

# Capa<sup>®</sup> LT 3 for Ultimate Low Temperature PU Performance

Ingevity is the world leader in polycaprolactone derivatives for polyurethane (PU) elastomers, adhesives and coatings through the Capa family of products. We offer a wide selection of polyols that allow formulators to develop PUs for applications where there can be no compromise on performance and durability. Our global manufacturing capabilities, logistic services and innovation and technical service center - as well as the flexibility of Capa technology itself - allow us to create innovative solutions for a broad array of applications.

## Pushing the boundaries of low temperature performance

Polyurethane (PU) is the material of choice for applications where flexibility of plastic parts is required not just at room temperature but across a wide range of environmental conditions. Unless a suitable material is used, plastics will crack when flexed at low temperature leading to failure and the need for frequent replacement.

Even the highest performing PUs will become brittle as temperatures plunge so it is critical to ensure the correct grade is used to maintain performance at the desired working temperatures. It is particularly key in oil and gas, aerospace, and automotive industries - where seals, gaskets and other flexible parts are made from PU - that the optimal material is selected to ensure safe and reliable equipment performance.

Capa LT 3 is a polyol that has been developed using proprietary technology to allow PUs to be produced with enhanced low temperature performance, allowing the requirements of such demanding applications to be fulfilled. Capa LT 3 has been designed, not only to allow a low glass transition temperature (T<sub>g</sub>) to be realized, but to achieve optimal viscoelastic properties at a much lower temperature. Capa LT 3 allows PUs to be made that can be used at temperatures 20°C lower than materials used today, all while maintaining the other properties to be expected of PU based on Capa.

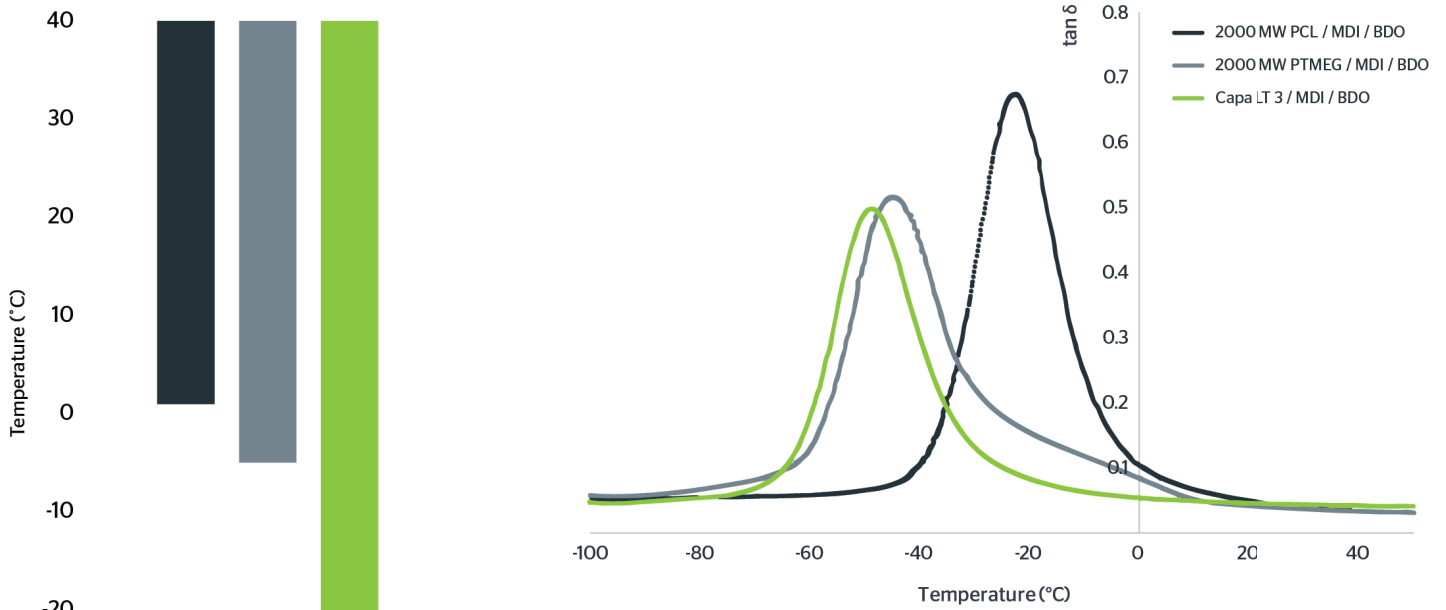
In addition to flexible industrial parts, Capa LT 3 is also ideal for producing PUs in specialist footwear such as ski boots and inline skates. Since high temperature performance is also maintained, Capa LT 3 gives optimal performance whatever the conditions.

## Capa LT 3 product offerings

Product	Appearance	Functionality	OH value (mg KOH/g)	Dynamic Viscosity (mPa-s @ 80°C)	Glass Transition Temperature (°C)	Acid value (mg KOH/g)	Water content (%)	Colour (Hazen)
Capa LT 3	White, waxy solid	2.0	35.5-39.5	432	-76	<0.05	<0.02	<100

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- 2000 MW PCL / MDI / BDO (80 Shore A)
- 2000 MW PTMEG / MDI / BDO (80 Shore A)
- Capa LT 3 / MDI / BDO (80 Shore A)

**Figure 1 (left)**

Typical minimum operating temperature for PU articles (80 Shore A Formulation based on Polyol/MDI/BDO), where viscoelastic properties remain consistent.

**Figure 2 (above)**

DMA analysis showing the viscoelastic properties of 80 Shore A PU formulations at low temperature extremes. PUs based on Capa LT have consistent performance to much lower temperature than competitive benchmarks.

	Units	2000 MW PCL / MDI / BDO	2000 MW PTMEG / MDI / BDO	Capa LT 3 / MDI / BDO
Hardness	Shore A	83	80	84
100% Modulus	MPa	4.1	4.5	5.2
300% Modulus	MPa	9.8	7.7	8.2
Ultimate Elongation	%	450	420	430
Tensile Strength	MPa	42.5	36.8	37.5
Tg, DSC	°C	-41.6	-67.2	-62.8
Tg, DMA	°C	-22.6	-44.9	-48.7
Tm, DSC	°C	190	188	216
Rebound resilience	%	50	65	59

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