



Capa™

For spearhead performance

Our Capa™ caprolactones

- Easy to process, shape and apply
- Outstanding flexibility even at low temperatures
- Lasting outdoor performance for polyurethane materials
- Excellent strength and abrasion resistance for polyurethanes
- Strong adhesion on difficult and sensitive substrates
- From a trusted partner offering tailor-made caprolactones

Spearheading performance with Capa™

Enhancing performance & adding value

Capa™ is our range of caprolactones, comprising monomer, polyol and thermoplastic caprolactones of varying molecular weight and functionality.

As the leading global producer of Capa™ caprolactones, we offer you the full range of caprolactone grades and technical support to enable the properties of Capa™ products to be exploited fully in the most demanding applications. The synergy of our own

product expertise and your specialized application know-how helps to guarantee that Capa™ caprolactones can be targeted with precision to ensure optimum performance.

Whether you are looking at enhancing your coating, adhesive or elastomer, Capa™ can achieve the whole spectrum of different properties such as wear-resistance, UV-resistance, gloss, adhesion or low temperature flexibility to name just a few – properties that add value to your product in a competitive market.





Endless properties – endless possibilities

Capa™ polycaprolactones take your product performance to a higher level and open up new market areas. Capa™ improves the quality of high-end coatings and paints in for example the automotive, transportation, marine and protective coatings industries, as well as the electronics sectors. Capa™ used in adhesives have found applications in shoe sole bonding, laminated packaging and textile bonding, while in elastomers Capa™ is used in diverse applications such as mine screens, printing rollers and advanced sports shoes. The possibilities are almost endless. Maybe you have an application just waiting to be tested?

Capa™ thermoplastics typically come in the form of granules or powders that can be remelted and remoulded, and are used in hot melt adhesives and biodegradable packaging.

The chemistry behind Capa™

The special performance properties of Capa™ polycaprolactones are determined by the ring-opening addition polymerization used in their manufacture. Ring-opening polymerization is carried out under mild conditions resulting in a very controlled polymerization meaning that by-products, such as water, are not produced. The resultant products have a low acid value, highly defined functionality, low polydispersity and very high reproducibility.



Global partner for caprolactone innovation

Your partner for development

Perstorp offers unique caprolactone market knowledge and experience. Based on that, we can offer tailor-made poly-caprolactones for your specific product need if our existing products do not exactly match your requirements. It is our desire to deliver a spearheaded solution regardless of whether your need is related to environmental demands, end-performance or the manufacturing process. We are helping customers to reduce or even eliminate VOC, we have improved mechanical performance and durability in end-products and our low viscosity products make processing easier and more economical. We welcome challenges.

Our sales and technical staff have the competence to discuss all caprolactone issues with you. Sometimes it is about finding the right product from our portfolio, at other times it may involve tailoring a product specifically for your application. Within a matter of months, we can come up with a new product. We have experts in Europe, Asia, North and South America, so you will always have someone locally to turn to with your query.

Meeting high capacity & quality at Warrington

With over 30 years' experience of making caprolactones, our plant in Warrington, UK, has accumulated genuine knowledge all the way to the factory floors. With a dedicated team entirely focused on Capa™ you can feel certain that you are getting the highest quality product possible. We have a controlled process for making the products to the right specification and with good consistency.

Perstorp has made significant investments at our Warrington plant to fulfill our customers' expectations. The factory has been expanded to meet higher market needs. We are constantly developing and testing our technology for new applications. Welcome to our exciting Capa™ world!



The multi-talented polyol

Introducing the Capa™ family

Made via Perstorp's unique process, we offer Capa™ monomer and from this we produce a wide range of Capa™ polyols and Capa™ thermoplastics. Our polyols and thermoplastics are made through ring opening polymerization technology giving a narrow molecular weight distribution, low viscosity and very low levels of bi-products.

Our Capa™ polyols are aliphatic esters that are extremely versatile and can deliver top performance in many different areas. Their low viscosity is particularly advantageous in applications for polyurethane elastomers, thermoplastics, coatings, paints, adhesives and foams. Capa™ polyols combine the performance of polyethers and polyester adipates in one structure.

General properties:

- Consistent crystallization
- High flexibility and low viscosity
- Low impurities
- Non-toxic and biodegradable

Polyurethans properties	Choice of polyol		
	Capa™	Polyether	Polyester adipate
Easy processing	•		
Hydrolytic stability	•	•	
High and low temperature service interval	•		
UV resistance	•		•





Capa™ polyols

Our portfolio of Capa™ polyols range from mono to tetra-functional polyols with molecular weights from 240 to 8000. Currently we employ 10 different initiators giving us the flexibility to tune the end-properties of polyurethane materials. The portfolio includes premium grades where the levels of impurities have been reduced even further and molecular weight distributions have been made even narrower. Premium grades offer additional benefits including an extra level of hydrolytic stability and are even easier to process due to exceptionally low viscosities.

Capa™ in polyurethane casts

Top benefits:

- Easy processing
- Consistent and adjustable reactivity
- Wide interval of service temperatures
- Overall excellent mechanical properties

The liquid poly-functional Capa™ grades are used to provide a highly flexible cross-linking for cast elastomers and give:

- Remarkable cold flex fatigue
- Improved compression sets
- Improved tear strength

Applications for polyurethane cast elastomers include leisure products, mining screens, acoustic submarine tiles, wheels and rollers.

Capa™ in thermoplastic polyurethanes

We supply a wide range of linear polycaprolactone diols with consistent and narrow molecular weight distribution, consistent reactivity and low viscosity to meet the demands of the TPU producer. Applications in automotive and industrial segments include seals and gaskets.

Top benefits:

- Easy processing with short cycle times
- Wide interval of service temperatures
- Overall excellent mechanical properties



Capa™ in polyurethane coatings

Capa™ polyols can be used in environmentally friendly coatings, such as polyurethane dispersions, high solid and UV-cure resins. The lower viscosity of the Capa™ polyol compared to an adipate based polyol means that no or less solvents are needed. Applications include industrial, leather and textile coatings, as well as non-polyurethane coating industries.

Top benefits:

- Low VOC and environmentally friendly coating
- Excellent solvent, chemical and UV resistance

Capa™ in adhesives

Capa™ polyols can be used in waterborne, solvent-based and hot melt polyurethane adhesives. They are particularly useful as they yield low viscosity adhesives which create strong bonds even to difficult substrates under demanding conditions. In the case of reactive adhesives the purity and consistency of Capa™ results in a valuable controlled and consistent open time. Applications can be found in the automotive and footwear industries, as well as a range of other areas.

Top benefits:

- Durable joints even in humid environments
- Excellent adhesion to various substrates including leather
- Fast wetting process

Capa™ in foams

Caprolactone-based micro-cellular foams combine the toughness and excellent physical properties normally associated with polyesters, with enhanced hydrolytic stability. Applications include automotive components and shoe soles.

Top benefits:

- Excellent mechanical properties even at low density
- Improved service life in humidity compared to adipates
- Reduced density compared to adipates



Capa™ thermoplastics

Capa™ in hot melt adhesives (HMAs)

Capa™ thermoplastics are low-melting crystalline polymers that are used as hot melt adhesives. Applications include toe puff and shoe counter components in footwear, scatter coat interlining adhesives, binders for non-wovens and structural and laminating adhesives for the automotive industry.

Top benefits:

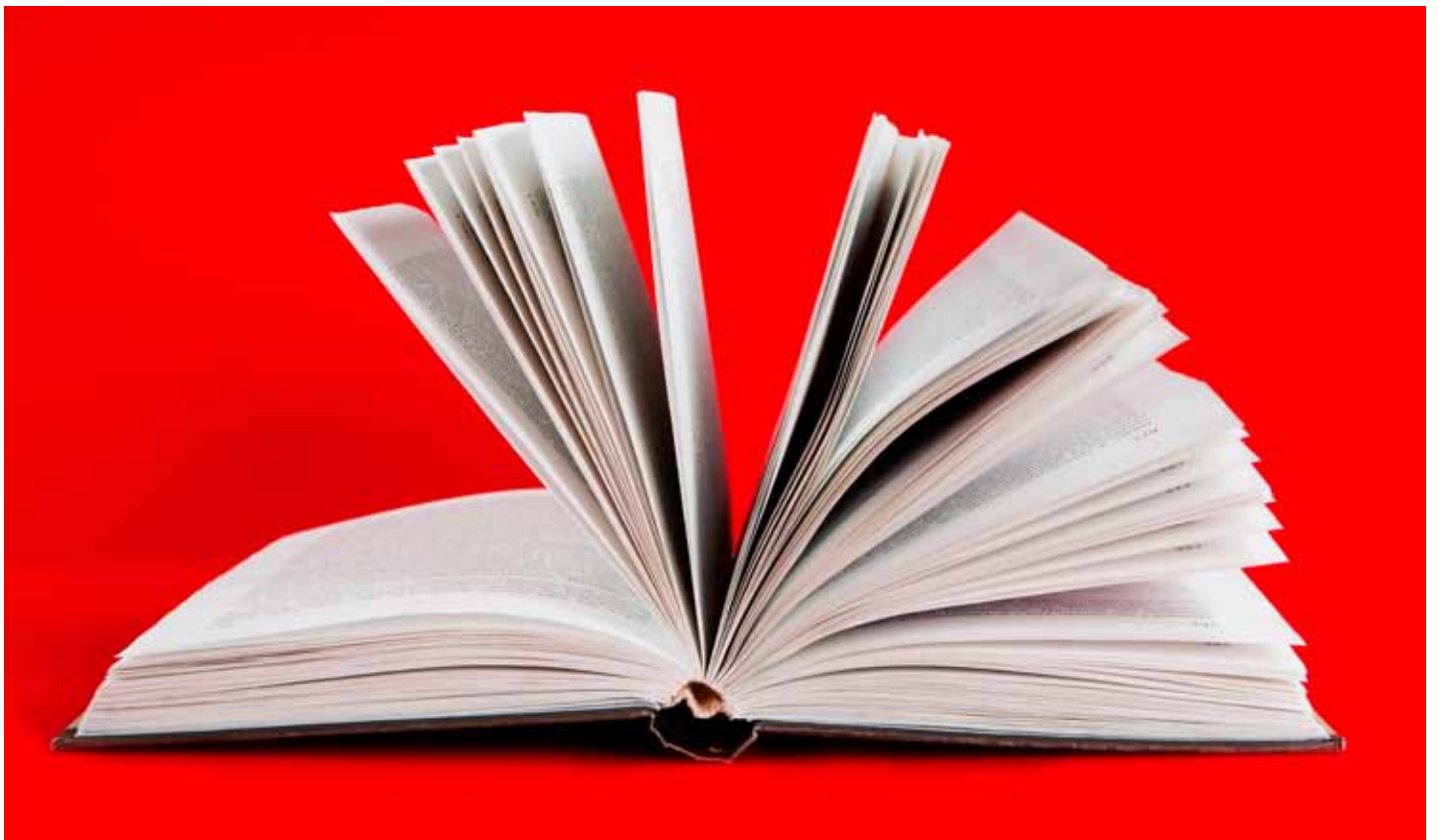
- Easy to apply with fast penetration into substrate
- Excellent adhesion to leather and other greasy substrates
- Low temperature activation, $T_m = 60\text{ }^\circ\text{C}$
- Good hydrolytic stability

Capa™ in laminating adhesive film

The higher molecular weight Capa™ grades are ideal for being processed into cast films for use as laminating adhesives. The benefits are the same as for HMAs and applications include binders for non-wovens and paper laminates.

Capa™ in reactive hot melt adhesives

In reactive hot melt adhesives, Capa™ thermoplastic polymers are used for their green strength and their ability to react with isocyanates as they have some OHV. Isocyanates can be added to create additional cross-linking which give added adhesive strength. The low viscosity is useful when mixing together and the low levels of catalysts ensure a controllable reaction. Reactive hot melt adhesives can be used in applications such as structural adhesives, textile bonding, bookbinding and shoes.





Capa™ in polymer applications

Capa™ in external medical applications

Low temperature moldability coupled with rigidity allows Capa™ thermoplastics to be a more versatile alternative to traditional plaster. These grades of Capa™ can be used in orthopedic splints, dental impressions and oncology immobilization systems.

Capa™ in other applications

Capa™ has an excellent compatibility with a wide range of polymers. The latter quality coupled with the ability to have high pigment loadings, also enables Capa™ to be used in universal master batches.

Capa™ in films & laminates

Capa™ thermoplastics include grades to make blown films, laminates and packaging. Films with biodegradable properties are suitable in e.g. foamed packaging or wrapping for both direct and indirect food contact.



Product data summary

Capa™ monomer							
	Assay	Boiling point	Melting point	Viscosity (cps at 20 °C)	Specific gravity (20 °C)	Flash point (closed cup)	Refractive index nD20
Monomer	> 99.9%	232 °C	-1 °C	6.67	1.079	127 °C	1.4629

Capa™ polyols								
Product group	Grade	Initiator	Typical molecular weight	OH value (mg KOH/g)	Acid value (mg KOH/g)	Reactivity	Viscosity (mPas ¹⁾)	Melting range (°C)
Monols	Capa™ 1301	CA	3000	18	< 0.25	Slow	640	60
Standard diols	Capa™ 2043	BDO	400	280	< 0.25	Slow	40	0-10
	Capa™ 2054	DEG	550	204	< 0.25	Fast	60	18-23
	Capa™ 2085	DEG	830	135	< 0.25	Slow	100	25-30
	Capa™ 2100	NEO	1,000	112	< 0.25	Fast	150	30-40
	Capa™ 2121	NEO	1,250	90	< 0.25	Slow	180	35-45
	Capa™ 2125	DEG	1,250	90	< 0.25	Slow	180	35-45
	Capa™ 2200	NEO	2,000	56	< 0.25	Fast	480	40-50
	Capa™ 2201	NEO	2,000	56	< 0.25	Slow	480	40-50
	Capa™ 2205	DEG	2,000	56	< 0.25	Slow	435	40-50
	Capa™ 2209	MEG	2,000	56	< 0.25	Slow	380	40-50
	Capa™ 2302	BDO	3,000	37	< 0.25	Fast	1,100	50-60
	Capa™ 2303	BDO	3,000	37	< 0.25	Slow	1,100	50-60
	Capa™ 2304	DEG	3,000	37	< 0.25	Fast	1,050	50-60
	Capa™ 2402	BDO	4,000	28	< 0.25	Fast	1,670	55-60
Capa™ 2803	BDO	8,000	14	< 0.25	Slow	8,600 ²⁾	55-60	
Premium diols	Capa™ 2077A	HDO	750	150	< 0.05	Slow	85	20-30
	Capa™ 2100A	NEO	1,000	112	< 0.05	Fast	150	30-40
	Capa™ 2101A	NEO	1,000	112	< 0.05	Slow	150	30-40
	Capa™ 2125A	DEG	1,250	90	< 0.05	Slow	175	35-45
	Capa™ 2161A	NEO	1,600	70	< 0.05	Slow	300	35-50
	Capa™ 2200A	NEO	2,000	56	< 0.05	Fast	480	40-50
	Capa™ 2200D	NEO	2,000	56	< 0.25	Fast	480	40-50
	Capa™ 2200P	NEO	2,000	56	< 0.05	Fast	400	40-50
	Capa™ 2201A	NEO	2,000	56	< 0.05	Slow	385	40-50
	Capa™ 2203A	BDO	2,000	56	< 0.05	Slow	460	40-50
	Capa™ 2302A	BDO	3,000	37	< 0.05	Fast	1,100	50-60
	Capa™ 2403D	BDO	4,000	28	< 0.25	Slow	1,670	55-60
Triols	Capa™ 3022	DEG/G	240	540	< 1.0	Fast	40	0-10
	Capa™ 3031	TMP	300	560	< 1.0	Slow	170	0-10
	Capa™ 3031A	TMP	300	560	< 0.05	Slow	170	0-10
	Capa™ 3041	TMP	400	395	< 1.0	Slow	160	0-10
	Capa™ 3050	TMP	540	310	< 1.0	Fast	160	0-10
	Capa™ 3091	TMP	900	183	< 1.0	Slow	165	0-10
	Capa™ 3121J	TMP	1,200	140	< 0.25	Slow	125	15.4
	Capa™ 3201	TMP	2,000	84	< 0.25	Slow	355	40-50
	Capa™ 3301	TMP	3,000	56	< 0.25	Slow	310	45-50
Tetrols	Capa™ 4101	Penta	1,000	218	< 1.0	Slow	260	10-20
	Capa™ 4801	Penta	8,000	28	< 1.0	Slow	4,700	40-50
Co-polymers	Capa™ 7201A	PTMEG	2,000	56	< 0.05	Slow	315	30-35
	Capa™ 7203	PC	2,000	56	< 0.25	Slow	1,100	25-35

Capa™ thermoplastic polyaprolactones

	Grade	Approximate molecular weight	Appearance	OH value (mg KOH/g)	Melt flow index ³⁾	Viscosity (mPas ⁴⁾)	Melting range (°C)
Thermoplastic polycaprolactones	Capa™ 6100	10,000	Solid	circa 11	N/A	9300	58-60
	Capa™ 6200	20,000	Solid	circa 6	15	N/A	58-60
	Capa™ 6250	25,000	Granules	circa 5	9	N/A	58-60
	Capa™ 6400	37,000	Granules	circa 4	40	N/A	58-60
	Capa™ 6430	43,000	Granules	circa 5	13	N/A	58-60
	Capa™ 6500	50,000	Granules	circa 2	7	N/A	58-60
	Capa™ 6500C	50,000	Granules	circa 2	7	N/A	58-60
	Capa™ 6506	50,000	Powder	circa 2	7	N/A	58-60
	Capa™ 6800	80,000	Granules	circa 1	3 ⁵⁾	N/A	58-60

¹⁾ Viscosity measurement: typical values, shear rate 0-500s⁻¹ at 60 °C

²⁾ Viscosity measured at 80 °C

³⁾ Typical values, melt flow index measured with 1" PVC die, 2.16 kg weight, g/10 minutes at indicated temperature; for 6200s at 80 °C, 6500s and 6800s at 160 °C

⁴⁾ Viscosity measurement: typical values, shear rate 0-500s⁻¹ at 100 °C

⁵⁾ Melt flow index = 5 kg, standard die at 190 °C

A = signifies enhanced hydrolytic stability

D = signifies reduced fogging and low viscosity

P = signifies low viscosity and increased reactivity

C = signifies high clarity

BDO = Butane Diol

CA = Cetyl Alcohol

DEG = Diethylene Glycol

DEG/G = Diethylene Glycol and Glycerine

HDO = Hexane Diol

MEG = Monoethylene Glycol

PC = Polycarbonate (aliphatic type)

Penta = Pentaerythritol

PTMEG = Polytetramethylene Ether Glycol

TMP = Trimethylolpropane





Your Winning Formula

The Perstorp Group, a trusted world leader in specialty chemicals, places focused innovation at your fingertips. Our culture of performance builds on 130 years of experience and represents a complete chain of solutions in organic chemistry, process technology and application development.

Matched to your business needs, our versatile intermediates enhance the quality, performance and profitability of your products and processes. This is how we enable you to meet market demands for safer, lighter, more durable and environmentally sound end-products – for the aerospace, marine, coatings, chemicals, plastics, engineering, and construction industries, as well as automotive, agricultural, food, packaging, textile, paper and electronics applications.

Our chemistry is backed by reliable business practices and a global commitment to responsiveness and flexibility. Consistent high quality, capacity and delivery security are ensured through strategic production plants in Asia, Europe and North America, as well as sales offices in all major markets. Likewise, we combine product and application assistance with the very best in technical support.

As we look to the future, we strive for the development of smarter and safer products and sustainable processes that reduce environmental impact and create real value in new chemical applications. This principle of proactive innovation and responsibility applies not only to our own business, but also to our work with yours. In fulfilling it, we partner with you to create a winning formula that benefits your business – as well as the people it serves.

Discover your winning formula at www.perstorp.com