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.
Pigmentation may affect 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 shown have been generated from a low number of production lots. Therefore, they are preliminary and not yet the result of a statistical evaluation. Therefore they must not be used to establish specifications.

For information about processing of VESTAMID®, please follow the general commendations about "Processing of VESTAMID® compounds".

FOR FURTHER INFORMATION PLEASE CONTACT US AT EVONIK-HP@EVONIK.COM
OR VISIT OUR PRODUCT AT WWW.VESTAMID.COM

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	VESTAMID® E40	-	ISO 14040, 14044
LCA certifier	TÜV Rheinland	-	ISO 14040, 14044
Blue water consumption	**12.8**	kg	ISO 14040, 14044
Global Warming Potential incl. bio. C incl. LUC	**6.1**	kg CO_2 eq./kg	ISO 14040, 14044
Global Warming Potential excl. bio. C incl. LUC	**6.1**	kg CO_2 eq./kg	ISO 14040, 14044
Land use (ReCiPe 2016)	**0.2**	Annual crop eq. y	ISO 14040, 14044
GWP savings incl. bio. C. as compared to classical production	**1.4**	kg CO_2 eq./kg	ISO 14040, 14044

Mechanical properties ISO	dry / cond	Unit	Test Standard
Tensile modulus	**87 / -**	MPa	ISO 527
Tensile strength	**17 / -**	MPa	ISO 527
Stress at 50% strain	**9 / -**	MPa	ISO 527
Typical for the mat. nom. strain at br., εtB	**200**	%	ISO 527
Tensile creep modulus, 0,5% Strain, 1h	*** / 80**	MPa	ISO 899-1
Tensile creep modulus, 0,5% Strain, 1000h	*** / 60**	MPa	ISO 899-1
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	**N / N**	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30°C	**N / N**	kJ/m²	ISO 179/1eA
Tensile-impact strength, notched, atN +23°C	**160 / 210**	kJ/m²	ISO 8256/1
Flexural modulus, 23°C	**90 / -**	MPa	ISO 178
Puncture - maximum force, +23°C	**880 / -**	N	ISO 6603-2
Puncture - maximum force, -30°C	**1740 / -**	N	ISO 6603-2
Puncture energy, +23°C	**14 / -**	J	ISO 6603-2
Puncture energy, -30°C	**25 / -**	J	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	**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/m³	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	**1010**	kg/m³	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	**1.5 / ***	mm	-
Yellow Card available	yes **/ ***	-	-
Yellow Card available	yes **/ ***	-	-

Electrical properties	**dry / cond**	**Unit**	**Test Standard**
Volume resistivity, ρV	**2E9 / 3E8**	Ohm*m	IEC 62631-3-1
Surface resistivity, σE	*** / 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	**- / 36**	kV/mm	IEC 60243-1
Dielectric strength, AC, S20/P50	**35 / -**	kV/mm	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

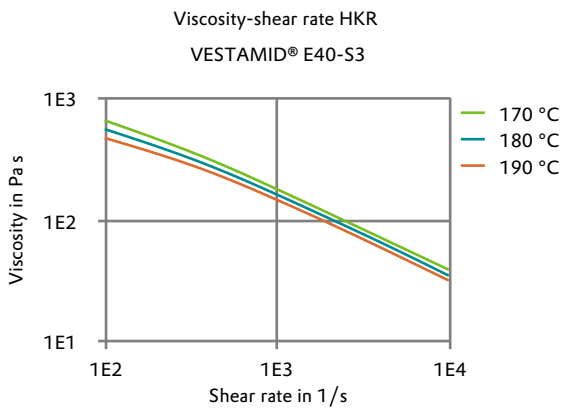
Mold temperature	**35 / ***	°C	-
Melt temperature	**200 / ***	°C	-

Polymer analytics	**dry / cond**	**Unit**	**Test Standard**
Viscosity number	**190 / ***	cm^3/g	ISO 307, 1157, 1628

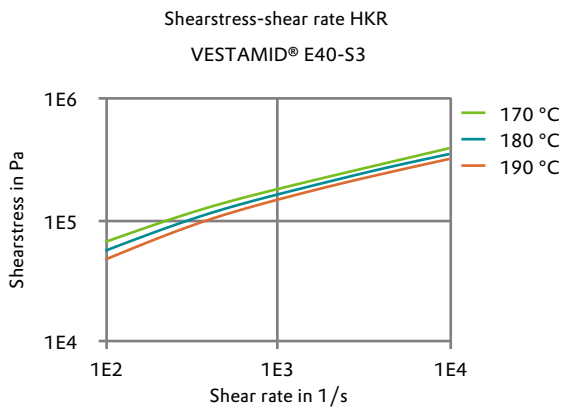
Test specimen production	**dry**	**Unit**	**Test Standard**
Injection Molding, melt temperature	**180**	°C	ISO 294
Injection Molding, mold temperature	**35**	°C	ISO 294
Injection Molding, injection velocity	**400**	mm/s	ISO 294
Injection Molding, pressure at hold	**70**	MPa	ISO 294

Diagrams

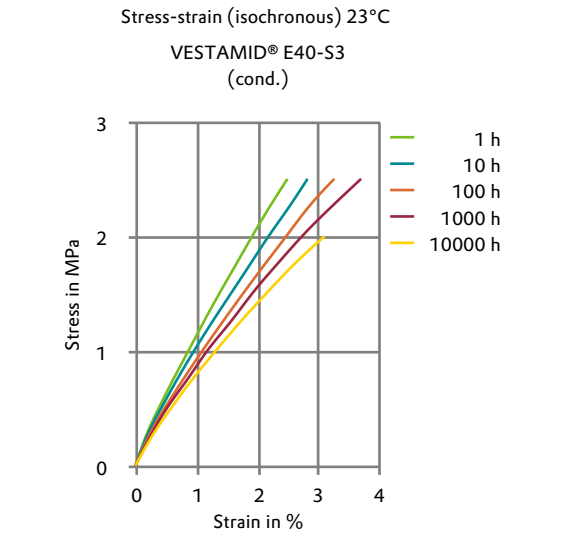
Viscosity-shear rate HKR



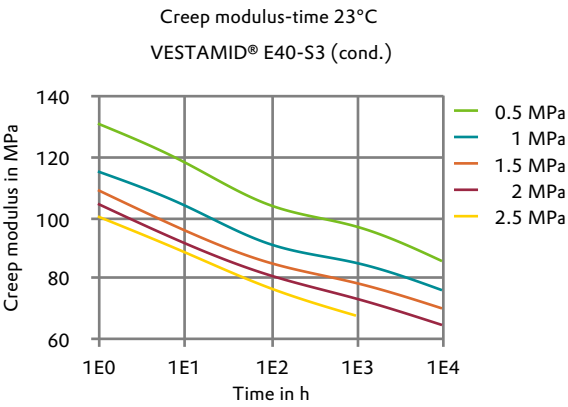
Shearstress-shear rate HKR



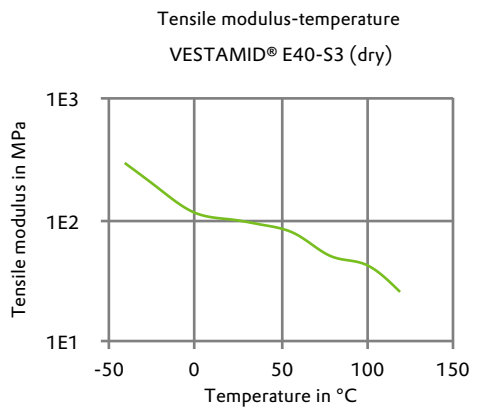
Stress-strain (isochronous) 23°C



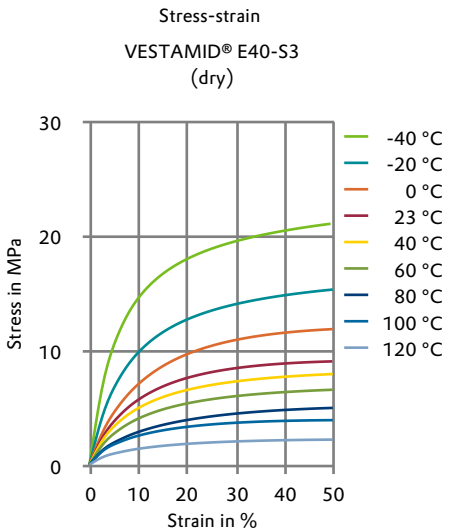
Creep modulus-time 23°C



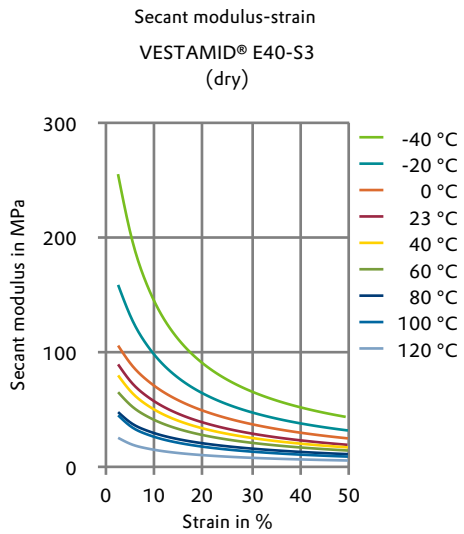
Tensile modulus-temperature



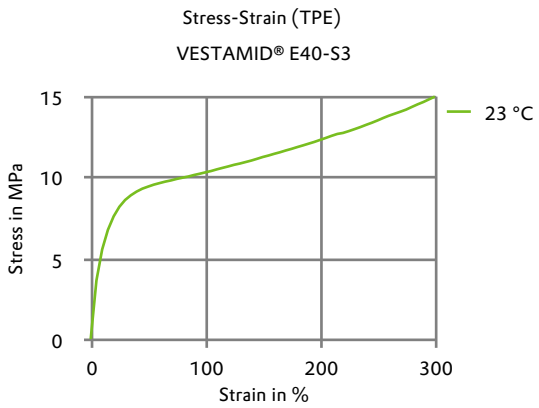
Stress-strain



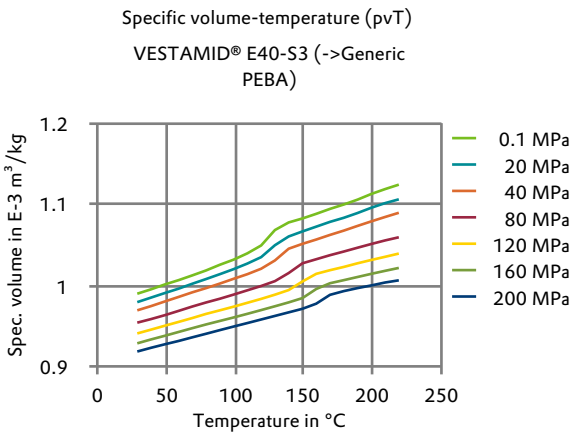
Secant modulus-strain



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)

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

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