

Function Meets Design

Innovative Material Solutions for the
Sports Industry





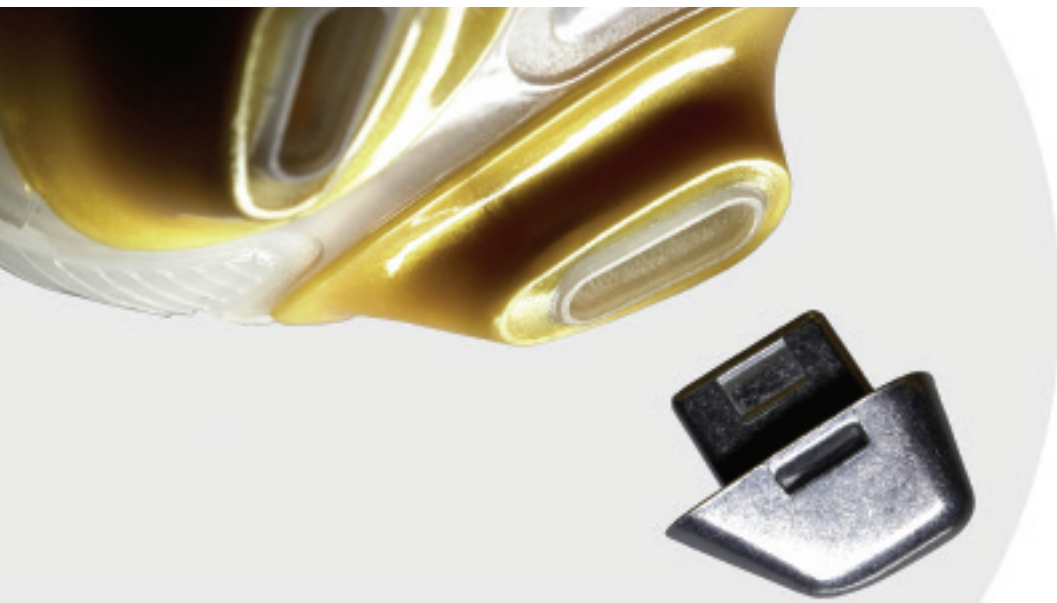
Function meets design

Partner of Leading Sports Equipment Manufacturers

Evonik Industries is the German-based creative industrial group which operates in the three business areas Chemicals, Energy and Real Estate. Evonik is a global leader in specialty chemicals.

Together with the Acrylic Monomers and Acrylic Polymers Business Lines the High Performance Polymers Business Line is a part of the Performance Polymers Business Unit. It is specialized in manufacturing customized products and systems, and has been producing high-performance plastics for over 40 years.

Established for more than 20 years as an innovative supplier to the sporting goods industry, High Performance Polymers has given a new meaning to the claim "function meets design". As a partner in development and a producer of high performance polymers with a global production, sales and service network, we have been able to contribute substantially to the successful implementation of the new ideas and product concepts of leading sports equipment manufacturers. In our Marl, Darmstadt, and Shanghai research centers we develop, in close consultation with the sporting goods industry, innovative material solutions that will enable our customers to meet market requirements, now and in the future.



Our products for the sports industry

- VESTAMID® L grades are PA 12-based compounds that are stabilized, reinforced, colored, and plasticized, depending on the application. They are used for manufacturing decorative films, functional parts, and cleats.
- VESTAMID® E grades are PEBA-based compounds in a wide range of flexibility and hardness. Specialty grades exhibit high transparency, excellent bonding to, e.g., TPU, and high dynamic capacity. They are suited for sports shoe soles and components, and for decorative films.
- The transparent specialty polyamides TROGAMID® CX can be processed into transparent functional and decorative parts, as well as frames and lenses of sports glasses.
- ROHACELL® is the brand for our PMI hard foam that is used as core material in cross-country and touring skis, snow- and surfboards, and racing bikes.





Whether they're top-level professionals or playing just for fun, athletes today have three main requirements of their equipment:

**functionality,
comfort,
and design.**

Our VESTAMID® E-series (PEBA) molding compounds are distinguished by **outstanding property profiles**. Resilience, abrasion, and flexibility, for example, allow the production of functional parts capable of withstanding high mechanical and dynamic stress.

A variety of **adhesion-optimized** molding compounds is available for environmentally compatible yet cost-effective production of shoe sole components. In our development centers we are working intensively on the development and processing of **multi-component systems**.

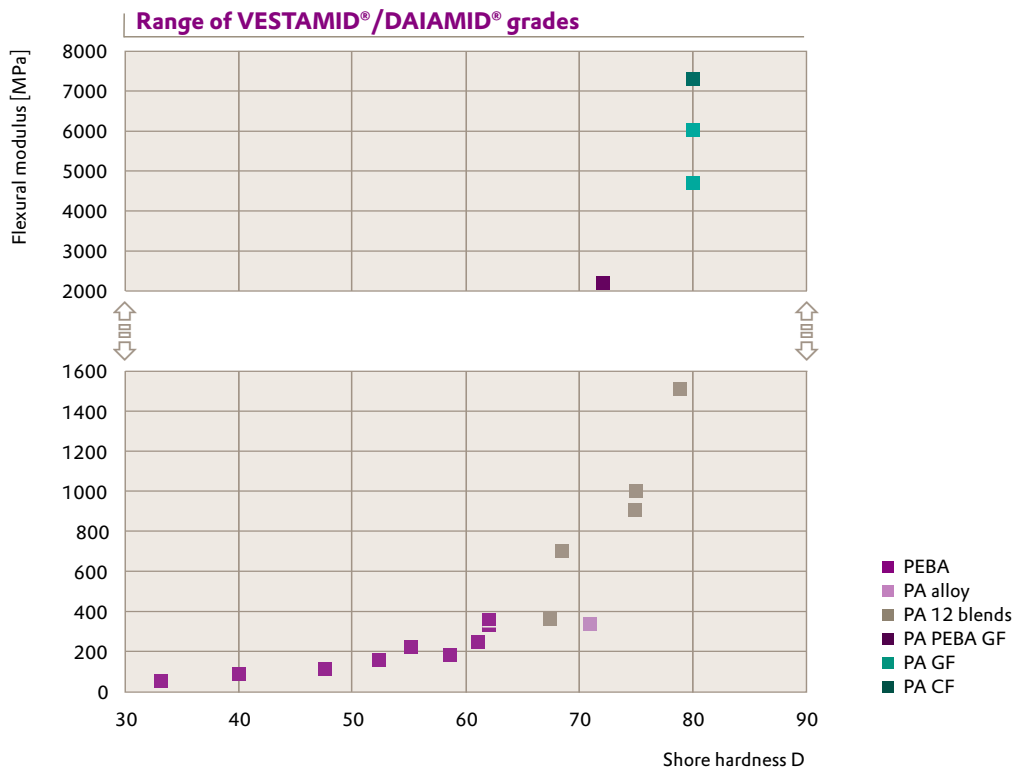
We satisfy highest design requirements with **decorative films** from our

VESTAMID® range of molding compounds. These can be excellently printed by all current methods and simultaneously provide a protective outer layer, for example for skis.

And because a first-rate technical concept alone does not necessarily lead to market success, we ensure, by way of our **transparent** molding compounds of the VESTAMID® and TROGAMID® series, that the results are clearly visible.

Performance sports equipment has to be lightweight, yet able to withstand extreme dynamic stresses. That's why **performance composites** contain ROHACELL® structural foam at the core.





Overview of the physical properties of the VESTAMID®/DAIAMID® grades

	VESTAMID/ DAIAMID	Description	Flexural modulus [MPa]	Transpar- ency (2mm plates)	Bond to TPU (ether/ ester)	Shore hardness D	Tensile modulus [MPa]	Tensile strength [MPa]	Strain at break [%]
1	■ E30-S4	PEBA	45	A	A	33	46	16	500
2	■ E40-S1	PEBA	80	C	C	40	80	23	300
3	■ E47-S3 (S4)	PEBA	120	C	C	47	120	32	300
4	■ E55K1-W2	PEBA	170	C	C	53	210	21	300
5	■ E58-S4	PEBA	190	A	A	58	200	39	300
6	■ E55-S3 (S4)	PEBA	210	C	D	55	220	36	300
7	■ E62K1-W2	PEBA	240	C	D	61	330	36	300
8	■ E62-S3 (S4)	PEBA	340	C	E	62	360	38	300
9	■ A5595	PA alloy	350	A	B	71	450	57	380
10	■ E62K2	PEBA	360	C	A	62	380	48	440
11	■ ZE7000	PA 12 blends	380	C	E	67	440	40	280
12	■ EX9200	PA 12 blends	700	C	E	68	750	52	309
13	■ LX9012	PA 12 blends	920	B	B	75	1000	46	240
14	■ LX9016	PA 12 blends	1000	A	B	75	1100	35	200
15	■ Select	PA 12 blends	1500	B	B	78	1860	41	330
16	■ ZE7200	PA PEBA GF	2100	C	D	72	2700	61	16
17	■ L1833	PA GF	4819	C	C	80	5000	104	6
18	■ L-GF30	PA GF	6000	C	C	80	6500	120	5
19	■ L-CF15	PA CF	7300	C	C	80	8000	120	5

A: clear
B: lightly opaque
C: milky

A: excellent
B: very good
C: good
D: normal
E: poor

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