. usage temperature (long term)	<b>100 - 120</b>	°C	EMS
Max. usage temperature (short term)	<b>220</b>	°C	EMS

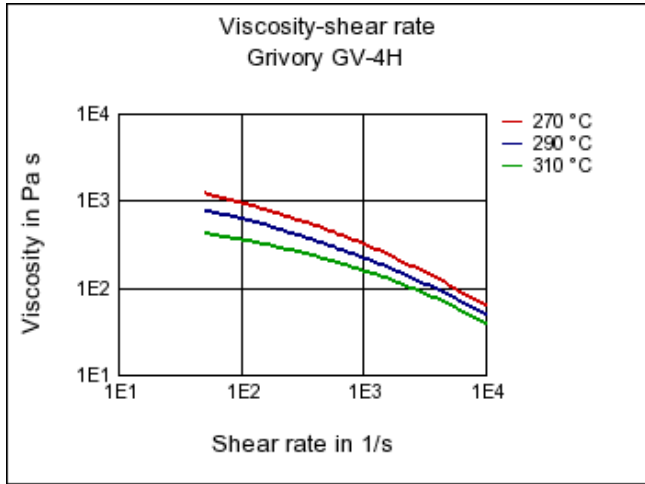
Electrical properties	dry / cond	Unit	Test Standard
Volume resistivity	<b>1E12 / 1E12</b>	Ohm*m	IEC 60093
Surface resistivity	<b>- / 1E13</b>	Ohm	IEC 60093
Electric strength	<b>33 / 33</b>	kV/mm	IEC 60243-1
Comparative tracking index	<b>- / 600</b>	-	IEC 60112

Other properties	dry / cond	Unit	Test Standard
Water absorption	<b>4.5 / -</b>	%	Sim. to ISO 62
Humidity absorption	<b>1.4 / -</b>	%	Sim. to ISO 62
Density	<b>1470 / -</b>	kg/m <sup>3</sup>	ISO 1183

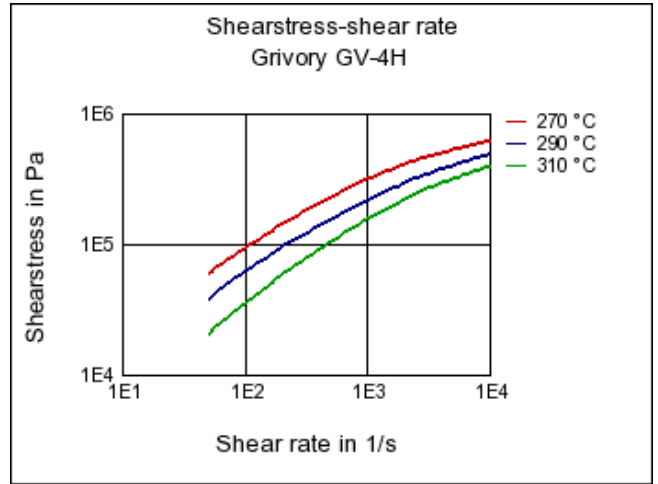
Rheo/Phys properties	dry / cond	Unit	Test Standard
Molding shrinkage (parallel)	<b>0.1 / -</b>	%	ISO 294-4, 2577
Molding shrinkage (normal)	<b>0.6 / -</b>	%	ISO 294-4, 2577

**Diagrams**

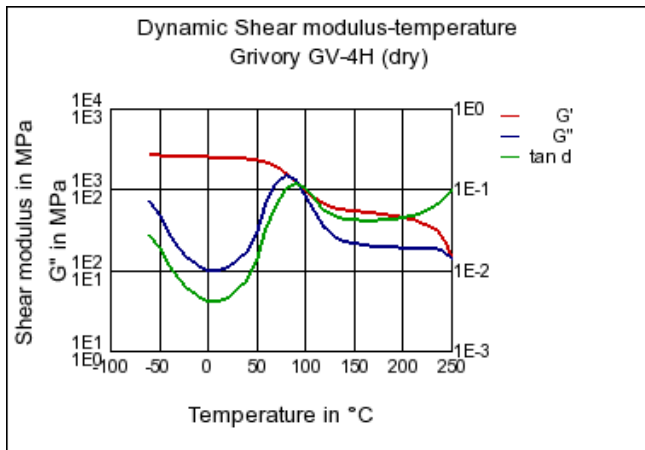
Viscosity-shear rate



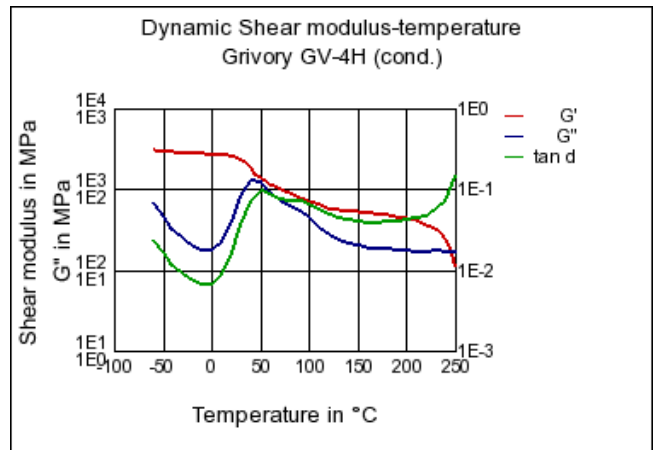
Shearstress-shear rate



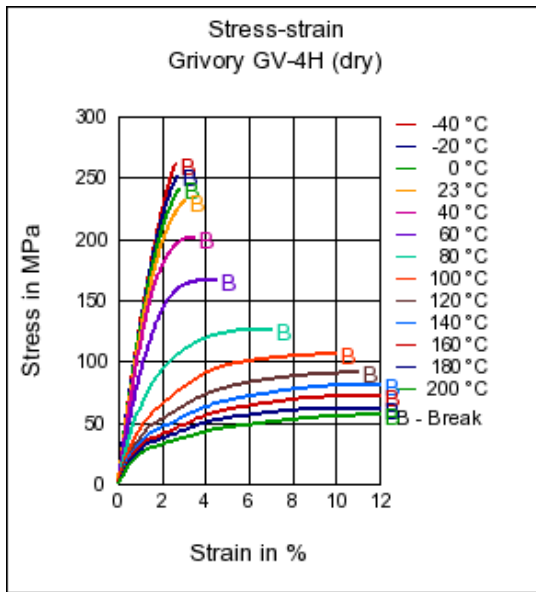
Dynamic Shear modulus-temperature



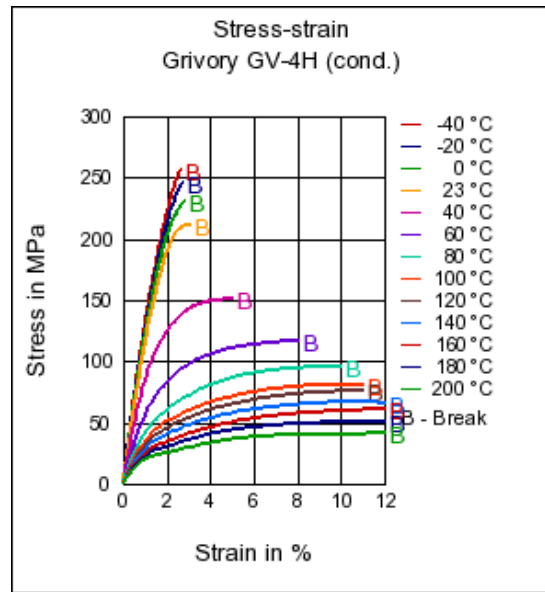
Dynamic Shear modulus-temperature



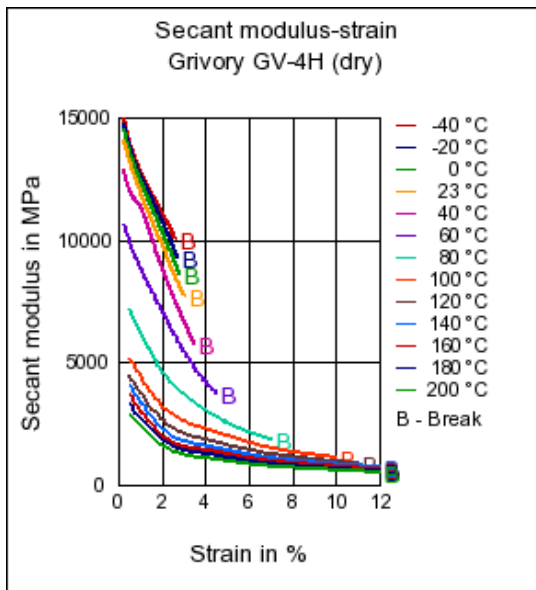
Stress-strain



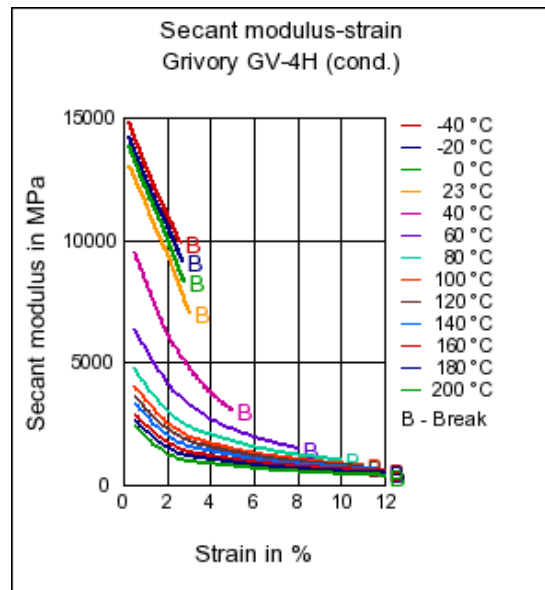
Stress-strain



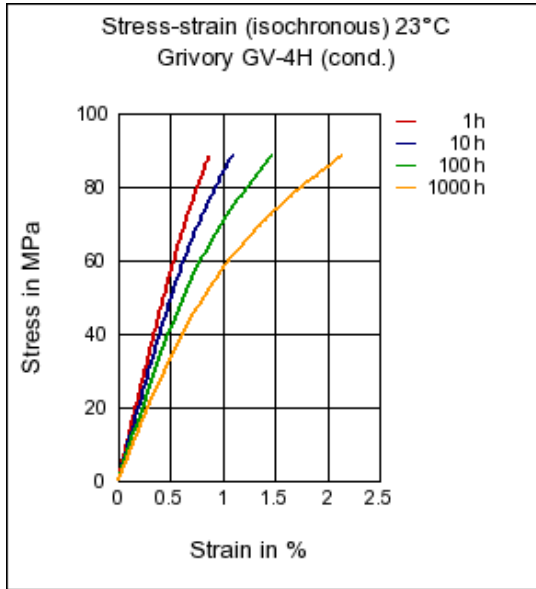
Secant modulus-strain



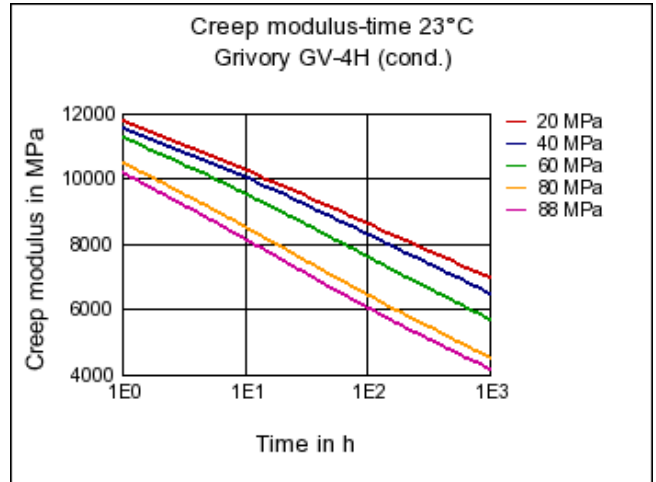
Secant modulus-strain



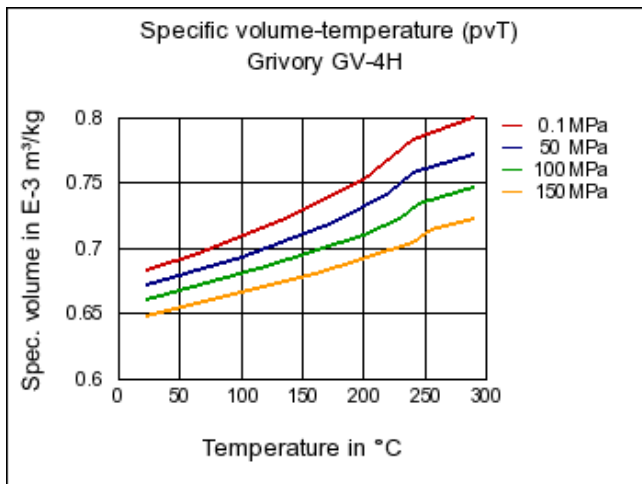
Stress-strain (isochronous) 23°C



Creep modulus-time 23°C



Specific volume-temperature (pvT)



Characteristic

Processing

Injection Molding

Regional Availability

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

Product Attributes

Partially aromatic Polyamide

Automotive

Air intake systems, Automotive electr. and electronics, lighting, Cooling and climate control, Powertrain and Chassis, Interior, Exterior

Electricals & Electronics

Electrical appliances, Electrical equipment, Energy distribution

Industry & Consumer goods

Housewares, Hydraulics & Pneumatics, Mechanical Engineering,

Power transmission, Sanitary, water and gas supply, Sports & Leisure, Tools & Accessories

## Chemical Media Resistance

### Acids

- ☺ Acetic Acid (5% by mass) (23°C)
- ☹ Chromic Acid solution (40% by mass) (23°C)
- ☺ Citric Acid solution (10% by mass) (23°C)
- ☹ Hydrochloric Acid (36% by mass) (23°C)
- ☺ Lactic Acid (10% 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)

### Bases

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

### Alcohols

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

### Hydrocarbons

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

### Ketones

- ☺ Acetone (23°C)

### Ethers








- ☺ Diethyl ether (23°C)

### Mineral oils






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

### Standard Fuels










- ☺ 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)
-  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 with alcohol (pref. ISO 1817 Liquid 4) (23°C)
-  Standard fuel without alcohol (pref. ISO 1817 Liquid C) (23°C)

#### Salt solutions

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

#### Other

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