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

Delivery form
Pellets, Granules

Sustainability
Sustainable electricity

Resistance to
Heat (thermal stability), UV / light / weathering

Processing
Injection molding, Extrusion

Additives
Unfilled

LCA-values	dry	Unit	Test Standard
LCA name of certificate	VESTAMID® E40	-	ISO 14040, 14044
LCA certifier	TÜV Rheinland	-	ISO 14040, 14044
Blue water consumption	**12.5**	kg	ISO 14040, 14044
Global Warming Potential incl. bio. C incl. LUC	**6.2**	kg CO_2 eq./kg	ISO 14040, 14044
Global Warming Potential excl. bio. C incl. LUC	**6.2**	kg CO_2 eq./kg	ISO 14040, 14044
Land use (ReCiPe 2016)	**0**	Annual crop eq. y	ISO 14040, 14044
GWP savings as compared to 2023 reference	**-1.3**	kg CO_2 eq./kg	ISO 14040, 14044

Mechanical properties ISO	dry / cond	Unit	Test Standard
Tensile modulus	**12600 / -**	psi	ISO 527
Tensile strength	**2470 / -**	psi	ISO 527
Stress at 50% strain	**1310 / -**	psi	ISO 527
Typical for the mat. nom. strain at br., tB	**200**	%	ISO 527
Tensile creep modulus, 0,5% Strain, 1h	*** / 11600**	psi	ISO 899-1
Tensile creep modulus, 0,5% Strain, 1000h	*** / 8700**	psi	ISO 899-1
Charpy impact strength, +23°C	**N / N**	ftlb/in^2	ISO 179/1eU
Charpy impact strength, -30°C	**N / N**	ftlb/in^2	ISO 179/1eU
Charpy notched impact strength, +23°C	**N / N**	ftlb/in^2	ISO 179/1eA
Charpy notched impact strength, -30°C	**N / N**	ftlb/in^2	ISO 179/1eA
Tensile-impact strength, notched, atN +23°C	**76.1 / 99.9**	ftlb/in^2	ISO 8256/1
Flexural modulus, 23°C	**13100 / -**	psi	ISO 178
Puncture - maximum force, +23°C	**198 / -**	lbf	ISO 6603-2
Puncture - maximum force, -30°C	**391 / -**	lbf	ISO 6603-2
Puncture energy, +23°C	**124 / -**	in-lb	ISO 6603-2
Puncture energy, -30°C	**221 / -**	in-lb	ISO 6603-2
Taber Abrasion Resistance, S33, 2x 500g	**< 15 / -**	mg/100 cycles	DIN 53754

Mechanical properties (TPE)	dry / cond	Unit	Test Standard
Stress at 5% elongation	**624 / -**	psi	ISO 527
Stress at 10% elongation	**928 / -**	psi	ISO 527
Stress at 20% elongation	**1230 / -**	psi	ISO 527
Stress at 50% elongation	**1450 / -**	psi	ISO 527
Stress at 100% elongation	**1680 / -**	psi	-
Stress at 300% elongation	**3030 / -**	psi	ISO 527
Strain at break TPE	**333 / -**	%	ISO 527
Stress at break TPE	**3250 / -**	psi	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	**302 / ***	°F	ISO 11357-1/-3
Glass transition temperature, DSC	**-76 / ***	°F	ISO 11357-1/-2
Temp. of deflection under load B, 0.45 MPa	**131 / ***	°F	ISO 75-1/-2
Vicat softening temperature A, 10 N, 50 K/h	**257 / ***	°F	ISO 306
Vicat softening temperature B, 50 N, 50 K/h	**140 / ***	°F	ISO 306
Coeff. of linear therm. expansion, 23°C to 55 °C, parallel	**0.000133 / ***	in/in/°F	ISO 11359-1/-2
Coeff. of linear therm. expansion, 23°C to 55 °C, normal	**0.000117 / ***	in/in/°F	ISO 11359-1/-2
Melting Temperature	**302**	°F	ASTM D 3418

Physical properties	dry / cond	Unit	Test Standard
Density	**1.01 / 1.02**	g/cm^3	ISO 1183
Water absorption	**1 / ***	%	Sim. to ISO 62
Humidity absorption	**0.4 / ***	%	Sim. to ISO 62
Shore D hardness	**40[b] / -**	-	ISO 7619-1

Compression Set under constant strain, 23°C	**32 / -**	%	ISO 815
Compression Set under constant strain, 70°C	**47 / -**	%	ISO 815
Compression Set under constant strain, 100°C	**84 / -**	%	ISO 815
Density	**1.01**	g/cm³	ASTM D 792

b: 3 seconds

Burning Behav.	**dry / cond**	**Unit**	**Test Standard**
UL Yellow Card available	yes **/ ***	-	-
Burning behav. at 1.5 mm nom. thickn.	**HB / ***	class	IEC 60695-11-10
Thickness tested	**0.0591 / ***	in	-

Electrical properties	**dry / cond**	**Unit**	**Test Standard**
Volume resistivity, V	**2E9 / 3E8**	Ohm*m	IEC 62631-3-1
Surface resistivity, E	*** / 2E13**	Ohm	IEC 62631-3-2
Relative permittivity, 100Hz	**7.5 / 9.5**	-	IEC 62631-2-1
Relative permittivity, 1MHz	**4.9 / 5.5**	-	IEC 62631-2-1
Dissipation factor, 100Hz	**700 / 3000**	E-4	IEC 62631-2-1
Dissipation factor, 1MHz	**1200 / 1200**	E-4	IEC 62631-2-1
Dielectric strength, AC, S20/S20, t. 1 mm	**- / 914**	kV/in	IEC 60243-1
Dielectric strength, AC, S20/P50	**889 / -**	V/mil	Sim. to IEC 60243-1

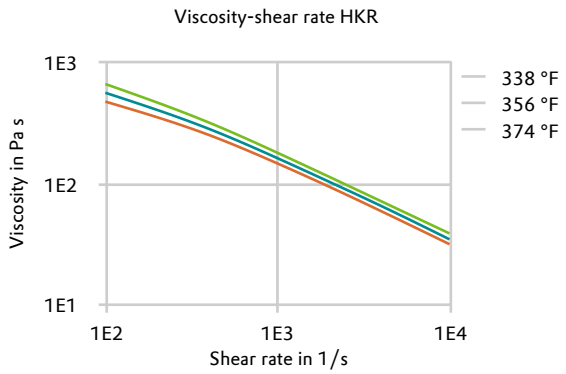
Rheological properties	**dry / cond**	**Unit**	**Test Standard**
Melt volume-flow rate, MVR	**40 / ***	cm³/10min	ISO 1133
Temperature	**240 / ***	°C	-
Load	**2.16 / ***	kg	-
Molding shrinkage, parallel	**0.5 / ***	%	ISO 294-4, 2577
Molding shrinkage, normal	**1.1 / ***	%	ISO 294-4, 2577
Mold temperature	**95 / ***	°F	-
Melt temperature	**392 / ***	°F	-

Polymer analytics	dry / cond	Unit	Test Standard
Viscosity number	**5260 / ***	in^3/lb	ISO 307, 1157, 1628

Test specimen production	dry	Unit	Test Standard
Injection Molding, melt temperature	**356**	°F	ISO 294
Injection Molding, mold temperature	**95**	°F	ISO 294
Injection Molding, injection velocity	**7.87**	in/s	ISO 294
Injection Molding, pressure at hold	**10200**	psi	ISO 294

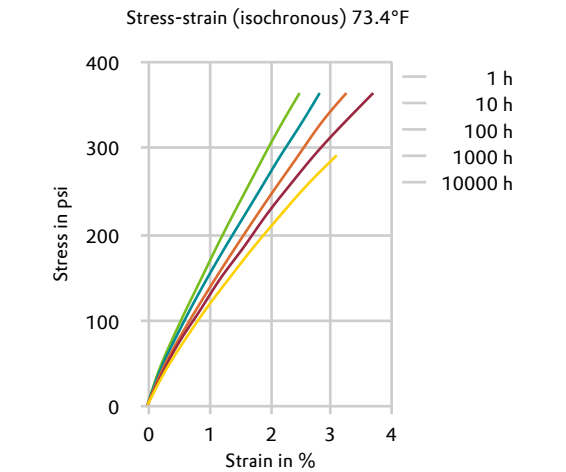
Diagrams

Viscosity-shear rate HKR

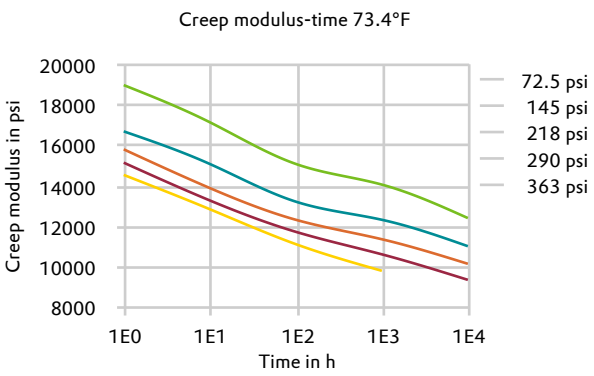


Shearstress-shear rate HKR

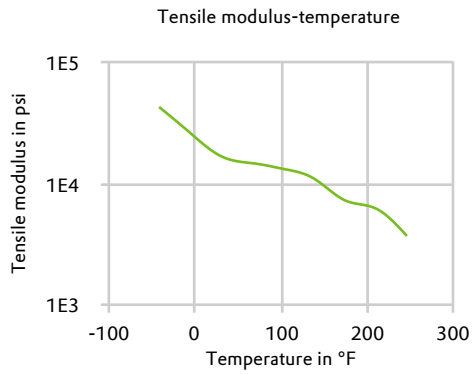
Stress-strain (isochronous) 73°F



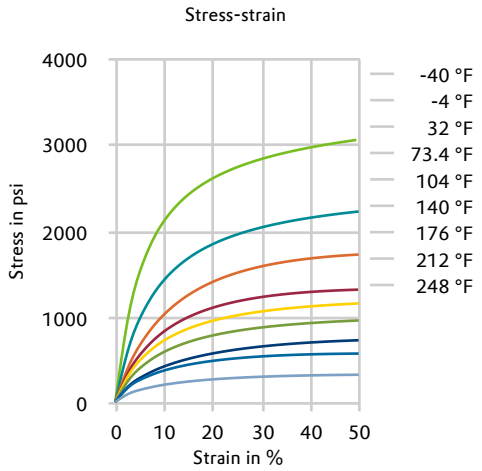
Creep modulus-time 73°F



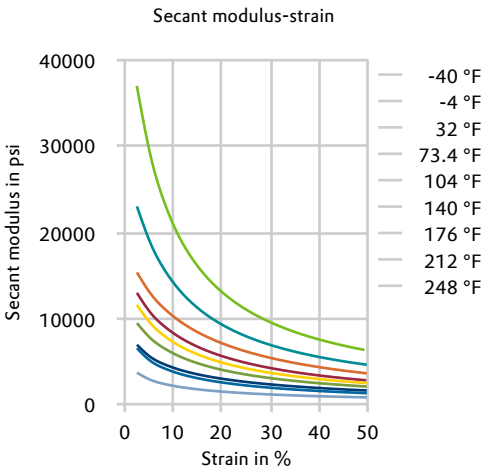
Tensile modulus-temperature



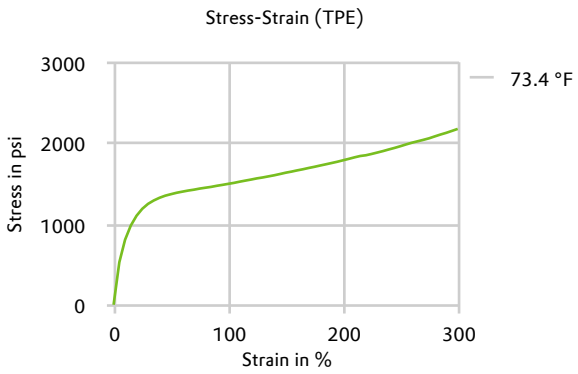
Stress-strain



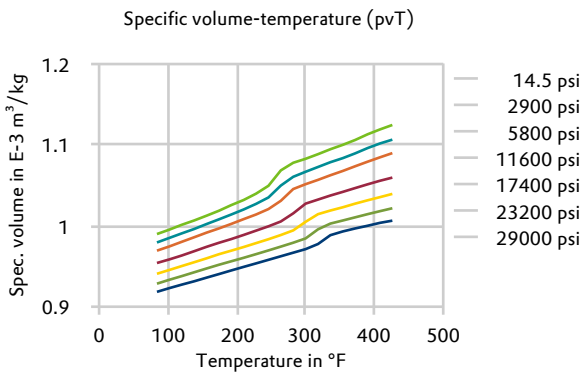
Secant modulus-strain



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)

Rheological calculation properties	dry	Unit	Test Standard
Min. mold temperature	**59**	°F	-
Max. mold temperature	**104**	°F	-
Min. melt temperature	**356**	°F	-
Max. melt temperature	**428**	°F	-