

**Ultramid® A4H**

PA66

BASF

A high heat aging resistant, medium viscosity injection moulding grade for highly stressed parts such as bearing cages, gear-wheels, coil formers and cable connectors.

Rheological properties	dry / cond	Unit	Test Standard
<b>ISO Data</b>			
Melt volume-flow rate, MVR	40 / *	cm <sup>3</sup> /10min	ISO 1133
Temperature	275 / *	°C	-
Load	5 / *	kg	-
Molding shrinkage, parallel	1.6 / *	%	ISO 294-4, 2577
Molding shrinkage, normal	1.8 / *	%	ISO 294-4, 2577

Mechanical Properties	dry / cond	Unit	Test Standard
<b>ISO Data</b>			
Tensile Modulus	3000 / 1200	MPa	ISO 527
Yield stress	80 / 50	MPa	ISO 527
Yield strain	4.2 / 23	%	ISO 527
Nominal strain at break	25 / >50	%	ISO 527
Tensile Creep Modulus, 1h	* / 1100	MPa	ISO 899-1
Tensile Creep Modulus, 1000h	* / 700	MPa	ISO 899-1
Impact Strength (Charpy), +23°C	no break / no break	kJ/m <sup>2</sup>	ISO 179/1eU
Impact Strength (Charpy), -30°C	210 / 250	kJ/m <sup>2</sup>	ISO 179/1eU
Notched Impact Strength (Charpy), +23°C	6 / 19.7	kJ/m <sup>2</sup>	ISO 179/1eA
Notched Impact Strength (Charpy), -30°C	4.9 / 4.5	kJ/m <sup>2</sup>	ISO 179/1eA

Thermal Properties	dry / cond	Unit	Test Standard
<b>ISO Data</b>			
Melting Temperature (10°C/min)	260 / *	°C	ISO 11357-1/-3
Temp. of deflection under load (1.80 MPa)	75 / *	°C	ISO 75-1/-2
Temp. of deflection under load (0.45 MPa)	220 / *	°C	ISO 75-1/-2
Vicat softening temperature, 50°C/h 50N	250 / *	°C	ISO 306
Coeff. of Linear Therm. Expansion, parallel	98 / *	E-6/K	ISO 11359-1/-2
Oxygen index	28 / *	%	ISO 4589-1/-2

Electrical Properties	dry / cond	Unit	Test Standard
<b>ISO Data</b>			
Relative permittivity, 1MHz	3.2 / 5	-	IEC 62631-2-1
Dissipation Factor, 100Hz	50 / -	E-4	IEC 62631-2-1
Dissipation Factor, 1MHz	250 / 2000	E-4	IEC 62631-2-1
Volume Resistivity	1E13 / 1E10	Ohm*m	IEC 62631-3-1
Surface Resistivity	* / 1E13	Ohm	IEC 62631-3-2
Comparative tracking index	- / 600	-	IEC 60112

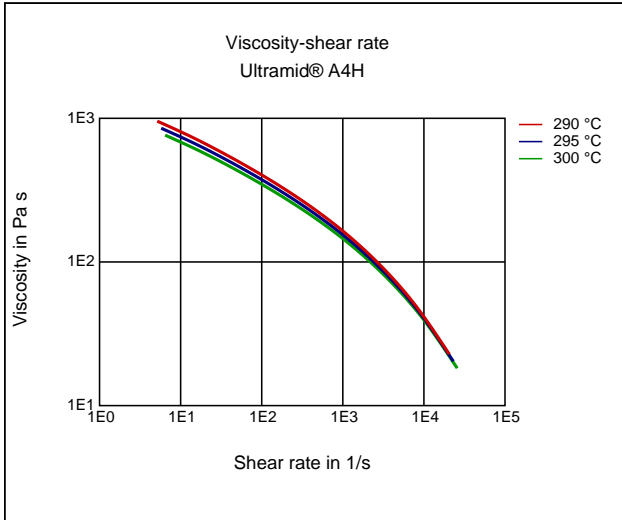
Other Properties	dry / cond	Unit	Test Standard
<b>ISO Data</b>			
Water Absorption	8.5 / *	%	Sim. to ISO 62
Humidity absorption	2.8 / *	%	Sim. to ISO 62
Density	1130 / -	kg/m <sup>3</sup>	ISO 1183

Material Specific Properties	dry / cond	Unit	Test Standard
<b>ISO Data</b>			
Viscosity number	190 / *	cm <sup>3</sup> /g	ISO 307, 1157, 1628

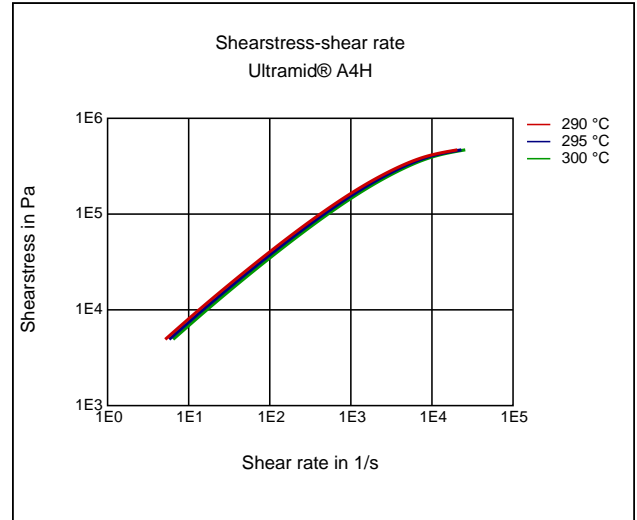
Test specimen production	Value	Unit	Test Standard
<b>ISO Data</b>			
Injection Molding, melt temperature	290	°C	ISO 294
Injection Molding, mold temperature	80	°C	ISO 294
Injection Molding, injection velocity	200	mm/s	ISO 294

Diagrams

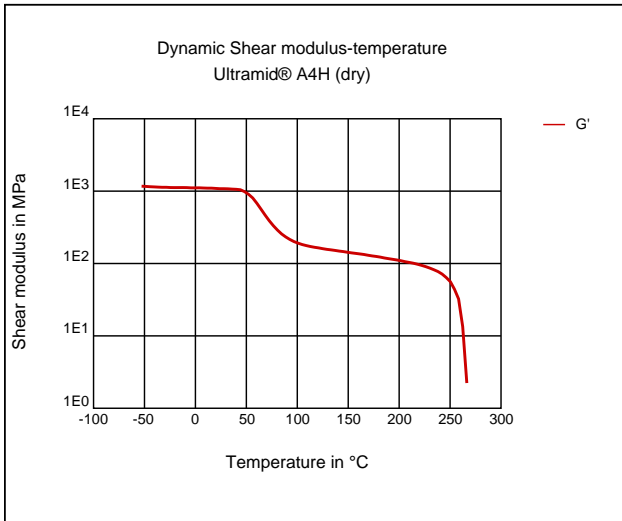
Viscosity-shear rate



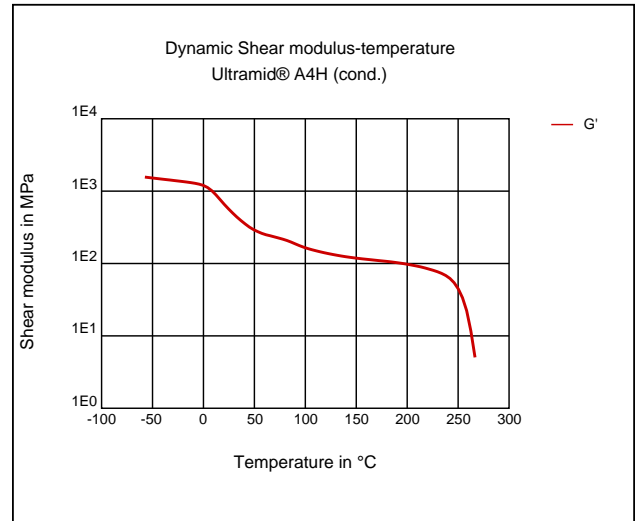
Shearstress-shear rate



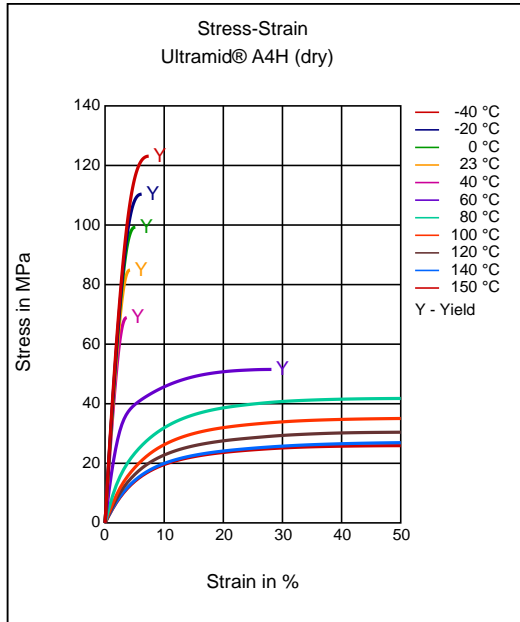
Dynamic Shear modulus-temperature



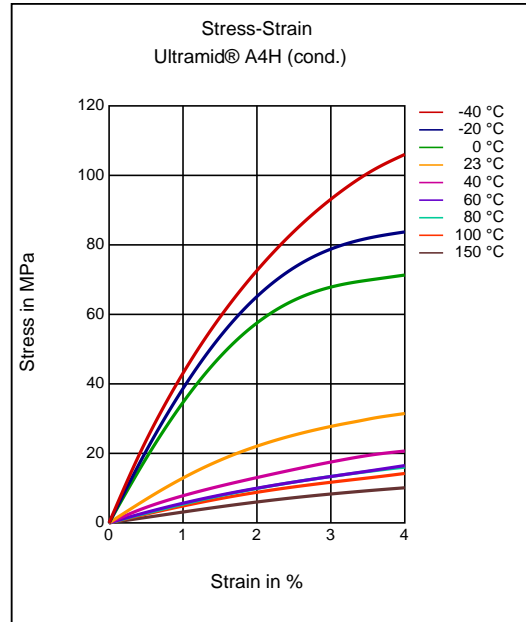
Dynamic Shear modulus-temperature



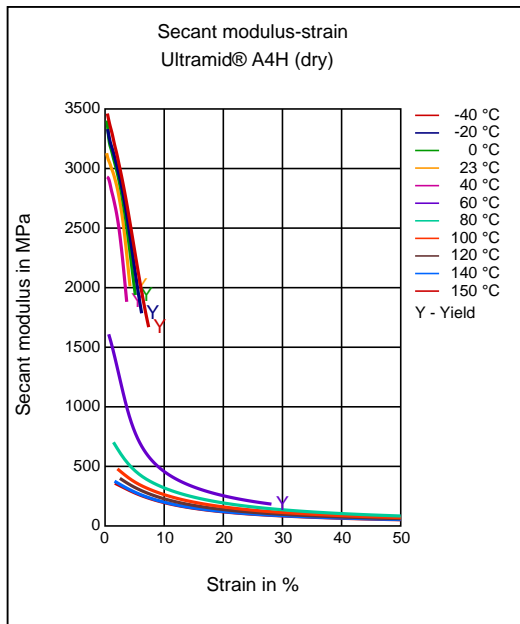
Stress-strain



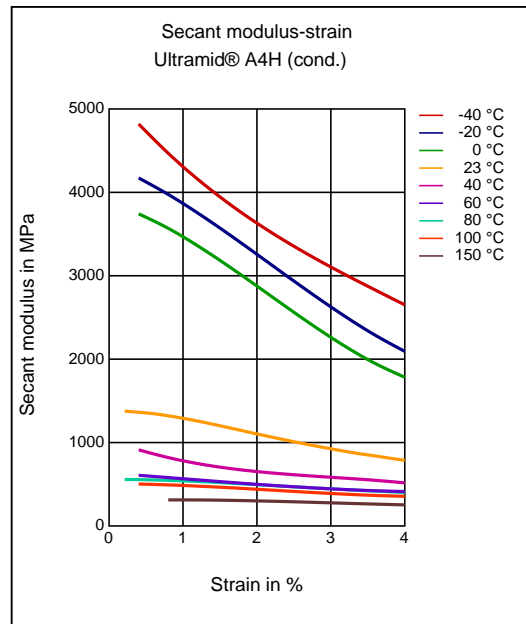
Stress-strain



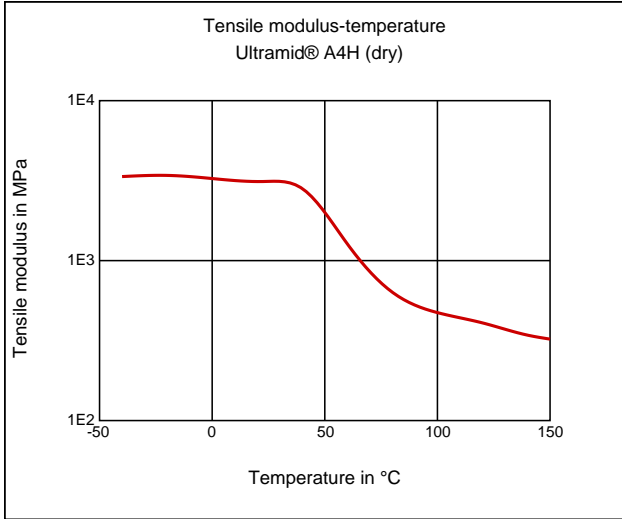
Secant modulus-strain



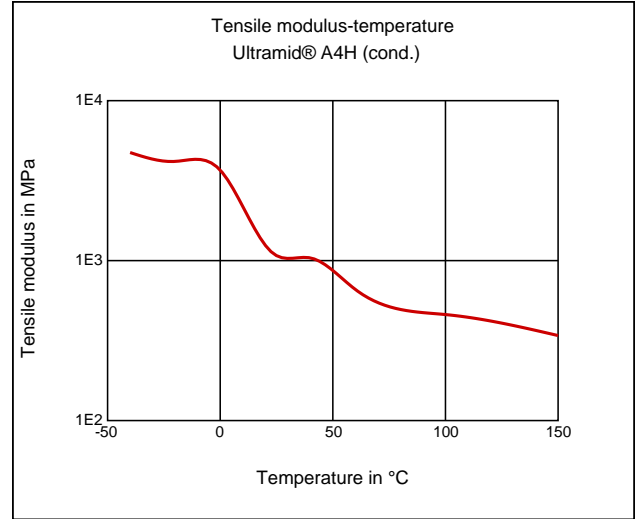
Secant modulus-strain



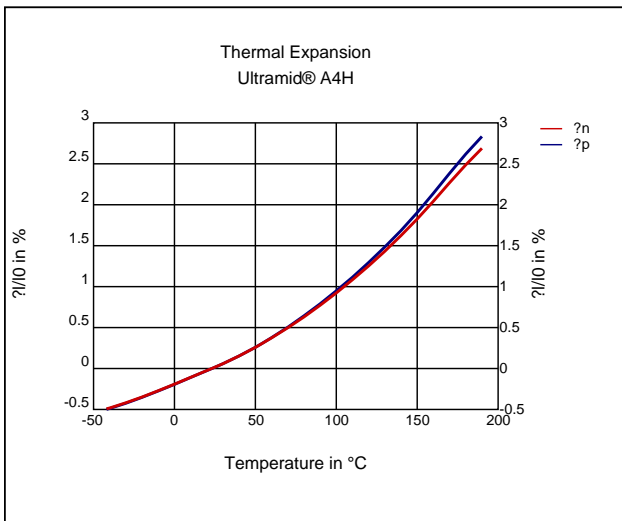
**Tensile Modulus-Temperature**



**Tensile Modulus-Temperature**



**Coeff. of linear thermal expansion, normal**



**Characteristics**

**Processing**

Injection Molding

**Delivery form**

Pellets

**Additives**

Lubricants, Release agent

**Special Characteristics**

Heat aging stabilized

**Injection Molding**

**PREPROCESSING**

Pre/Post-processing, max. allowed water content: .15 %  
Pre/Post-processing, Pre-drying, Temperature: 80 °C  
Pre/Post-processing, Pre-drying, Time: 4 h

**PROCESSING**

injection molding, Melt temperature, range: 280 - 300 °C  
injection molding, Melt temperature, recommended: 290 °C  
injection molding, Mold temperature, range: 60 - 80 °C  
injection molding, Mold temperature, recommended: 60 °C

injection molding, Dwell time, thermoplastics: 10 min

## 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)

### 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)

### Standard Fuels

- ✓ Diesel fuel (pref. ISO 1817 Liquid F) (23 °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)
- ✗ 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)
- ✓ Water (23 °C)

## Disclaimer

### Liability Exclusion

These guide values are measured and provided by the product manufacturer and have been determined on standardised test specimens and can be affected by pigmentation, mould design and processing conditions. M-Base has taken the guide values from the producer's original Technical Data Sheet. **ALBIS AND M-BASE ARE THEREFORE NOT RESPONSIBLE FOR THE ACCURACY OF THE GUIDE VALUES AND CANNOT GIVE ANY WARRANTY WITH REGARD TO THEIR CORRECTNESS.**

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