
The elasticity
you need

ELASTO MER'S

PRODUCTS PORTFOLIO



versalis

The elastomers portfolio



1

Background

Versalis is the chemical company of Eni, market leader in the Elastomers business with a long-standing industry acumen and expertise.

The synthetic elastomers commercialized by Versalis are the well-known Europrene®, Neocis®, Dutral®, Intene® grades, all of which are produced at the

consistently state-of-the-art plants and monitored by the same dedicated individuals who wore different hats all along the company's evolution from Anic, Enoxy, EniChimica, Enichem, Enichem Elastomeri, Enimont, Enichem Elastomeri, Polimeri Europa and now Versalis.



1957	Rolling out the first E-SBR bale at the Ravenna, Italy plant when the company was known as Anic. Building the SB latex plant for a total nameplate capacity (NPC) of 145 KT.
1959	Starting up a plant for High Cis BR with Titanium catalyst and a NPC of 40 KT was achieved within the same year.
1981	Starting up a 25 KT plant for CBX Latex.
Early 80s	After the merger of the NBR activities from Anic with Montedison and SIR, the Porto Torres based plant (Sardinia, Italy) was converted into continuous emulsion polymerization of NBR for a nameplate capacity of 33 KT.
1983	The acquisition of International Synthetic Rubber by EniChem Elastomeri, adding an NPC of 110 KT of E-SBR and SB Latex from the Hythe, UK plant and 120 KT of S-SBR and BR from the Grangemouth, UK plant.
1990	The acquisition of the Ferrara, Italy based Dutral® EP(D)M plant by Montedison with a 85 KT NPC.
1993	Increasing the SBC NPC to 90 KT in Ravenna, Italy.
1994	Starting up a new 40 KT line in Ravenna, Italy of Neodium catalyzed High Cis BR, the first ever to be developed from original R&D activities.
2002	Starting up of the hydrogenation section to produce SEBS in the SBC plant in Ravenna, Italy.
2003	The shutdown of High Cis Ti-BR 40 KT plant in Ravenna, Italy in order to avoid the use of aromatic solvent and increase of Nd Hcis BR NPC in 2008.
2008	Debottlenecking of High Cis ND BR plant to 80 KT in Ravenna (Italy).
2014	Start up of Matrica Plants and shutdown of the E-SBR and SB Latex (Hythe, UK).
2015	Start up of a new S-SBR line in Grangemouth (UK) and debottlenecking of the existing plant.
2017	Starting up a 200 kt multipurpose plant in Yeosu (Korea) in JV with Lotte Chemicals (LVE)
2018	Starting up a new 50 kt plant for EPDM in Ferrara (Italy)

Versalis' elastomers

S-SBR

S-SBR is the family of choice for the manufacturing of top performance tyre. The anionic polymerization allows to obtain tailored micro and macro-structure to optimize the trade off between wet grip and rolling resistance.

Europrene® SOL B/R
Versalis is one of the few Manufacturers able to supply S-SBR grades obtained through batch and continuous process. The SOL R grades are suitable when used in Carbon Black and Silica based compounds for "green" tyres. The SOL B grades are advantageously used in adhesives, bitumen modification and ABS/PS manufacturing.





E-SBR

E-SBR is a general purpose rubber characterized by ease of processing mechanical properties and abrasion resistance. It has a limited resistance to oil and weather when properly compounded, it is suitable for use in outdoor applications.

Europrene®

Versalis offers one of the widest product portfolios on the market ranging from dry to oil extended to high styrene grades. All grades are well recognized for their quality and performance consistency. A large variety of safe oil extended grades is available TDAE, NAPH and RAE containing grades.



TPR

The **Thermoplastic Rubber** are styrenic block copolymers characterized by high elasticity and mechanical properties together with good low temperature performance. The properties are strongly influenced by the co-monomer used, micro and macro structure and the unsaturation level. The product range includes grades with low/high Styrene and di-block content, various molecular weights and viscosities to meet the requirements of the different final applications.

Europrene® SOL T/TH

Under Europrene® SOL T/TH trademark the following products are offered: Styrene-Butadiene-Styrene block copolymers (dry and oil extended) to be used in bitumen modification for roofing and road paving, adhesives, technical compounds, plastic modification and footwear; Styrene-Isoprene-Styrene block copolymers to be used in hot melt and pressure sensitive adhesives for tapes, labels and hygiene; Styrene-Ethylene-Butylene-Styrene fully saturated block copolymers to be used in technical compounds for the building, automotive, appliances, healthcare industry, hot melt adhesives and polymer modification.



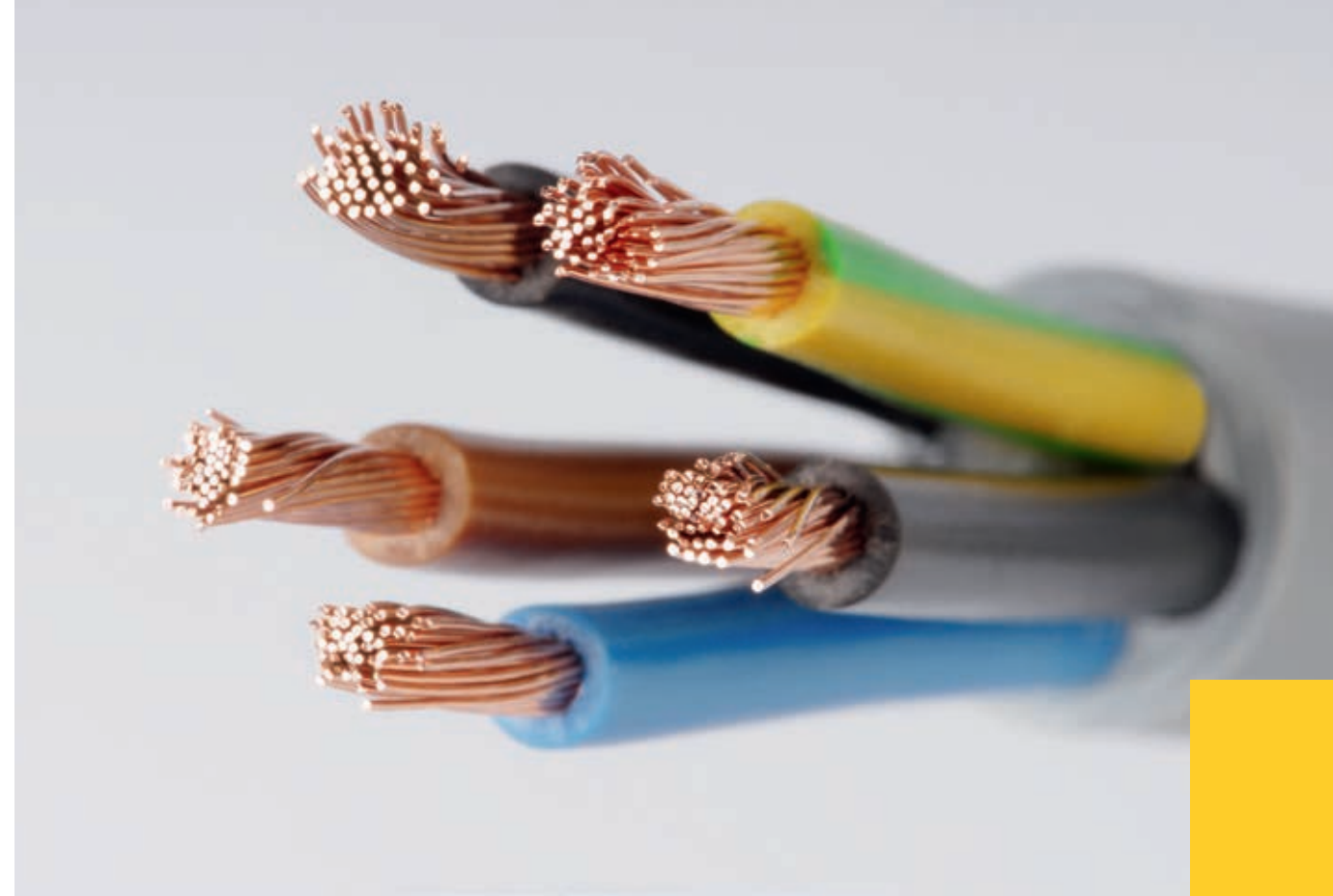
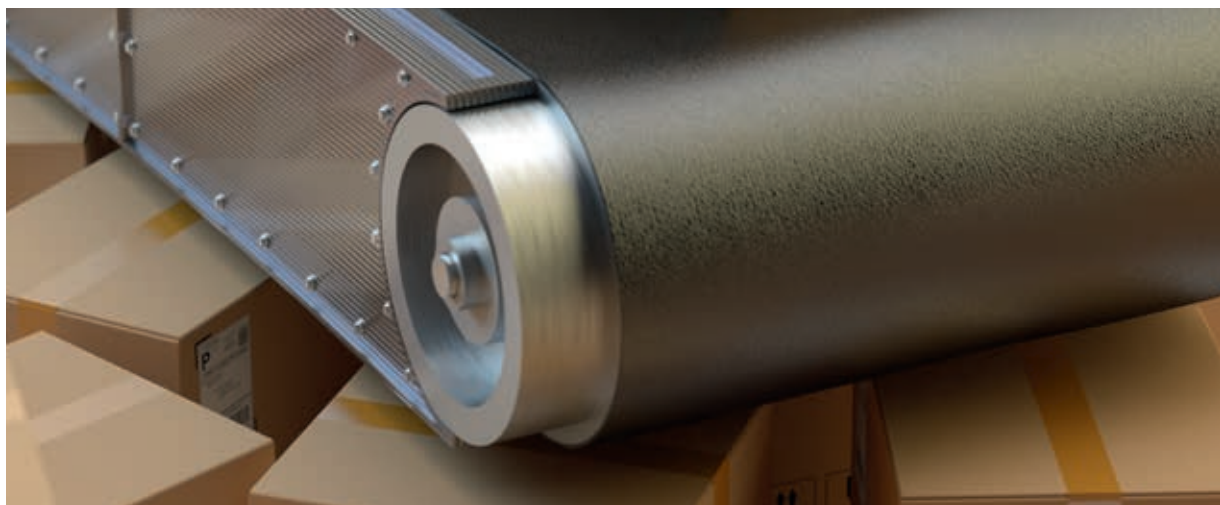


BR

Butadiene elastomers are characterized by an excellent resistance to abrasion, high resilience/rebound, good resistance to fatigue cracking and crack growth. Their extremely low glass transition temperature provides enhanced low temperature performance compared to other general purpose rubbers.

Europrene Neocis®/Intene®

The Versalis portfolio is among the widest offered on the market. The catalyst systems used are both Nd-Ziegler-Natta and Lithium. The former is able to supply the highest Cis containing BR to reach the highest elastic behavior, while the latter allows to get medium Cis and high vinyl containing grades. The applications are all types of types (sidewall and tread) and HIPS manufacturing.



NBR

NBR is the first elastomer family to be taken into account when a vulcanizate has to be resistant to oil. Resistance to apolar fluids like oil and gasoline as well as low temperature flexibility are influenced by the acrylonitrile content in the copolymer.

Europrene® N/GRN/N OZO

Europrene® N can be considered the worldwide reference for compositional homogeneity of the polymer chain that allows the best possible trade off between oil and low temperatures resistance.

Furthermore, GRN grades prove an extremely low mould fouling and high cure and speed rate so to be considered the elastomers of choice for massive productions, particularly when high temperature injection moulding cycles are adopted. Europrene® N family ranges from Mooney viscosity as low as 30 up to 80 MU. When ozone resistance has to be combined to oil resistance the use of Europrene® N OZO is required. This elastomer family is obtained fluxing PVC to an appropriate Europrene® N grade.





Latex

Latex is an aqueous anionic dispersion of a styrene-butadiene copolymer obtained by emulsion polymerization. High Solid Latexes are the elastomeric family of choice when resilient foamed items have to be manufactured. Low Solid Latexes are widely used for cord dipping in tyre manufacturing. For paper impregnation and coating are used styrene-butadiene copolymer modified with carboxylic groups.

Europrene Latice®

The wide portfolio of Europrene® HS Latices allows to produce resilient foamed mattresses and pillows in the desired range of firmness and with optimal cellular structure. Compared to Natural Latexes Intex®/Europrene® HSL have better consistency in terms of gelling time, pH and they are free of allergenic proteins. Within LS Latices specific grades were developed to improve the compatibility between rubber mixes and cords used in tyre manufacturing.



EP(D)M

EP(D)M elastomers are characterized by excellent resistance to ageing and weathering, good resistance to both high and low temperatures, low permanent set values and good resistance to a large number of chemicals. Now represent the single largest synthetic rubber for non-tyre application.

Dutral® CO/TER/BTR/PM/OCP

The first synthesis of an Ethylene Propylene Elastomer Copolymer in the World was performed in Ferrara

based laboratories by prof. Natta and his Team in the late 50's. Under the Dutral® trademark, the following types are offered Ethylene-Propylene Copolymer (Dutral® CO), Ethylene-Propylene - ENB Terpolymer (Dutral® TER and BTR), Copolymers specifically developed for polyolefin modification (Dutral® PM) and Copolymers to be used as Viscosity Modifier in lubricants (Dutral® OCP). The main applications are Automotive, Building, Wire&Cable, Appliances, TPV and Rubber Mechanical Goods.



Versalis in the world

Versalis is focused on establishing itself as a solution provider, offering a range of increasingly market-oriented products at an international level.

The company is present in the APAC region through its Shanghai-based subsidiary, Versalis Pacific Trading; in Mumbai, India; in Singapore; and in South Korea through LVE, a joint venture with Lotte Chemical.

Versalis can also count on subsidiaries Versalis Americas – with offices in Houston, Texas – and Versalis Mexico. Furthermore, Versalis serves the oil and gas industry with offices in Ghana and in Congo, with its portfolio of oilfield chemicals. Thanks to a widespread sales network, distributors and sales agents, Versalis can serve all markets worldwide.

Headquarters	Sales network	Plants	UK
San Donato Milanese, Milan (Italy)	Austria Belgium China Congo Czech Republic Denmark France Germany Ghana Greece Hungary India Italy Mexico Poland Portugal Romania Russian Federation Slovak Republic South Korea Spain Taiwan USA Venezuela	<u>Italy</u> Brindisi: - Steam cracking - Aromatics - Polyethylene Crescentino: - Bio-ethanol Ferrara: - Elastomers - Polyethylene Mantua: - Intermediates - Styrene - Styrenics Porto Marghera: - Steam cracking - Aromatics Porto Torres: - Elastomers - Renewable chemistry Priolo: - Steam cracking - Aromatics Ragusa: - Polyethylene EVA - Butadiene Ravenna: - Elastomers	<u>UK</u> Grangemouth: - Elastomers <u>France</u> Dunkerque: - Steam cracking - Polyethylene EVA <u>Germany</u> Oberhausen: - Polyethylene EVA <u>Hungary</u> Százhalombatta: - Styrenics <u>South Korea</u> Yeosu (LVE, a joint venture with Lotte Chemical): - Elastomers
R&D			
<u>Italy</u> Ferrara Mantua Novara Porto Torres Ravenna Rivalta Scrivia	Turkey United Arab Emirates (VPM, a joint venture with Petrochem/Mazrui Energy Services) UK USA		



versalis

Versalis spa
Piazza Boldrini, 1
20097 San Donato Milanese (MI) - Italy
Ph. 0039 02 520.1

info.elastomers@versalis.eni.com
versalis.eni.com

Technical service:

Piazza Boldrini, 1
20097 San Donato Milanese (MI) - Italy

Ph. 0039 02 520.32493
for EP(D)M, NBR and TPR

Ph. 0039 02 520.32455
for SBR/BR and Latex



Social accountability system of Versalis S.p.A.
complies with the requirements of SA8000



07/2019