Elastollan®
Thermoplastic Polyurethane Elastomers (TPU)
The more there is in it, the more you can get out of it

There is a lot in Elastollan – just like these Russian dolls.

elastic and resistant to buckling
tight bending radii (for hoses)
good dimensional stability
resistant to weathering
flexible at low temperatures, impact-resistant and flexural in bending
good resilience
resistant to oils, greases and ozone
abrasion and wear resistant
resistance to microbial attack and hydrolysis (also in salt water)

the material is what counts
The material is what counts

At some stage comes the question: what material shall we use? – The answer can be critical to success or failure, since the material must sustain what the product promises. And moreover: besides its physical properties the material should be easy and economical to process, compatible with the environment, and ultimately capable of recycling.

Utilise potential

Elastollan, the thermoplastic polyurethane elastomer made by BASF, provides the market with a material with outstanding potential for innovation. Through customised Elastollan formulations we are able to meet complex specifications for demanding applications.

Elastollan’s career as a problem-solver begun over 30 years ago. Constantly developed and adapted to the requirements of the market, Elastollan has established itself successfully as a multi-talented material in virtually every branch of industry.

<table>
<thead>
<tr>
<th>Definitions</th>
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<tr>
<td>Elastollan</td>
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<tr>
<td>The registered trademark Elastollan is used by BASF for its thermoplastic polyurethane elastomers (TPU). The material Elastollan has especially good physical properties, making it suitable for demanding applications in virtually all sectors of industry.</td>
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<th>Processing</th>
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<tr>
<td>• Injection moulding</td>
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<td>• Extrusion</td>
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<td>• Blow moulding</td>
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<tr>
<th>sound and vibration damping</th>
<th>extremely good resistance to penetration and tear propagation</th>
<th>may be coloured as desired</th>
<th>glass-fibre reinforced version also available</th>
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<tr>
<td>get out of it what has been put into it</td>
<td>hardness from 55 Shore A to 74 Shore D</td>
<td>can be painted</td>
<td>long life – resistant to ageing</td>
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<tr>
<td>can be processed on conventional injection moulding, extrusion and blow moulding machines</td>
<td>can be painted</td>
<td>glass-fibre reinforced version also available</td>
<td>recyclable</td>
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Elastollan – it’s got everything in it
Problem-solving – is it a problem?

It is easy to get “cold feet” when facing demanding remits or complex specifications without assistance. That is when problem-solving itself becomes a problem.

Problem-solving – no problem!

In such cases as these, a strong, competent and motivated partner on whom you can trust is indispensable. For problems involving materials, BASF has been a first choice among leading companies for many years.

We work flat out for you

Our offer: tell us about your subject, your problem, your requirement profile. Turn your material problem into ours.

The lonely life of this man of the wild is an adventurous one. Even in snowstorms and with shortages of food and fuel, he is completely self-reliant.

Without help, life is hard, very hard – and not only in the Arctic....
For our business partners, everything is mobilised

Full service
Our staff, with their commitment, motivation, training, competence and skills, represent the “heart” of the company. Combined with our comprehensive technical equipment resources, they put us in a position to offer our business partners every conceivable aid in solving the problems at hand.

Customer advice
Our customer advisers, with their technical, chemical and commercial qualifications, stand ready to assist our business partners on site with word and deed. We get to grips with your requirement profile and make your problem into ours.

Research and development
Our researchers in the fields of chemistry and engineering, together with our marketing staff, have a clear objective: the development of marketable products for the present and the future. This involves the optimization of existing products and especially the realisation of entirely new concepts.

Applications engineering
In our pilot plant with its injection moulding machines and extruders we can reproduce and test out virtually any production situation in-house, then bring it to the production stage.

Mechanical and chemical testing
All standard physical and chemical tests are carried out in-house. We have a special testing facilities.

As a world leader in the field of TPU we mobilise our extensive potential for your use. Together with you we shall analyse the problem and – we shall solve it, with top quality, innovation and efficiency.

“The wishes of our customers have top priority” is a key motif in our philosophy.

Our combined competence leads to successful synergies and partnerships

Each Elastogran granule represents more than 30 years of TPU know-how. We have drawn together our competence in materials to create the potential for problem solving and innovations:

- customer service
- research and development
- standard and special physical and chemical tests
- applications engineering know-how in injection moulding machines and extruders.

An ongoing exchange of experience ensures benefits to our business partners – in the form of new application opportunities from materials which are entirely new or else further optimised.

Our Elastollan is the TPU benchmark throughout the world. We owe this success to our product and to the co-operation of our business partners.

Our combined competence leads to successful synergies and partnerships
Elastollan sheathing turns wires into perfect cables and cable connectors

Conventional wiring technology in modern cars has clearly reached its limits. One solution is to use flexible flat cable coated with Elastollan thermoplastic polyurethane (PU). Such cables are not only lighter and require less space, they also provide better performance and safety.

Demanding use in industrial robots: trailing cables, pneumatic hoses, protective hoses and electric cables are made from Elastollan. Utilizing its flexibility, abrasion-resistant and flame-resistant characteristics, giving long-term resistance to mechanical wear.

Resists the manifold strains in the field of photovoltaic: cable sheathing made of halogen-free, flame-retardant Elastollan. It withstands the effects of UV and ozone radiation just as well as microbes and hydrolysis.

Cables with Elastollan protection against

Conventional
Cable sheathing and cable connectors made from Elastollan are flexible, watertight throughout their length, and resistant to breaking and impact.

ABS systems must be 100% reliable. This applies equally to cables and connectors. Elastollan-sheathed wiring provides for undisturbed, secure flows of information, even in that part of the wheel housing exposed to stone damage, water and cold.

Protection against downtime

Elastollan sheathing for cables and connectors meets the most stringent criteria for the protection of valuable and sensitive power and control cables. Functional efficiency and reliability are therefore quite substantially enhanced. Downtime and failures are minimised.

Properties

- Abrasion-resistant
- Flexible from -40 to +125°C
- Resistant to cutting, tearing and tear propagation
- Good electrical properties
- Microbial resistance (polyether grades)
- Resistant to hydrolysis
- Resistant to oils and greases
- Resistant to ozone and high-energy radiation.

Special Elastollan grades are also

- Flame-retardant without halogen
- Suitable for matt surfaces
- Crosslinkable.

Hardness: 75 Shore A to 74 Shore D.

Processing

On conventional processing machines
- Extrusion for sheathing
- Injection moulding for connectors

Typical automotive applications

- ABS, ESP, BBK, ASR, DSC and TC systems
- Control cables for injection pumps
- Battery cables.

Typical applications in machine-building and toolmaking

- Trailing cables for robots
- Feed lines for robots and handling equipment.

Typical applications in the construction industry

- Power supply for construction machinery and equipment.

Special cable applications

- Rail vehicles, medical equipment, offshore, nuclear energy and domestic applications.
Extremely hard wearing hoses and profiles of Elastollan for machines and equipment

Functionally reliable and durable: with Elastollan

Pneumatic control cables made from Elastollan have optimal bursting pressure and resilience characteristics. They are extremely hard wearing and can cope with tight bends.

These characteristics make them suitable for use wherever mobile equipment is supplied with compressed air.
Extraction and conveying hoses of Elastollan are very flexible and durable for use with abrasive substances.

Properties
- abrasion-resistant
- flexible from -40 to +100°C
- resistant to cutting, tearing and tear propagation
- ozone-resistant
- microbial resistance (polyether grades)
- resistant to hydrolysis
- resistant to oils and greases.

Special Elastollan grades are also
- flame-retardant without halogen
- suitable for matt surfaces
- plasticizer free
- antistatic.

Hardness: 60 Shore A to 74 Shore D.

Processing
On conventional processing machines.

Typical applications for hoses
- pneumatic hoses
- spiral hoses
- conveying hoses
- hydraulic hoses (outer layers)
- insulation hoses.

Typical applications for profiles
- strippers
- round-section belts/v-belts
- toothed belts
- sealing lips
- ninges
- escalator-handrail.

Properties combined
Hoses and profiles must be hard-wearing, flexible, and resistant to media, but also value for money. Elastollan meets these requirements in an ideal manner.

Features of round-section and V-belts made of Elastollan:
- low elongation,
- abrasion resistance,
- flexibility and easy to weld.

Handrails made of Elastollan can be dyed in any conceivable colour. They are easily maintained and exchanged, if necessary. Their low flexural strength helps save operating power.

Flexible and hard wearing; profiles made from Elastollan, also in combination with other plastics.
Highly-flexible films, super-elastic fibres and soft-touch compounds from Elastollan

Agreeably soft is the feel of this anthracite-coloured handle of rubber compound. Modification with Elastollan gives a durable composite.

Super-elastic fibres made from Elastollan without solvents are kind to the skin and are used in fashion textiles. In stretch hosiery, sportswear and swimwear, Elastollan gives body control combined with freedom of movement.

Tensioned elasticity. Highly elastic and tear-resistant Elastollan film is an elegant solution for the packaging industry. The stretched Elastollan film surrounds the product, holds it carefully in place, and absorbs vibration and shocks.
Elastollan protective film which is impermeable to liquids protects mattresses, while allowing water vapour to pass through to maintain comfort.

Properties
- abrasion-resistant
- flexible from -40 to +125°C
- resistant to cutting, tearing and tear propagation
- microbial resistance (polyether grades)
- resistant to hydrolysis
- resistant to oils and greases
- resistant to ozone and high-energy radiation.

Special Elastollan grades are also
- flame-retardant without halogen
- suitable for matt surfaces
- characterised by good adhesion to reaction foams and laminating adhesives
- highly elastic and stretchable
- suitable for thermoforming
- scratchproof
- weldable
- no yellowing (aliphatic grades)
- moisture permeable.

Hardness: 70 Shore A to 74 Shore D.

Processing
On conventional processing machines
- extrusion for films and fibres
- compounding for polymer blends.

Typical applications for films
- interior trim and engine enclosure (automotive)
- protective film for mattresses
- packaging film
- ski and snowboard film
- air cushions for shoe inserts
- clothing
- roof lining
- wound dressing.

Typical applications for fibres
- textiles for clothing
- orthopaedic items
- elastic ribbon.

Typical applications for compounds
- fastening elements
- safety elements
- multi-component articles.

For industrial and leisure uses:
Film, fibre and compounds of Elastollan

Safety and comfort
Flexible film of Elastollan is not only decorative but also protects, seals and insulates. This enhances safety and comfort when used in motor vehicles and other applications.

Super-elastic fibres make skintight fabrics super-comfortable and bring the wearer into shape.

In compounds Elastollan improves impact strength and adhesion to other plastics.

Scratch-resistant film of Elastollan blend, with low temperature flexibility, protects the surface of snowboards. The big advantage: the attractive décor is safely protected from damage beneath the film.
Experience the difference:
Elastollan in automotive applications

Safer, more attractive, better value for money, greater comfort:
TPU Elastollan

Good resilience and high abrasion-resistance distinguish the colourfast cup-holder made of Elastollan.

The shapely designed cover made of soft aliphatic Elastollan connects armrest and inner door handle in an elegant way.

Center console and slider cover made of soft, non-plasticized aliphatic Elastollan in 2-shot-over-molding design. The scratch resistant Elastollan surface with its soft-touch feel enhances the perceived quality of the car interior. The colour fastness of aliphatic TPU avoids additional off-line coating of the surface.
Elastollan spring seats and bellows meet the extremely high specifications for the chassis unit.

Properties
- resistant to oil, grease and ozone
- abrasion-resistant
- notched impact strength
- rigid
- flexible at low temperature
- good resilience
- flexural strength
- elastic
- durable
- elastic modulus up to 10,000 N/mm²

Hardness: 55 Shore A to 74 Shore D.

Processing
On conventional injection moulding machines.

Typical automotive applications
- gear knobs
- inner door handles
- bushings
- stop dampers
- cover strips
- aerials
- seals
- cable runs
- chassis spring seatings
- non-slip linings/shutters
- trim
- door/seat stops
- cupholder.

For demanding applications

No other industry has such wide-ranging specifications for materials as the automotive industry.

Elastollan provides this branch of industry with a material which satisfies its need for quality and reproducibility and which moreover stands out for material properties such as low temperature flexibility, good appearance and damping, resistance to oils, reliability and durability.

A surface of high quality appearance, made from Elastollan. The slush skin of this instrument panel is made of a development product with many other advantages: outstanding UV resistance, low emissions and fogging, free of plasticisers, low density, good low temperature properties.

Thanks to Elastollan this inner door handle stands out for its pleasant touch, good damping properties, high-quality and long life.

Flexible sealing lips made of Elastollan protect the car interior against dirt and moisture whilst providing excellent adhesion to polyamides.
For sport and leisure: Elastollan increases the fun factor

Head and foot into winter sport: Elastollan for ski goggles, ski and snowboard boot shells and snowboard surfaces.
Properties

- abrasion-resistant
- notched impact strength
- rigid
- flexible at low temperature
- good resilience
- flexural strength
- elastic
- durable.

Processing

On conventional injection moulding machines.

Typical applications in the footwear sector

- soles for safety footwear,
- walking boots and shoes,
- sports shoes
- heel taps
- reinforcements
- trimmings.

Hardness: 55 Shore A to 60 Shore D.

Typical applications for leisure activities

- skateboard rollers
- inline roller skate shells
- golf trolley covers
- mast sleeves
- boom mountings.

Hardness: 85 Shore A to 64 Shore D.

Typical wintersport applications

- ski boot shells
- shells for snowboard boots
- film for snowboards
- ski tips and ends
- binder elements.

Hardness: 80 Shore A to 74 Shore D.

Fun, fun, fun with Elastollan: performance-enhancing, ergonomic, trendy

Also good for safety footwear. Elastollan shoe soles are comfortable, lightweight, fashionable, ergonomic, resistant, durable and anti-static.

Ultimate kick

Sport and entertainment take top place in our leisure society. The market is a growing one. Consumers and producers are constantly on the search for the “ultimate kick”. With Elastollan as material, your ideas for products soon become promising reality.
Transporting, conveying, sorting: with Elastollan

The rollers of such permanently running escalators cover thousands of kilometres in a year. That means continuous stress which only abrasion-resistant, tough and resilient materials such as Elastollan can withstand.

Able to take continuous loading, abrasion-resistant and sound-damping: Elastollan roller tyres for conveyor systems and shopping trolleys.
For conveyance of materials, Elastollan suction elements are flexible, soft, hard wearing and resistant to tear propagation. They adhere to paper, film and metal surfaces.

Meeting the requirements

A characteristic feature of the transport industry is the high level of specifications for the materials used. Products made from Elastollan take hard use and give long life in service. Their sound-damping properties create a less noisy environment.

Properties
- resistant to oil, grease and ozone
- abrasion-resistant
- notched impact strength
- rigid
- flexible at low temperature
- good resilience
- flexural strength
- elastic
- durable.

Hardness: 55 Shore A to 74 Shore D.

Processing
On conventional injection moulding machines.

Typical applications in the fields of sorting, conveying and transport
- bottle stands
- rail pads
- screen elements
- castors
- lift cable pulleys
- guide rollers for escalators.

Vibration-damping Elastollan rail pads between rail and concrete sleeper prevent shock and vibration to the track. They also reduce railway noise levels.

Elastollan screen elements for long-term resistance to abrasion from hard, sharp-edged bulk materials of every kind.
For the food producers: efficient tools made from Elastollan

Good yields and economical use of resources: with Elastollan
Properties
- abrasion-resistant
- notched impact strength
- rigid
- flexible at low temperature
- good resilience
- flexural strength
- elastic
- durable.

Hardness: 55 Shore A to 74 Shore D.

Processing
On conventional injection moulding machines.

Typical applications in agriculture
- grass collecting fingers/rollers
- conveyor belts
- seals/cages for roller bearings
- ear tags
- collars and chains
- picking fingers
- transponders.

Typical applications in the fishing industry
- stoppers for long-line fishing lines.

High-tech but solid and reliable
High-tech products in the food-producing sector have become indispensable instruments for rationalisation, enhanced efficiency and ability to compete. But they are also essential aids to targeted and careful use of natural resources.

Even more than in other sectors, both farming and fishing make high demands on the strength and resistance of the materials employed. Elastollan products meet these criteria over the long-term, with their resistance to physical, chemical and biological factors.

Elastollan ear tags for the identification of livestock last a lifetime. Weather-resistant, flexible and with high tear propagation strength, they are also suitable to carry barcodes and chips.

To maintain world fish stocks, selective fishing is a much better alternative to fishing with nets. Elastollan stoppers on the long lines hold the cords with the fishing hooks reliably in position, making selective fishing practicable for both deep sea and inshore fisheries.

Crops being harvested are carefully graded by flexible sorting attachments and freed from adhering earth. Abrasion-resistant Elastollan means long service life.
Elastollan in combination with other materials

Handles, for example for power tools, are given a better feel and become less easily soiled, with soft, scratchproof handle coverings made from Elastollan.

More functional through Elastollan: multi-component parts

More economic production

Elastollan can be combined with engineering plastics. This also optimises the property spectrum of the finished product. Multi-component products make for more efficient production by reducing handling and simplifying production processes.

Properties
- abrasion-resistant
- notched impact strength
- rigid
- flexible at low temperature
- good resilience
- flexural strength
- elastic
- durable
- can be combined with other materials

Hardness: 55 Shore A to 98 Shore A

Processing
On conventional injection moulding machines and multi-component machines.

Doctor blades in photographic developing machines wipe the chemical residues from the photographs. The flexible Elastollan edges protect the photo material and are at the same time resistant to chemicals.

A constant companion for people who may need assistance is this pulsing device. Its polycarbonate and Elastollan casing is a good example of composite material use.
Potential solutions from Elastollan

If it can’t be done, it doesn’t exist

Elastollan provides a range of materials which makes virtually any conceivable product capable of realisation. Make use of Elastollan’s hidden potential to give shape to your finished products.

Properties
- abrasion-resistant
- notched impact strength
- rigid
- flexible at low temperature
- good resilience
- flexural strength
- elastic
- durable.

Hardness: 55 Shore A to 74 Shore D.

Processing
On conventional injection moulding machines.

Linings of glass-fibre-reinforced Elastollan are able to cope with the fluctuating temperatures in professional coffee-making machines owing to their thermal expansion properties.

The high-grade optics of these binoculars are “packaged” aesthetically in Elastollan material, which also makes them easy to hold and protects them from wind and weather.

Elastollan horseshoes protect both the joints of the horse and the purse of the rider.

Professional swimming pool cleaner. The flexible, serrated Elastollan cleaning disc clings to the contours of the pool, is abrasion-resistant and resistant to chlorinated water.
Our future lies in the future

Only those who think about the future will be able to escape the present. We are making every effort to find answers to the questions and needs of tomorrow. We follow up trends and use them to provide ideas for our portfolio. We invest in research and development so that in the future too, Elastollan will continue to be a potential solution for the needs of the market.

What can be more exciting than the future?

New properties
- light-fast
- soft touch
- antistatic
- flame resistant

New combinations
- material combinations
- TPU with TPU
- TPU with PU
- TPU with rubber
- TPU with thermoplastics

New products
- foamed Elastollan
- aliphatic Elastollan
- flexible Elastollan

Ideas for the world of tomorrow

"When I grow up I’ll invent a car that runs on water. Then everyone can fill up at the tap and I’ll be famous".
The future has already begun

Elastollan will become even more versatile, covering an even wider range of applications. We shall bring entirely new properties to the market, and – Elastollan will become even easier and quicker to process.

Elastollan – for the products of tomorrow

For all that, we are conscious of our responsibility towards people and the environment. In the future too, Elastollan products will contribute to improving our quality of life.
BASF is the leading supplier of polyurethane basic products, systems and specialties. With its global network of 35 polyurethane System Houses and its comprehensive product and service portfolio, BASF is the preferred partner of its customers in many industries. With its world-scale plants BASF secures its leading market position in the manufacture of polyurethane basic products in all regions of the world.

In the European Economic Area BASF Polyurethanes GmbH is running the BASF polyurethane business via its 14 System Houses. In Europe, BASF is both the market and technology leader of polyurethane systems and polyurethane specialty elastomers.

Working hand in hand with our customers

In the highly service-oriented polyurethane systems and specialties business, experience and expertise are what customers require. With its network of System Houses, BASF offers fast local support in the development of individual solutions, including technical service, sales and marketing. BASF ensures reliable supply of basic polyurethane products like MDI, TDI.
Research and Development

World-wide BASF Polyurethane Research for PU systems and PU special elastomers has been centralized in the newly created Research Centre in Lemförde. Nearly 200 specialists work in this think tank of expertise and creativity for the fields of Research, Development and Applications Technology. With the know-how of this international technology centre we provide our expertise to other BASF Group companies in America and Asia which are active in the field of polyurethane.

Individual Innovations

No matter which PU application is involved – BASF turns the apparently impossible into an innovative reality. In close project-related co-operation with the customer our specialist teams of chemists, physicists, engineers and sales experts develop tailor-made, creative and economic solutions. We create a solid and reliable base with our customers through both active dialogue and combined experience. Our sectoral applications technology which stretches throughout Europe is strictly focused on value added benefit.

Portfolio:
BASF develops, produces and sells:
- PU elastomers as thermoplastic specialty elastomers
- PU elastomers as cellular specialty elastomers
- PU base products, such as isocyanates, polyols, catalysts, auxiliary materials
- PU systems, divided into system groups such as rigid, flexible, integral, compact

Sites (EMEA)
- Germany (headquarters)
- France
- The UK
- The Netherlands
- Italy
- Russia
- Sweden
- South Africa
- Spain
- Turkey
- Hungary
- Slovakia
- Dubai

and polyols on a global scale from the company’s world-scale plants.
Quality management

Client satisfaction is the basis of enduring commercial success, and we strive to meet our clients’ expectations of our products and services. In order to guarantee this, we have introduced a quality management system several years ago, extending to all areas of the company. Every business process is regularly assessed using key performance indicators, and is further developed as a result. The aim is to optimise the efficiency and make the relationship between all activities and processes as smooth as possible. Every staff member is urged to contribute ideas and advice to ensure we are constantly improving our processes.

The basis of our quality management system is the international standard ISO 9001, supported by the supplementary automobile industry requirements ISO/TS 16949.

Top performance is possible only when everything comes together: personnel and material, planning and execution, motivation and will. At the limits of what is feasible, perfection counts.
The two possible means of recycling

Protection of the environment and the husbanding of natural resources are established corporate objectives.

Thermoplastic polyurethane’s may be recycled in an environmentally-compatible manner by two methods:

1. Thermal utilisation
2. Material recycling

Economic, ecological and product safety factors vary from one case to another.

Thermoplastic polyurethanes are suitable for both thermal utilisation and material recycling.

Thermal utilisation

In thermal utilisation, polyurethane makes use of what has been a long tradition with wood: the gaining of energy through combustion. All PUR materials can be converted into electrical power in modern refuse incineration plants by using their high energy value, thereby making a contribution to the conserving of natural resources.

Material recycling

Up to a maximum of 30% of TPU regrind may be added to original granules.
Multitalented Elastollan

With proven product grades, recognised good service and constant ongoing development, Elastollan has won a permanent place in the market for a wide range of applications.

Using our knowledge and many years of experience we wish to contribute to your success: with the multi-talented material Elastollan and innovative solutions to problems, tailored to your requirements.

For further information we have the following brochures ready to send in response to your call:
- Elastollan – Product Range
- Elastollan – Material Properties
- Elastollan – Processing Recommendations
- Elastollan – Electrical Properties
- Elastollan – Chemical Resistance

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