

Test Standard

ISO 2039-1

# **Grilamid TR 55** PA12/MACMI

# EMS-GRIVORY | a unit of EMS-CHEMIE AG

#### Product Texts

Product designation according to ISO 1874:

PA 12/MACMI, GT, 11-020

Mechanical properties (TPE)

Ball indentation hardness

Mechanical properties	dry / cond	Unit	Test Standard
Tensile Modulus	2200 / 2200	MPa	ISO 527-1/-2
Yield stress	75 / 75	MPa	ISO 527-1/-2
Yield strain	7/9	%	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)	7/8	kJ/m²	ISO 179/1eA
Charpy notched impact strength (-30°C)	7/7	kJ/m²	ISO 179/1eA

dry / cond

MPa

-/120

Thermal properties	dry / cond	Unit	Test Standard
Glass transition temperature (10°C/min)	160 / -	°C	ISO 11357-1/-2
Temp. of deflection under load (1.80 MPa)	130 / -	°C	ISO 75-1/-2
Temp. of deflection under load (0.45 MPa)	145 / -	°C	ISO 75-1/-2
Coeff. of linear therm. expansion (parallel)	80 / -	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion (normal)	80 / -	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	- / 31	kV/mm	IEC 60243-1
Comparative tracking index	- / 600	-	IEC 60112

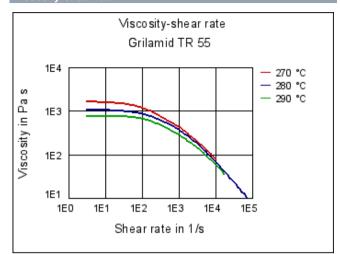
Other properties	dry / cond	Unit	Test Standard
Water absorption	3.5 / -	%	Sim. to ISO 62
Humidity absorption	1.5 / -	%	Sim. to ISO 62
Density	1060 / -	kg/m³	ISO 1183

Rheo/Phys properties	dry / cond	Unit	Test Standard
Molding shrinkage (parallel)	0.6 / -	%	ISO 294-4, 2577
Molding shrinkage (normal)	0.7 / -	%	ISO 294-4, 2577

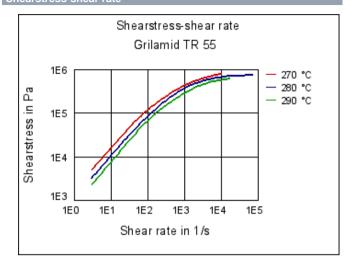
### Diagrams

Created: 2018-03-28 Source: www.materialdatacenter.com

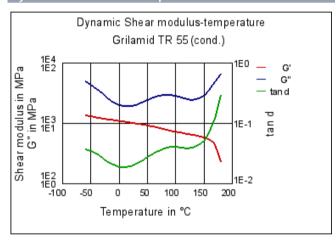
# Viscosity-shear rate



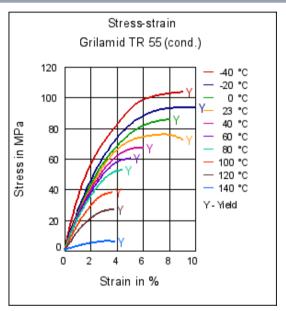
# Shearstress-shear rate



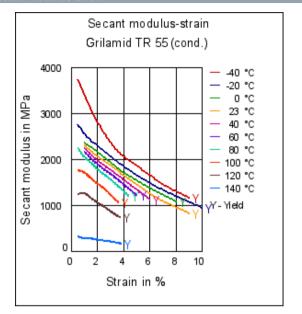
#### Dynamic Shear modulus-temperature



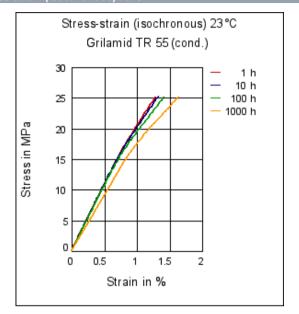
### Stress-strain



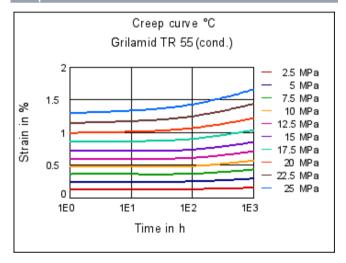
#### Secant modulus-strain



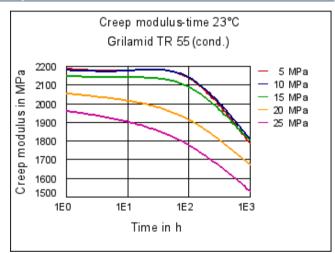
# Stress-strain (isochronous) 23°C



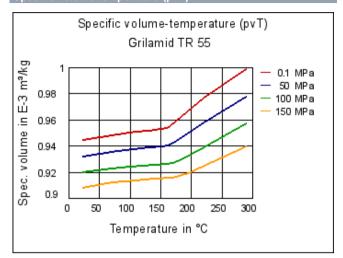
# Creep curve °C



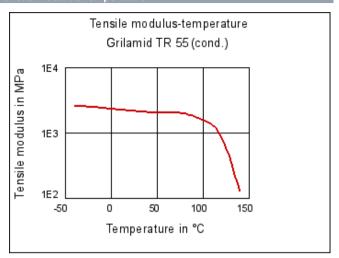
# Creep modulus-time 23°C



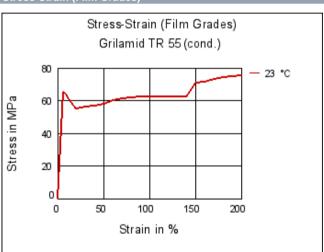
# Specific volume-temperature (pvT)



### Tensile modulus-temperature



### Stress-Strain (Film Grades)



# Characteristics

|--|--|

Injection Molding, Other Extrusion

# Delivery form

Granules

#### Special Characteristics

Transparent

#### Regional Availability

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

#### Ontics

Lenses, Optical components

# Packaging

Non oriented film, Cosmetics / Personal care, Medical packaging

#### **Burning Behaviour**

UL V2

#### **Food Contact**

EU Requirements, FDA

# Biocompatibility

USP VI, ISO 10993

Created: 2018-03-28 Source: www.materialdatacenter.com

Page: 4/6

#### Automotive

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

### Electricals & Electronics

Electrical appliances, Electrical equipment, Cables & Tubes, Energy distribution, Lighting, Mobile phones and other portable devices

#### Industry & Consumer goods

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

### 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)

Created: 2018-03-28 Source: www.materialdatacenter.com

Page: 5/6

- 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)
- **U** ISO 1817 Liquid 2 (60°C)
- ... ISO 1817 Liquid 3 (60°C)
- U ISO 1817 Liquid 4 (60°C)
- Standard fuel without alcohol (pref. ISO 1817 Liquid C) (23°C)
- UStandard 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)