

LEVAMELT® FOR REACTIVE POLYURETHANE HOT MELTS

Thanks to their outstanding performance profile and their user-friendly nature, moisture-curing polyurethane hotmelts are one of the fastest growing segments in today's adhesive industry. Most reactive hot melt adhesives use isocyanate-terminated polyurethane (PUR) prepolymers, which are applied like typical hotmelts, cooled to solidify, and cured by the reaction with moisture from the surrounding. PUR prepolymers are usually formed by reactions of isocyanates with polyols. Especially the diol component offers a great latitude for modification of PUR hotmelts by applying crystallizing or amorphous polyols.

Generally, green strength and open time for PUR hotmelt formulations are opposite. The faster the PUR hot melt transforms from an amorphous liquid state to a crystalline solid the higher will be the green strength and the shorter the open time. By adding Levamelt®, which is an elastomeric ethylene - vinyl acetate copolymer with a vinyl acetate (VA) content of 40 to 90 wt.-%, to PUR hotmelt formulations the open time can be efficiently prolonged without compromising mechanical properties too much.

ARLANXEO offers a broad range of ethylene - vinyl acetate copolymers. Especially high MFI Levamelt® grades with medium to high polarity and vinyl acetate contents of 45 wt.-%, 68 wt.-% or 80 wt.-% are well suited to serve as a modifier for PUR hotmelt.

Table 1: Levamelt® portfolio for PUR hotmelts.

	VA Content/ [wt.-%]	MFI/[g/10min]**	Morphology
Levamelt® 456	45	25	semi-crystalline
Levamelt® 686	68	25	amorphous
Levamelt® 806 VP*	80	18	amorphous

* VP = trial product, test quantities available

**MFI = melt flow index (190 °C, 2,16 kg)

The positive effect of Levamelt® on the open time of a PUR hotmelt was investigated in a base formulation. Levamelt® was added in 10, 15 and 20 parts to a standard PUR formulation with polyester diols with a high glass transition temperature (Tg) of around +30 °C and a very short open time for PUR hotmelts (Table 2).

Table 2: PUR hotmelt test formulation with Levamelt® as modifier.

	Parts	Influence on open time	Influence on green strength	Remarks
Polyester polyol 1	53.83	-	+	partially crystalline
Polyester polyol 2	26.91	-	+	amorphous, increases adhesion to polar substrates
Polypropylene glycol	7.22	+	-	amorphous, low temperature flexibility, flow
Methylene diphenyl isocyanate (MDI)	12.01			moisture cure
2,2'-Dimorpholino- diethyl ether (DMDEE)	0.03			catalyst
Levamelt®	10-20	+	+	Open time extender

The open time of PUR hotmelts is effectively extended with Levamelt® 456, 686 and Levamelt® 806 VP. Depending on the amount of the modifier used, open time of test recipe can be prolonged by more than 100%. (Figure 1) Thus, you can fine-tune the PUR hotmelt properties easily by choosing the right vinyl acetate content and chain length of the modifier.

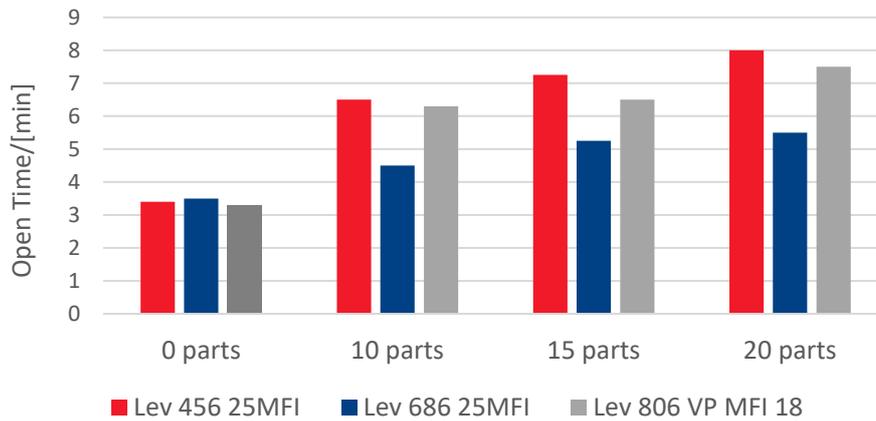


Figure 1: open time of PUR hotmelts are efficiently extended by Levamelt®.

Besides the extension of the open time, PUR hotmelts modified with Levamelt® offer better flexibility and higher green strength. Thus, with Levamelt® you have a new tool in hand to adjust selectively the PUR hotmelt properties according to the polarity of the PUR hotmelt.

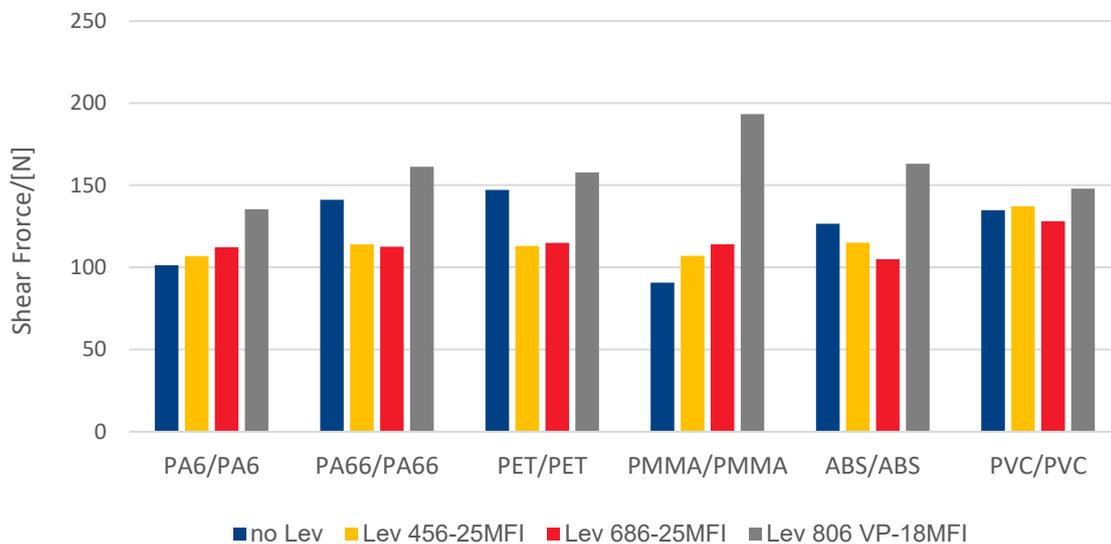


Figure 2: PUR hotmelts modified with Levamelt®, especially the new Levamelt® 806 VP shows improved green strength. (Dimension test specimen: 50 mm x 25 mm).

Levamelt® as additive in PUR hotmelt formulations offers:

- adjustment of the hotmelt properties according to the polarity of the PUR formulation
- increase of initial strength for PUR hotmelts on different substrates, especially the new **Levamelt® 806 VP** shows improved initial green strength
- extension of PUR hotmelt open time by more than 100 % possible

*Disclaimer

"This is a trial product. Further information, including amended or supplementary data on hazards associated with its use, may be compiled in the future. For this reason, no assurances are given as to type conformity, processability, long-term performance characteristics or other production or application parameters. Therefore, the purchaser/ user uses the product entirely at his own risk without having been given any warranty or guarantee and agrees that the supplier shall not be liable for any damages, of whatever nature, arising out of such use. Commercialization and continued supply of this material are not assured. Its supply may be discontinued at any time. In other respects, the trial product is subject to our current version of the General Conditions of Sale and Delivery."

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