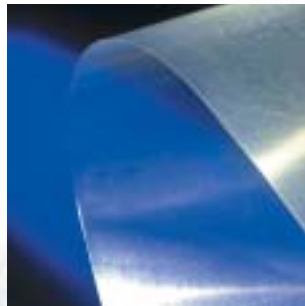
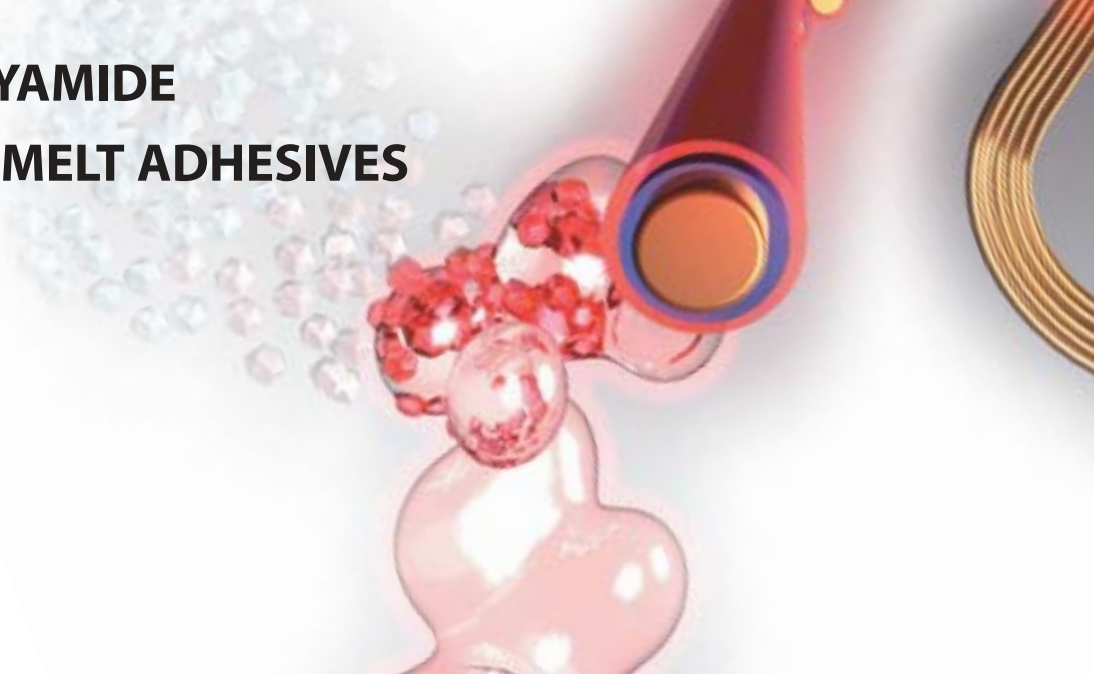


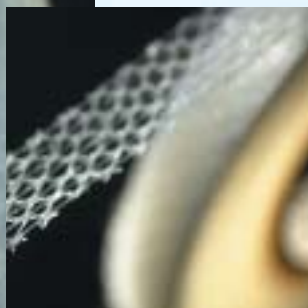
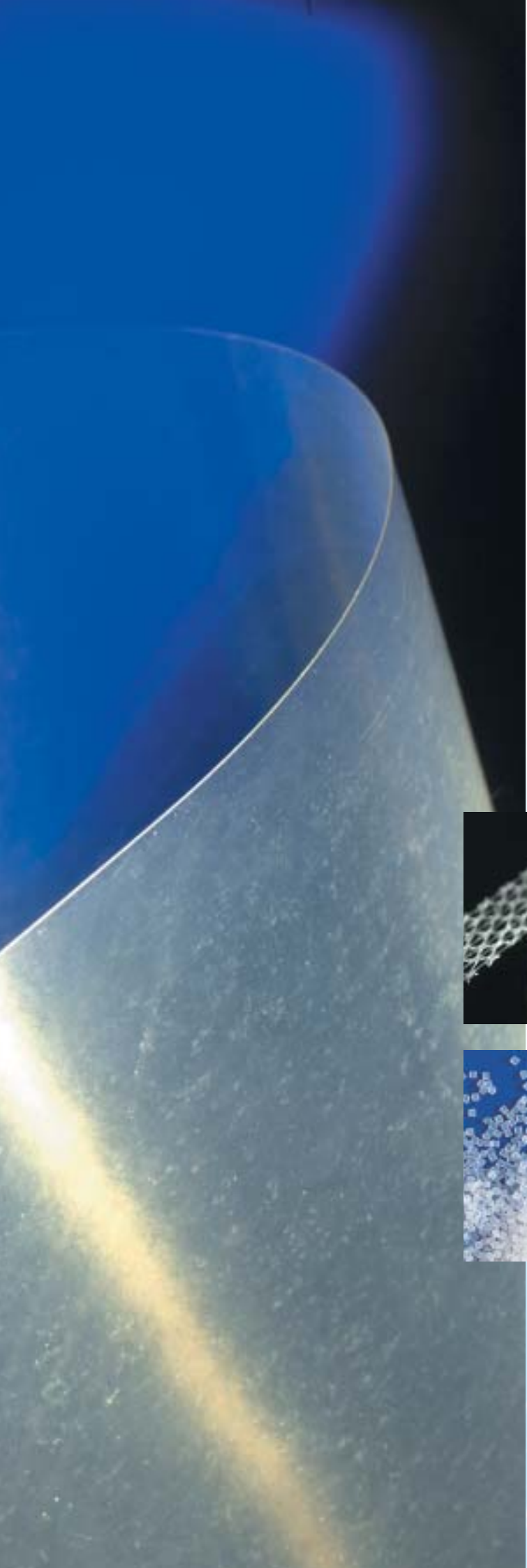
degussa.

creating essentials



**COPOLYAMIDE
HOTMELT ADHESIVES**





VESTAMMELT®

Content

Content

1 Introduction	4
2 Processing	5
3 Properties	7
4 Applications	10
5 Quality	12
6 Environmental Impact and Safety	14
7 Supply and Packaging	15



1 Introduction

The High Performance Polymers Business Unit of the Degussa AG manufactures a line of customized hotmelt adhesives under the trade name VESTAMELT®.

Used in a variety of industries, it provides all applications with a good balance of

- high-quality service properties,
- easy and reliable processing,
- and high cost-effectiveness.

These advantages provide for a wide range of products with certain optimized features, depending on the application. Extensive market knowledge and close relationships with our customers allow us to detect changing needs early on and respond quickly with new developments. We benefit from our back-integrated production.

Copolyamides are second to none when it comes to bonding textiles, that is, textile interlinings. Of the many polyamide hotmelt adhesives, the most suitable are those which, like VESTAMELT, contain laurilactam as an essential monomer. Only these hotmelt adhesives have melting points that allow textiles to be fixed efficiently and damage-free and to withstand washing and dry cleaning admirably.



Powders

Many industrial applications require the use of hotmelt adhesives in powder form. To obtain this powder, the VESTAMELT granules are embrittled with liquid nitrogen and cold-ground. The following table shows an overview of particle sizes and their respective applications:

	Particle size	Application	Substrate	Engravings
P 1	0–80 µm	Powder dot	Light fabrics, light charmeuse	25–40 mesh, CP 66–110
		Paste dot	Nonwoven 10–14 g/m ²	11–40 mesh, CP 32–160
P 816	80–160 µm	Double dot	Woven interlining, charmeuse (10–80 g/m ²)	
P 012 P 016	0–120 µm 0–160 µm	Powder dot	Knitted interlining (double-rib knits), woven interlining	25–30 mesh, CP 66–110
P 2	80–200 µm	Powder dot	Knitted interlining, woven interlining	11–20 mesh, CP 32–81
		Double dot	Knitted interlining, woven interlining, knitted fabric	
P 3	200–300 µm	Powder scattering	Needle punched nonwoven 30–50 g/m ² , light fabric	
P 4	300–500 µm	Powder scattering	Needle punched nonwoven > 250 g/m ² , glass fabric >250 g/m ²	

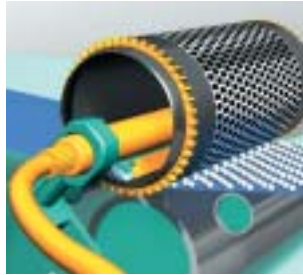
Granules

Here is an overview of common applications with granulate hotmelt adhesives:

Application form	Process	Coating machine	Application
Hotmelt coating	Hotmelt dot	Meltprint, screen print	Interlinings, laminates
Adhesive films	Extrusion	Chill roll, slot nozzle	Laminates
Adhesive nets	Extrusion	Melt nozzle	Laminates
Spunbond nonwoven	Extrusion	Spinning jet	Laminates
Fibers	Extrusion	Nozzle	Adhesive yarn
Rods	Extrusion	Nozzle	Monofilaments
Self-bonding varnishes	Dipping (from solution)	Dipping bath	Deflection yokes

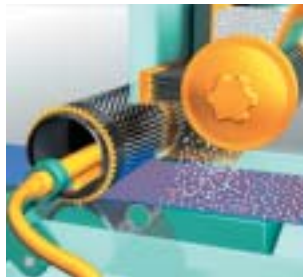
Processing

VESTAMELT powder or granulates can be applied to substrates by means of typical processes. For each of these processes, you can request a separate in-depth brochure. The brochures' titles match the following headings.



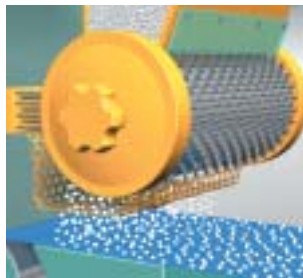
Paste Dot

- Powder application for nonwoven fabric, double-rib knits and special fabrics
- Grain sizes between 0 and 80 μm
- Used in textiles for the garment industry



Double Dot

- Powder application for the base dot and top dot
- Grain sizes between 0 and 80 μm for the base dot, and between 80 and 200 μm for the top dot
- Used in textiles for the garment industry



Powder Scattering

- Powder application for many substrates
- Grain sizes between 160 and 500 μm
- Used primarily for industrial textiles



Powder Dot

- Powder application for fabrics, double-rib knits and thermally stable nonwovens
- Grain sizes between 0 and 200 μm
- Used in textiles for the garment industry



Hotmelt Print/Extrusion

- Granulate application for hotmelt gravure, hotmelt screen print, slit die extrusion and adhesive footers and for forming foils, nets, nonwoven fabrics and filaments
- Used primarily for industrial textiles



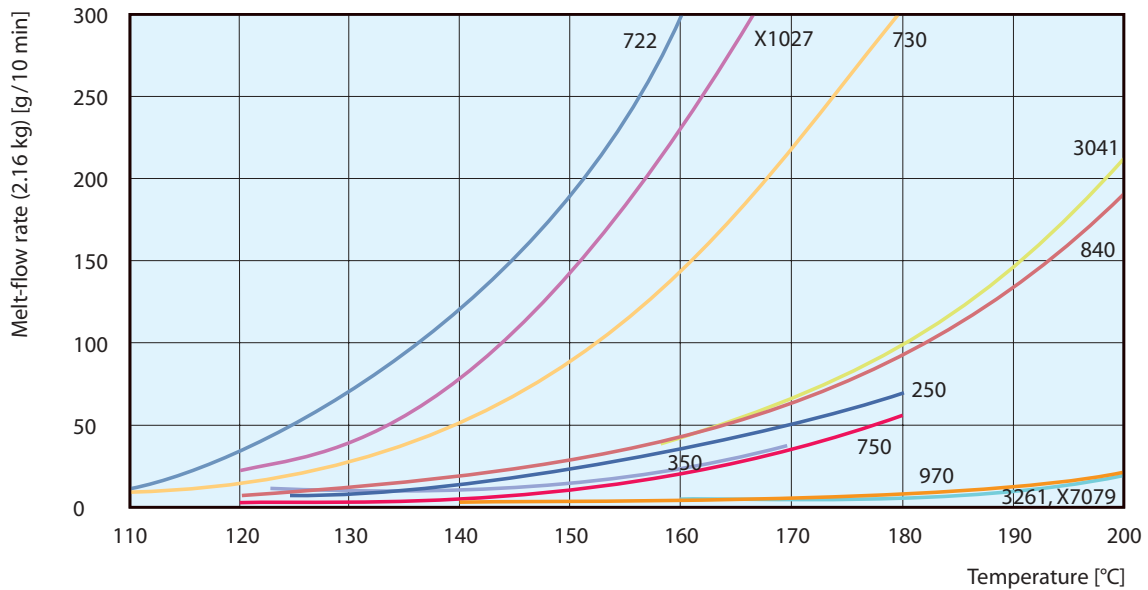
Self-Bonding Varnishes

- Granulate application for manufacturing baked enamels for coil wires
- Used in the electronics industry for TV and monitor deflection yokes, head sets, small motors

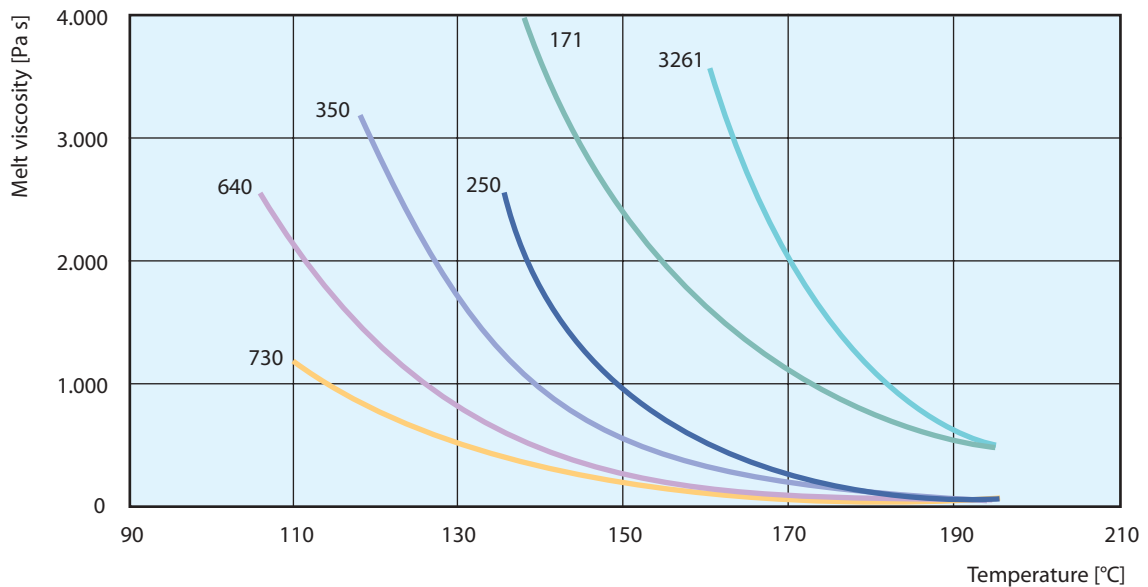
Properties

3 Properties

As mentioned above, High Performance Polymers is well placed to offer hotmelt adhesives custom-made to customer specifications and market needs. The following figures and the table of deliverable hotmelt adhesives provide an overview of the broad property profile.



Melt-flow rate: The curve labeling corresponds to the VESTAMELT grade.



Melt viscosity: The curve labeling corresponds to the VESTAMELT grade (high-pressure capillary rheometer, angular frequency: 100 s^{-1}).

Properties

	VESTAMELT grade	Processing						Kofler bar		Melting points	
		Paste dot	Double dot	Powder scattering	Powder dot	Hotmelt print extrusion	Self-bonding varnish	Tack point	Melting point	Optical	DSC
								°C	°C	°C	°C
Copolyamides	171	x				x		105	130	136	115
	250	x	x		x			120	135	135	123
	251					x		120	135	135	123
	253			x				120	135	135	123
	350	x		x	x			95	120	122	105
	351					x		95	120	122	105
	432					x		95	115	116	110
	450	x		x	x			100	120	117	110
	451						x	100	120	117	110
	471						x	100	120	119	112
	640	x				x		90	105	96	76
	722					x		95	105	107	100
	730	x	x	x	x			95	105	108	100
	732					x		95	105	108	100
	742					x		95	105	108	100
	750	x		x	x			95	105	108	100
	753				x			95	105	108	100
	840	x	x		x	x		100	120	121	113
	932	x	x	x	x	x		100	115	119	116
	940	x	x	x	x	x		100	115	119	116
970	x			x			100	115	119	–	
3041					x		140	155	157	138	
3261					x		135	160	160	159	
X4685						x	135	160	160	–	
X7079						x	135	155	138	130	
X1010						x	130	180	185	–	
Development products ¹⁾	X1027	x	x			x		110	125	120	110
	X1038					x		120	135	135	123
	X1310	x	x					110	125	117	110
	X1316	x	x					120	135	135	123

¹⁾ = available upon request

²⁾ = at 180 °C

³⁾ = at 230 °C

⁴⁾ = increase in molecular weight is possible above 150 °C

+++ = very good

++ = good

+ = satisfactory

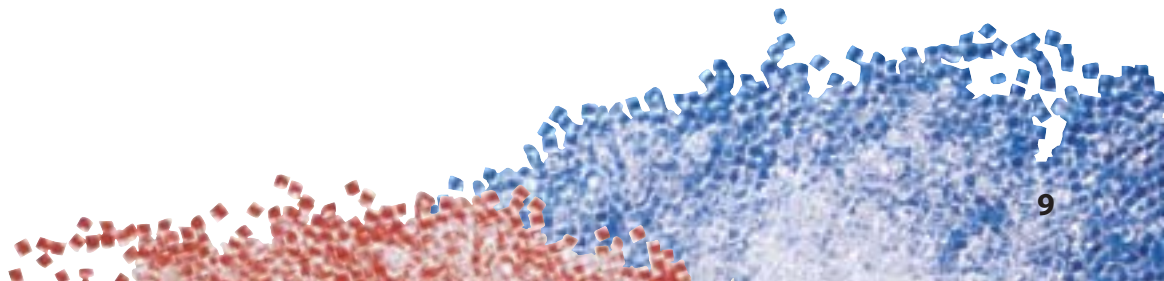
o = adequate

^{c)} = crosslinkable grades, crosslinking starts at 160 °C, temperature action takes at least 30 s

G = granules

P = powder

Viscosities		Resistance to...			Heat-setting conditions			Supply form	VESTAMELT grade
Melt flow rate 160 °C/2.16 kg	Solution viscosity	Washing at	Dry cleaning	Steam	Temperature	Pressure	Time		
g/10 min		60 °C			°C	N/cm ²	s		
8	1.7							G, P	171
30	1.5	+++	+++	+++	140–160	3–5	10–20	G, P	250
30	1.5	+++	+++	+++	140–160	3–5	10–20	G	251
30	1.5	+++	+++	+++	140–160	3–5	10–20	G, P	253
22	1.5	++	+++	+	130–150	3–5	10–20	G, P	350
22	1.5	++	+++	+	130–150	3–5	10–20	G	351
130	1.3	++	+++	+	130–150	3–5	10–20	G	432
22	1.5	++	+++	++	130–150	3–5	10–20	G, P	450
22	1.5	++	+++	+	130–150	3–5	10–20	G	451
6	1.7							G, P	471
30	1.4	o	++	o	100–140	1–2	5–15	G, P	640
310	1.2	+	+++	o	110–140	1–3	5–20	G	722
125	1.3	++	+++	+	120–150	2–5	10–20	G, P	730
125	1.3	++	+++	+	120–150	2–5	10–20	G	732
20	1.4	++	+++	+	120–150	3–5	10–20	G	742
13	1.5	++	+++	+	120–150	3–5	10–20	G, P	750
13	1.5	++	+++	+	120–150	3–5	10–20	G, P	753
40	1.4	++	+++	++	120–150	3–5	10–15	G, P	840
100	1.3	++	+++	++	130–150	3–5	10–15	P, G	932
40	1.4	++	+++	++	130–150	3–5	10–15	P, G	940
3	1.7	++	+++	++	130–150	3–5	10–15	P, G	970
45	1.4							G	3041
7 ²⁾	1.6							G	3261
3 ²⁾	1.4							G	X4685
7 ²⁾	1.7							G	X7079
5 ³⁾	1.7							G	X1010
220	1.3	+++	+++	++	120–150	3–5	10–15	P, G	X1027
16	1.5	+++	+++	+++	140–160	3–5	10–15	P, G	X1038
110 ⁴⁾	1.3	+++	+++	+++	120–150 ^{o)}	3–5	10–60 ^{o)}	P	X1310
20 ⁴⁾	1.5	+++	+++	+++	130–150 ^{o)}	3–5	10–60 ^{o)}	P	X1316



Applications

4 Applications



Textile industry

Many VESTAMELT hotmelt adhesives are used in the garment industry to bond interlinings in women's and men's garments. In addition, they are successfully used in technical textile manufacturing.

Automotive industry

VESTAMELT is used in various automotive applications such as door paneling, headliners, interior trim, rear window shelves and seat heaters. Depending on the required resistance to heat, the grades 250, 350 or 732 are suitable.



If special thermal stability is required, the thermally cross-linking VESTAMELT hotmelts X1310 and X1316 are recommended.

Reliable bonding of paper to aluminum, for example, for the construction of fuel filters, is provided by either VESTAMELT 3041 or 3261, depending on the type of fuel.



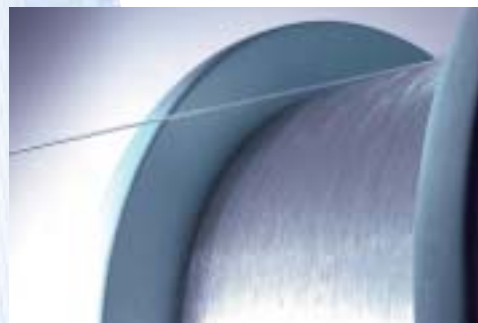
Electronics industry

To make deflection yokes, insulated wires are coated with hotmelt varnishes and bonded together by inductive heat. The dimensionally stable coils obtained in this way find application in many electrical and electronic appliances and instruments. Depending on the various applications such as monitors, TV sets, and audio or video equipment, we recommend VESTAMELT 451, 471, X4685, X7079, X1010 or polyamide 12 VESTAMID® N1901.



Construction industry

Copolyamide hotmelt adhesives permit cost-effective manufacture of advanced components. Windows, ceilings, carpets and acoustic insulation systems with lightweight panels are bonded with VESTAMELT 171, 250, 350, 730 or X1038.



5 Quality

Quality

Like all products of the High Performance Polymers Business Unit, VESTAMELT hotmelt adhesives satisfy the highest quality standards. Our system for quality assurance is certified according to ISO 9001:2000. In several audits conducted by our customers, this quality management system received excellent ratings. Depending on the delivery form and application, suitability and consistent quality of our hotmelt adhesives are tested essentially by the following methods:

Optical melting point (capillary method)

The product is introduced into a capillary and melted in an oven with a light source at its center. The light transmission increase of the sample at the start of melting is recorded as the melting point.

Kofler melting point

Product is scattered onto a heating bench to supplement the optical melting point determination. This is a quick and straightforward way of providing information on the melting point and adhesion point.

Melting point (DSC)

The sample and an empty reference crucible are heated according to a specified program. The difference in the absorbed heat quantity is determined. As a rule, the results of the second heating are recorded. The maximum of the melt peak is considered the melting point.



Melt-flow rate (MFR)

The determination of the melt-flow rate according to ISO 1133 is used to evaluate the flow behavior and melt viscosity of the product. Ten grams of sample dried under specified conditions is placed in a tempered metal cylinder and subjected to a load of 21.6 Newtons with a cylindrical punch. The sample quantity that flows through a standardized discharge nozzle within a specified length of time is determined and expressed in g/10 min.

Relative solution viscosity

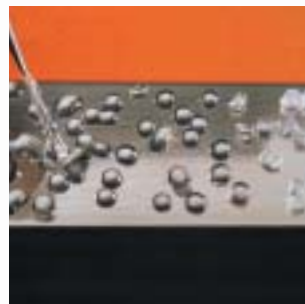
The measurement is taken on the basis of ISO 307. The exit time of the solvent m-cresol (t_0) and the polyamide dissolved in m-cresol (t) at 25° C provides the relative solution viscosity according to the formula $\eta_{rel} = t/t_0$.

Particle size distribution

To determine the particle size distribution according to ISO 4610, screens of different mesh width are used depending on the powder type. For example, powders with a particle size distribution of 0–80 μm are tested with screens of mesh widths 50 μm , 80 μm , 90 μm and 100 μm . Ten grams of product is sieved for 5 minutes; subsequently, the sieve throughput is determined.

Bulk density

About 110 ml of product is allowed to flow out of a funnel into a graduated cylinder. The bulk density is the quotient of mass and volume (ISO 60).



6 Environmental Impact and Safety

VESTAMELT hotmelt adhesives are non-toxic substances that do not pose a hazard to water and are not governed by any particular safety regulations. They can be disposed of in landfills or incinerated as normal household waste in accordance with local ordinances. Further information can be obtained from the EC safety data sheet for the various VESTAMELT hotmelt adhesives.

No dangerous by-products are formed if VESTAMELT is processed correctly. Care should be taken, however, to ventilate the working area properly, as is required when processing thermoplastics. Dust formation must be avoided. If dust occurs, steps must be taken to prevent electrostatic charges and to stay away from ignition sources.

VESTAMELT hotmelt adhesives are combustible. Flammable gases are released at melt temperatures above 300° C. Combustion with sufficient air supply produces carbon monoxide (CO), carbon dioxide (CO₂), water (H₂O), and nitrogen-containing compounds as end products. Since the spectrum of crack and combustion products depends to a large extent on combustion conditions, it is not possible to make any general statements here.



7 Supply and Packaging

VESTAMELT hotmelt adhesives are delivered as a dry, ready-to-process powder in multi-layer, PE-laminated paper bags or as a granulate in foil-laminated bags with a net weight of 20 kg. One shipping unit consists of a non-returnable pallet measuring 1,000 x 1,200 mm and is loaded with 50 bags.

On demand we also deliver VESTAMELT in octabins with a net weight of 1,000 kg of granules and 800 kg of powder or in bigbags filled with 500 or 600 kg of powder, depending on bulk density. Both kinds of bulk packaging are delivered on non-returnable pallets measuring 1,140 x 1,140 mm.

The storage time of unopened packages is almost unlimited under ordinary storage conditions, unless the packaging is damaged.



This information and all further technical advice is based on our present knowledge and experience. However, it implies no liability or other legal responsibility on our part, including with regard to existing third party intellectual property rights, especially patent rights. In particular, no warranty, whether expressed or implied, or guarantee of product properties in the legal sense is intended or implied. We reserve the right to make any changes according to technological progress or further developments. The customer is not released from the obligation to conduct careful inspection and testing of incoming goods. Performance of the products described herein should be verified by testing, which should be carried out only by qualified experts in the sole responsibility of a customer. Reference to trade names used by other companies is neither a recommendation, nor does it imply that similar products could not be used.

® = registered trademark

Your technical contacts:

Martin Risthaus
Phone: +49 2365 49-4356
e-mail: martin.risthaus@degussa.com

Paul-Ludwig Waterkamp
Phone: +49 2365 49-6734
e-mail: paul-ludwig.waterkamp@degussa.com

Your contact for the Americas:
Kenneth Werner
Phone: +1 973 541-8397
Fax: +1 973 541-8390
e-mail: kenneth.werner@degussa.com

Your contact for Asia:
Quanming Pan
Phone: +86 21-5132 9315
Fax: +86 21-5442 3597
e-mail: quanming.pan@degussa.com

Degussa AG
High Performance Polymers
45764 MARL
GERMANY
Phone: +49 2365 49-9878
Fax: +49 2365 49-5992
www.vestamelt.com

