

Product Information

# VESTAMID® E40-S3

## HEAT- AND LIGHT-STABILIZED POLYAMIDE 12 ELASTOMER FOR MOLDING OF SPORT SHOE SOLES

**VESTAMID® E40-S3** is a PA 12 elastomer consisting of PA 12 segments and softening segments. The material is free of volatile or migrating plasticizer.

The VESTAMID® E represents thermoplastic elastomers generically characterized as polyether block copolyamides (PEBA) consisting of PA 12 and polyether segments.

VESTAMID® E40-S3 is especially developed for sport shoe soles. It has good impact strength at low temperatures.

VESTAMID® E40-S3 is supplied as spherical pellets in moisture-proof packaging, ready for processing.

The process temperatures should be within a range of 170°C – 210°C.

The use of colorants may affect property values.

Inside the original and undamaged packaging, the product has a shelf life of at least 2 years when stored in dry rooms at temperatures not exceeding 30°C.

The results presented were generated from a small number of production lots. They are therefore provisional and not yet the result of a statistical analysis.

### Key Features

#### Industrial Sector

Sustainable, Industry and Engineering, Sports and Lifestyle

#### Sustainability

Sustainable electricity

#### Processing

Injection molding, Extrusion

#### Delivery form

Pellets, Granules

#### Resistance to

Heat (thermal stability), UV / light / weathering

#### Additives

Unfilled

LCA-values	dry	Unit	Test Standard
LCA name of certificate	<a href="#">VESTAMID® E40</a>	-	ISO 14040, 14044
LCA certifier	<a href="#">TÜV Rheinland</a>	-	ISO 14040, 14044
Blue water consumption	<b>12.5</b>	kg	ISO 14040, 14044
Global Warming Potential incl. bio. C incl. LUC	<b>6.2</b>	kg CO <sub>2</sub> eq./kg	ISO 14040, 14044
Global Warming Potential excl. bio. C incl. LUC	<b>6.2</b>	kg CO <sub>2</sub> eq./kg	ISO 14040, 14044
Land use (ReCiPe 2016)	<b>0</b>	Annual crop eq. y	ISO 14040, 14044
GWP savings as compared to 2023 reference	<b>-1.3</b>	kg CO <sub>2</sub> eq./kg	ISO 14040, 14044

Mechanical properties ISO	dry / cond	Unit	Test Standard
Tensile modulus	<b>87 / -</b>	MPa	ISO 527
Tensile strength	<b>17 / -</b>	MPa	ISO 527
Stress at 50% strain	<b>9 / -</b>	MPa	ISO 527
Typical for the mat. nom. strain at br., tB	<b>200</b>	%	ISO 527
Tensile creep modulus, 0,5% Strain, 1h	<b>* / 80</b>	MPa	ISO 899-1
Tensile creep modulus, 0,5% Strain, 1000h	<b>* / 60</b>	MPa	ISO 899-1
Charpy impact strength, +23°C	<b>N / N</b>	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy impact strength, -30°C	<b>N / N</b>	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy notched impact strength, +23°C	<b>N / N</b>	kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength, -30°C	<b>N / N</b>	kJ/m <sup>2</sup>	ISO 179/1eA
Tensile-impact strength, notched, atN +23°C	<b>160 / 210</b>	kJ/m <sup>2</sup>	ISO 8256/1
Flexural modulus, 23°C	<b>90 / -</b>	MPa	ISO 178
Puncture - maximum force, +23°C	<b>880 / -</b>	N	ISO 6603-2
Puncture - maximum force, -30°C	<b>1740 / -</b>	N	ISO 6603-2
Puncture energy, +23°C	<b>14 / -</b>	J	ISO 6603-2
Puncture energy, -30°C	<b>25 / -</b>	J	ISO 6603-2
Taber Abrasion Resistance, S33, 2x 500g	<b>&lt; 15 / -</b>	mg/100 cycles	DIN 53754

Mechanical properties (TPE)	dry / cond	Unit	Test Standard
Stress at 5% elongation	4.3 / -	MPa	ISO 527
Stress at 10% elongation	6.4 / -	MPa	ISO 527
Stress at 20% elongation	8.5 / -	MPa	ISO 527
Stress at 50% elongation	10 / -	MPa	ISO 527
Stress at 100% elongation	11.6 / -	MPa	-
Stress at 300% elongation	20.9 / -	MPa	ISO 527
Strain at break TPE	333 / -	%	ISO 527
Stress at break TPE	22.4 / -	MPa	ISO 527
Compression set at 70 °C, 24h	47 / -	%	ISO 815
Compression set at 100 °C, 24h	84 / -	%	ISO 815
Compression set at 23 °C, 24h	32 / -	%	-

Thermal properties	dry / cond	Unit	Test Standard
Melting temperature	150 / *	°C	ISO 11357-1/-3
Glass transition temperature, DSC	-60 / *	°C	ISO 11357-1/-2
Temp. of deflection under load B, 0.45 MPa	55 / *	°C	ISO 75-1/-2
Vicat softening temperature A, 10 N, 50 K/h	125 / *	°C	ISO 306
Vicat softening temperature B, 50 N, 50 K/h	60 / *	°C	ISO 306
Coeff. of linear therm. expansion, 23°C to 55 °C, parallel	240 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, 23°C to 55 °C, normal	210 / *	E-6/K	ISO 11359-1/-2
Melting Temperature	150	°C	ASTM D 3418

Physical properties	dry / cond	Unit	Test Standard
Density	1010 / 1020	kg/m <sup>3</sup>	ISO 1183
Water absorption	1 / *	%	Sim. to ISO 62
Humidity absorption	0.4 / *	%	Sim. to ISO 62
Shore D hardness	40 <sup>[b]</sup> / -	-	ISO 7619-1

Compression Set under constant strain, 23°C	<b>32 / -</b>	%	ISO 815
Compression Set under constant strain, 70°C	<b>47 / -</b>	%	ISO 815
Compression Set under constant strain, 100°C	<b>84 / -</b>	%	ISO 815
Density	<b>1010</b>	kg/m <sup>3</sup>	ASTM D 792

b: 3 seconds

<b>Burning Behav.</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>
UL Yellow Card available	<a href="#">yes</a> / *	-	-
Burning behav. at 1.5 mm nom. thickn.	<b>HB</b> / *	class	IEC 60695-11-10
Thickness tested	<b>1.5</b> / *	mm	-

<b>Electrical properties</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>
Volume resistivity, V	<b>2E9 / 3E8</b>	Ohm*m	IEC 62631-3-1
Surface resistivity, E	<b>*</b> / <b>2E13</b>	Ohm	IEC 62631-3-2
Relative permittivity, 100Hz	<b>7.5 / 9.5</b>	-	IEC 62631-2-1
Relative permittivity, 1MHz	<b>4.9 / 5.5</b>	-	IEC 62631-2-1
Dissipation factor, 100Hz	<b>700 / 3000</b>	E-4	IEC 62631-2-1
Dissipation factor, 1MHz	<b>1200 / 1200</b>	E-4	IEC 62631-2-1
Dielectric strength, AC, S20/S20, t. 1 mm	<b>- / 36</b>	kV/mm	IEC 60243-1
Dielectric strength, AC, S20/P50	<b>35 / -</b>	kV/mm	Sim. to IEC 60243-1

<b>Rheological properties</b>	<b>dry / cond</b>	<b>Unit</b>	<b>Test Standard</b>
Melt volume-flow rate, MVR	<b>40</b> / *	cm <sup>3</sup> /10min	ISO 1133
Temperature	<b>240</b> / *	°C	-
Load	<b>2.16</b> / *	kg	-
Molding shrinkage, parallel	<b>0.5</b> / *	%	ISO 294-4, 2577
Molding shrinkage, normal	<b>1.1</b> / *	%	ISO 294-4, 2577
Mold temperature	<b>35</b> / *	°C	-
Melt temperature	<b>200</b> / *	°C	-

VESTAMID®

**Polymer analytics**

Viscosity number

**dry / cond**

**190 / \***

**Unit**

cm<sup>3</sup>/g

**Test Standard**

ISO 307, 1157, 1628

**Test specimen production**

Injection Molding, melt temperature

**dry**

**180**

**Unit**

°C

**Test Standard**

ISO 294

Injection Molding, mold temperature

**35**

°C

ISO 294

Injection Molding, injection velocity

**200**

mm/s

ISO 294

Injection Molding, pressure at hold

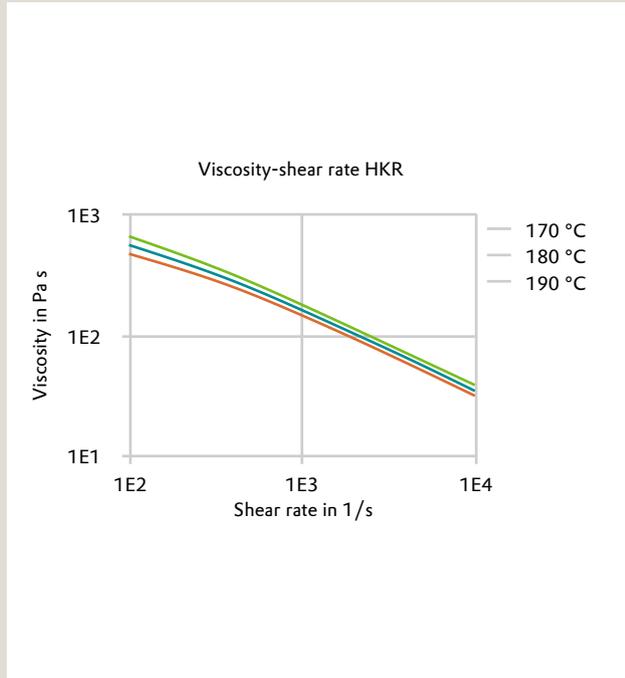
**70**

MPa

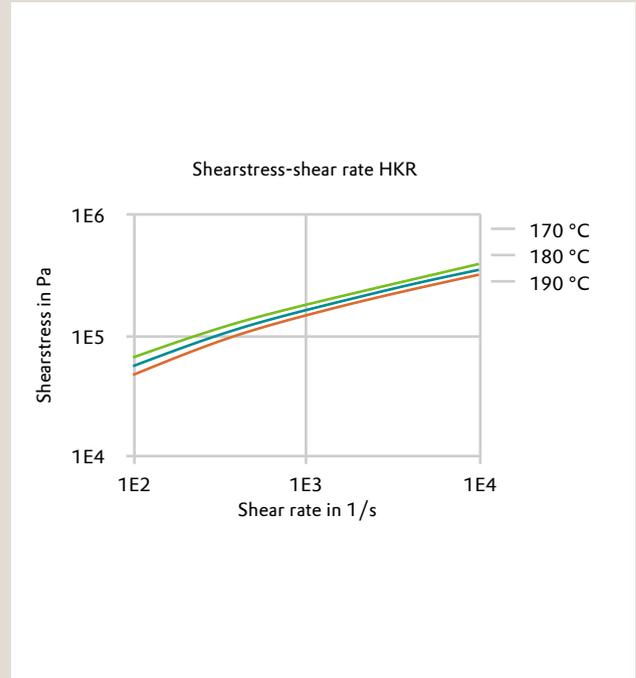
ISO 294

Diagrams

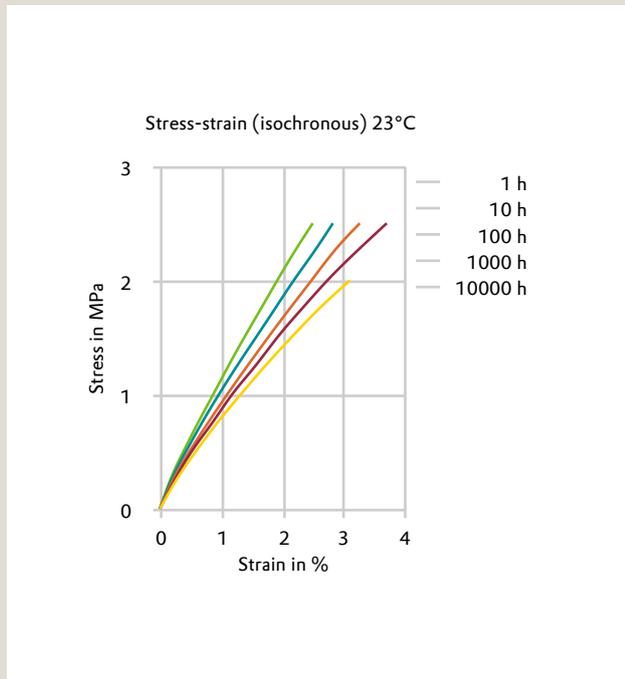
Viscosity-shear rate HKR



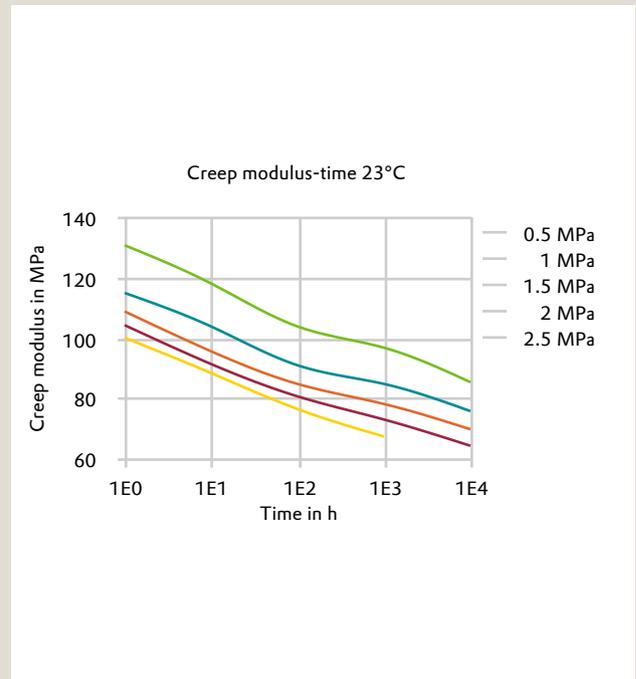
Shearstress-shear rate HKR



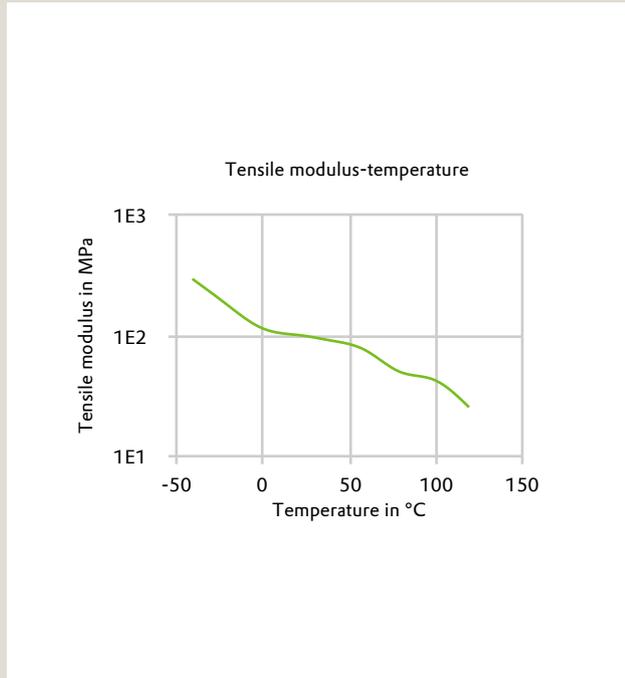
Stress-strain (isochronous) 23°C



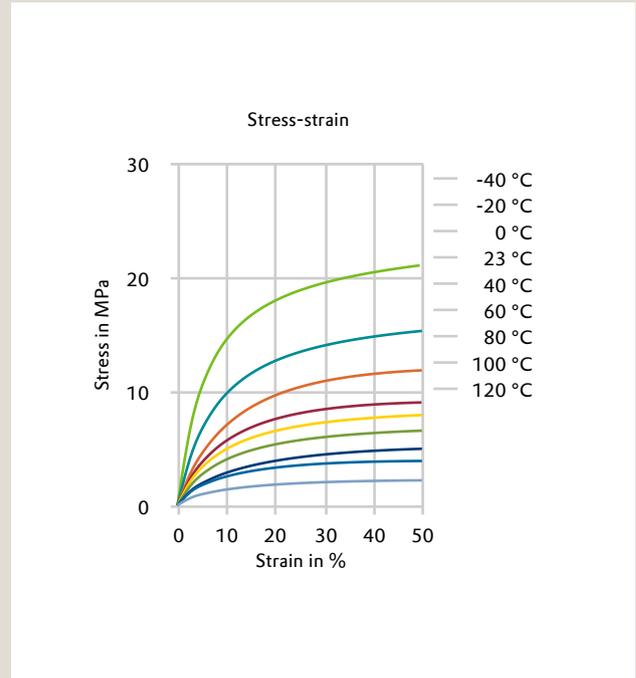
Creep modulus-time 23°C



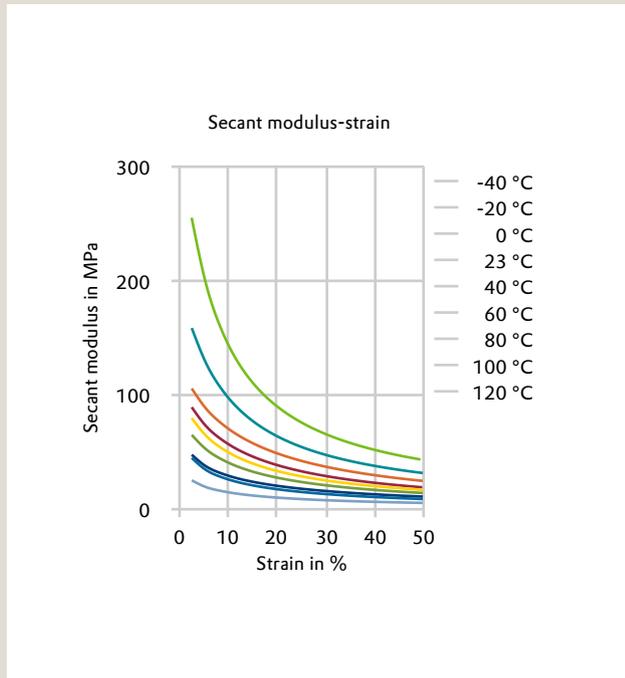
Tensile modulus-temperature



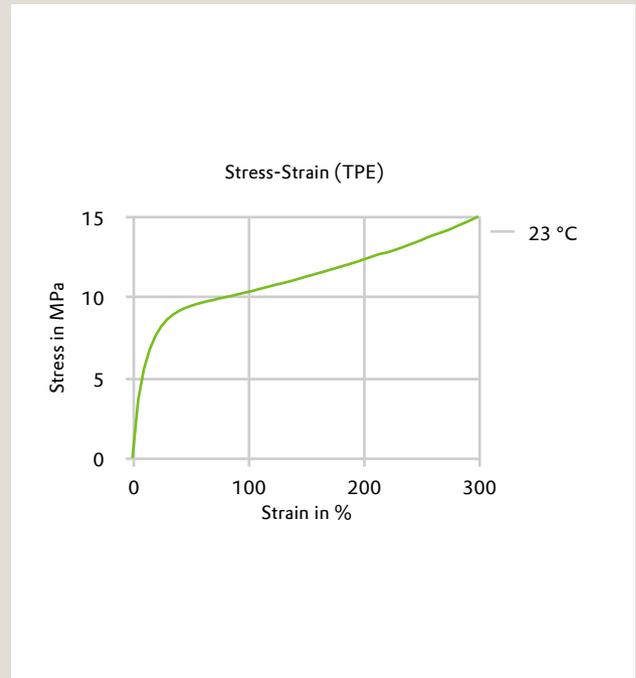
Stress-strain



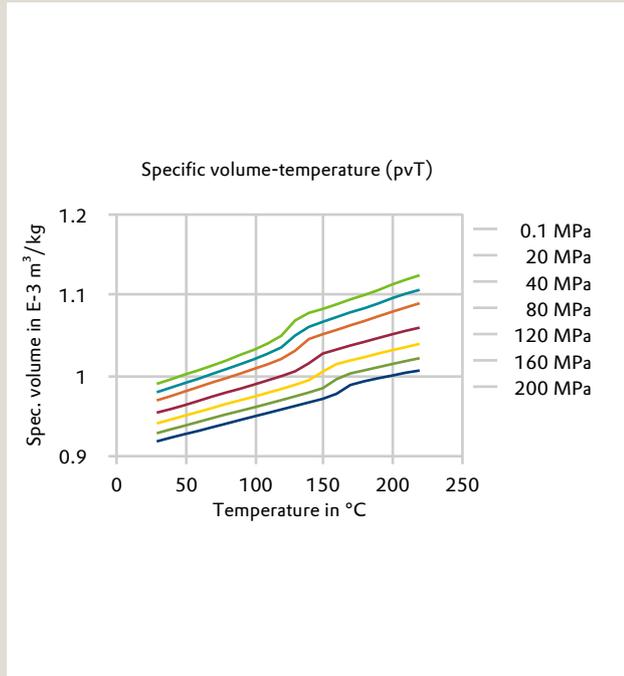
Secant modulus-strain



Stress-Strain (TPE)



**Specific volume-temperature (pvT)**



**Characteristics**

**Processing**

Profile extrusion

**Color**

Natural color

**Special Characteristics**

Light-stabilized, U.V. stabilized, High heat resistant

**Additives**

Plasticizer, Light stabilizer, Heat stabilizer

**Chemical Media Resistance**

**Acids**

- ✓ Acetic Acid (5% by mass) (23°C)
- ✓ Citric Acid solution (10% 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)

**Salt solutions**

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

**Other**

- ✓ Ethyl Acetate (23°C)
- ✓ Hydrogen peroxide (23°C)
- ✓ Water (23°C)

<b>Rheological calculation properties</b>	<b>dry</b>	<b>Unit</b>	<b>Test Standard</b>
Min. mold temperature	<b>15</b>	°C	-
Max. mold temperature	<b>40</b>	°C	-
Min. melt temperature	<b>180</b>	°C	-
Max. melt temperature	<b>220</b>	°C	-