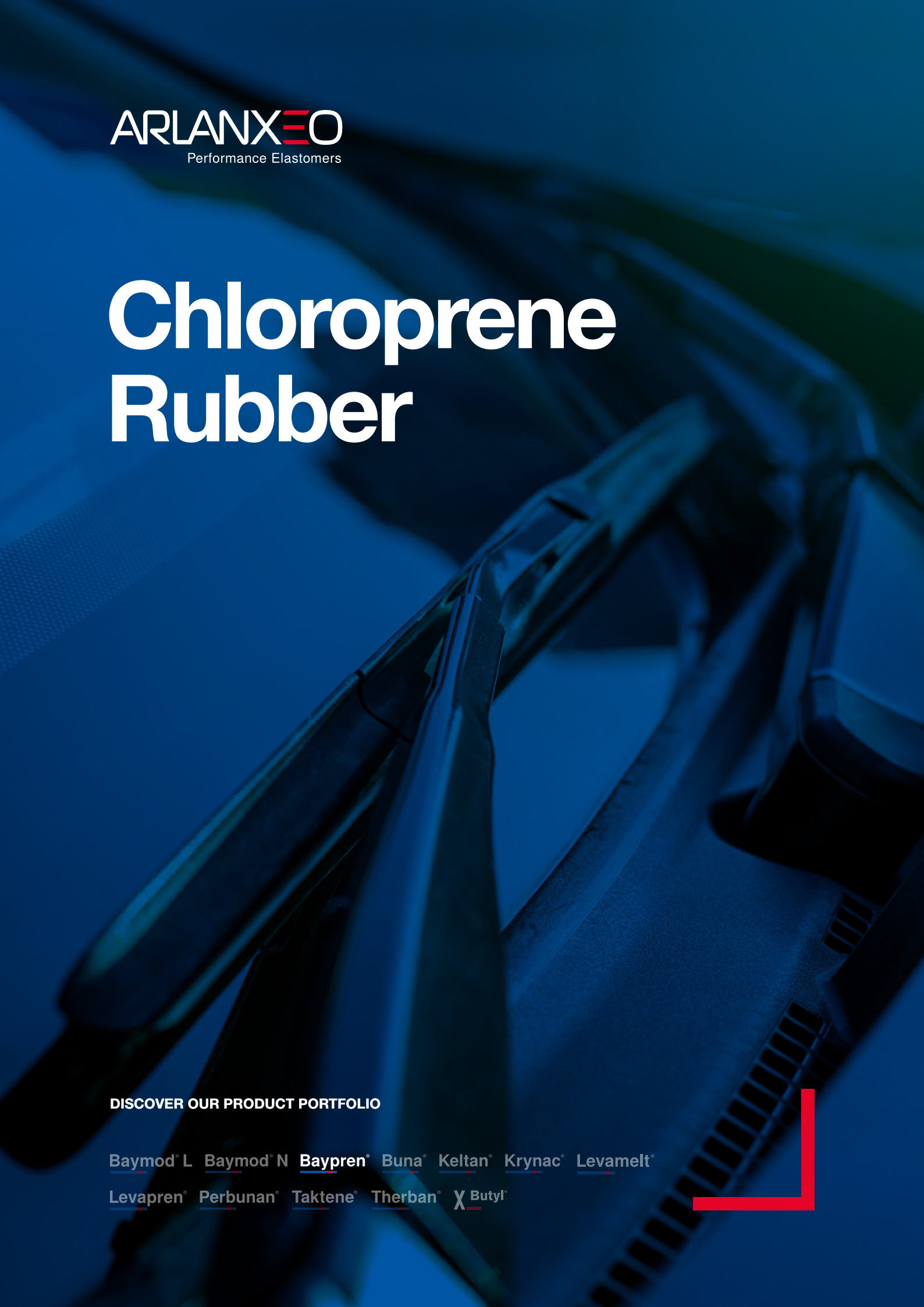
ARLANXEO
Performance Elastomers

Chloroprene Rubber



DISCOVER OUR PRODUCT PORTFOLIO

Baymod® L Baymod® N **Baypren®** Buna® Keltan® Krynac® Levamelt®
Levapren® Perbunan® Taktene® Therban® X Butyl®

ABOUT ARLANXEO

ARLANXEO is a world-leading synthetic elastomer company with its headquarters in The Hague, the Netherlands. Since December 31st, 2018, the company is a wholly-owned subsidiary of Saudi Aramco, a leading producer of energy and chemicals, based in Dhahran, Saudi Arabia. ARLANXEO develops, produces and markets high-performance elastomers that are used for a wide range of applications in the automotive and tire industry, building and construction, oil and gas industries as well as for consumer goods and the pharmaceutical sector.

Our production sites, research and development facilities and business offices span the globe to be close to our customers, maintain short transportation routes and assure high delivery reliability. Our world-scale plants produce efficiently, flexibly and sustainably – in Europe, Asia and North and South America.

As a competent and reliable partner of our customers, we deliver tailor-made solutions that reflect our high standards of quality, innovation, safety and sustainability. ARLANXEO offers a broad product lineup for highest requirements. We aim to create significant value for our customers and shareholders by applying best practices, using best-in class technologies and constantly striving for new and better solutions – for first-class products and services.

Content

Baypren®

Chloroprene rubber (international ASTM/DIN-abbreviation: CR) is a high-performance material with a wide variety of applications. **Baypren®** is the brand-name of the ARLANXEO range of polymers based on 2-chloro-1,3-butadiene (chloroprene), which are manufactured by water-based emulsion polymerization. The importance of **Baypren®** is derived essentially from its attractive combination of key properties which are unmatched by any other kind of rubber at a comparable price. This has led to the development of many product variants to meet diverse requirements.

Properly formulated **Baypren®** compounds are suitable for moldings and extrudates of all kind. Articles prepared thereof cover reinforced hoses, roll covers, belts, including conveyor belts, air spring bellows, cable sheathing and insulation for low-voltage cables, foams, including open and closed-cell foamed rubber, corrosion-resistant linings, sheeting, fabric proofings and footwear (boots). The inherent flame-retardancy of **Baypren®** vulcanizates can be adjusted to meet special requirements.

PROPERTIES

CRYSTALLIZATION

A key property of stereoregular polymers is their tendency to crystallize. Polymers like natural rubber or chloroprene rubber harden due to the formation of microcrystallites. The crystallization speed is influenced by the regularity of the polymer chain, the more regular the higher the tendency for orientation of the macromolecules and the faster the crystallization rate.

Hardness due to crystallization is fully reversible and can be removed by subjecting the crystallized material to heat or dynamic stress. Hardness due to crystallization is not connected to hardening of the product when going into a glassy state. Below the glass transition temperature, all polymers have significantly increased moduli.

The tendency of polymers to crystallize can be influenced by an appropriately controlled production process. For this reason, rubber articles based on **Baypren®** with a low tendency to crystallize, display virtually no increase in hardness due to crystallization even after exposure to low temperatures for a long period of time. In contrast, polymers with a particularly pronounced tendency to crystallize, display an increase in hardness already after a relatively short time.

MODIFICATION

The properties of **Baypren®** rubber are influenced by the type of modification of the raw polymer.

Effect of pre-crosslinking

- Reduction of the elastic resilience (snappiness) of the raw rubber and uncured compound
- Reduction of the die swell
- Improvement in calendering behavior
- Improvement of the surface smoothness of injection-molded and extruded articles
- Improvement of the dimensional stability, e. g. of uncured profiles

Effect of sulfur modification

- Facilitates mastication of the rubber, permitting the production of soft compounds with good building tack
- Only magnesium oxide and zinc oxide required for vulcanization
- Better tear resistance than standard grades
- Better adhesion to fabrics than standard grades
- Better dynamic properties

Effect of xanthogen disulfide (XD) modification

- Lower elasticity (less “nerve”) means easier processing (by calendering or extrusion)
- Better mechanical properties than standard grades in the same formulation
- Higher filler loadings possible

PROPERTIES OF VULCANIZATES BASED ON BAYPREN®

With the correct formulation, finished products made of **Baypren®** display the following characteristic outstanding properties in addition to their excellent rubber-elastic behavior:

- Resistance to weathering, both in dry and humid climates
- Excellent combustion behavior
- Good aging and heat resistance
- Good tensile strength, tear and wear resistance
- High dynamic fatigue resistance
- Resistance to water and a large number of chemicals over a long period
- Good adhesion to reinforcing substrates consisting of textiles, metals or glass fibers
- Resistance to fungi and soil bacteria
- Low gas permeability

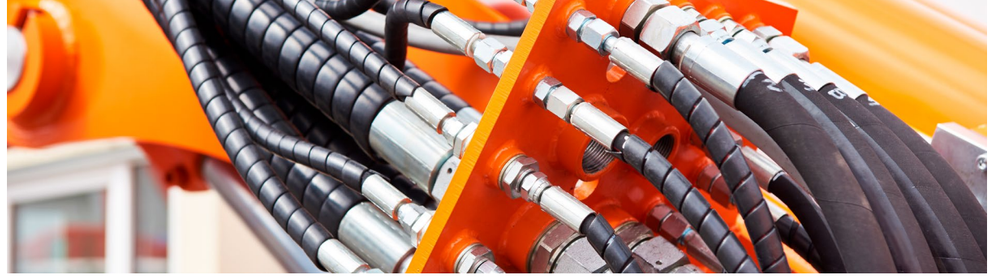
Thanks to its excellent set of properties, **Baypren®** is being used for the production of highly stressed rubber articles in many sectors, primarily in the automotive industry, mechanical engineering, plant construction, ship-building, mining and mineral oil production. The properties of **Baypren®** vulcanizates are influenced by the type of modification of the raw polymer (see above).

AGING AND HEAT RESISTANCE

Baypren® vulcanizates stabilized with an optimized antioxidant system, display excellent aging resistance. They neither soften nor harden at high temperatures or over long periods of stress and remain elastic and useable. The heat resistance of **Baypren®** vulcanizates is considerably better than that of natural rubber vulcanizates. It also exceeds the heat resistance of nitrile rubber.

WEATHERING AND OZONE RESISTANCE

While vulcanizates produced from many other rubbers tend to crack and harden relatively quickly and degrade when exposed to weathering and/or ozone, properly compounded **Baypren®** vulcanizates do not exhibit any significant deterioration, even after many years of exposure to atmospheric influences such as light, UV, rain, industrial gases, ozone and oxygen. Weathering experiments in an ozone athmosphere show that technical rubber goods based on **Baypren®** display sufficient elasticity for the majority of static applications (for example structural profiles) even after 50 years of continuous operations.



RESISTANCE TO WATER AND CHEMICALS

Baypren® vulcanizates are resistant to water, acids, alkaline solutions and a large number of industrial chemicals. With a good resistance to hydrocarbons, **Baypren®** vulcanizates show sufficient performance in contact with mineral oils to make them suitable for many applications. The corresponding volume change in mineral oils decreases with increasing naphthenic and, in particular, paraffinic content of the oil. **Baypren®** vulcanizates have a swelling resistance that is considerably better than that of vulcanizates based on styrene-butadiene rubber, natural rubber or ethylene-propylene diene rubber.

RESISTANCE TO FUNGI AND BACTERIA

Technical rubber goods that are in contact with soil for long periods of time are susceptible to be attacked by soilborne bacteria and fungi. In the long term, this can lead for example to destroyed underground cables. In contrast to the majority of other rubber types, **Baypren®** displays superior resistance to these microorganisms. This resistance can be enhanced through suitable compounding.

ABRASION RESISTANCE

Baypren® vulcanizates are highly wear-resistant. Their abrasion resistance is similar to that of nitrile rubber.

RESILIENCE

Properly formulated **Baypren®** vulcanizates feature very good resilience, although they do not attain the level of natural rubber. Very good resilience values are achieved in vulcanizates with a relatively high hardness.

DYNAMIC FATIGUE RESISTANCE

Baypren® vulcanizates are highly resistant to dynamic fatigue. Special grades are available to meet extremely stringent specifications, such as those applied to drive belts. For these grades the loss factor and hence the heat build-up under dynamic load are particularly low.

GAS IMPERMEABILITY

Baypren® vulcanizates have a very low gas permeability, which is roughly equivalent to that of nitrile rubber.

DEFORMATION PROPERTIES

Baypren® vulcanizates have a low compression set over a wide temperature range. The low-temperature compression set is a key value employed in the assessment of vulcanizates for use in seals. At higher temperatures, where aging also plays a role, the compression sets are lower than those of a large number of other elastomers.

COMBUSTION BEHAVIOR

Baypren® vulcanizates can be compounded for improved combustion behavior. The inherent flame retardancy of the polymer itself means that even stringent end-user specifications can be met. Limiting oxygen index (LOI) values above 50% can be attained with **Baypren®**. For example demanding specifications for flame retardant conveyor belts in underground mining applications can easily be met by properly compounded **Baypren®**.

LOW-TEMPERATURE FLEXIBILITY

The glass transition temperature of **Baypren®** polymers remains fairly constant almost irrespective of the polymers' tendency to crystallize. The brittleness temperature and the glass transition temperature of **Baypren®** vulcanizates can be reduced to below -50°C by an appropriate compound formulation. Where rubber parts made of **Baypren®** are required to remain flexible at low temperatures over long periods, grades with a low crystallization tendency are recommended.

ELECTRICAL PROPERTIES

Baypren® is highly suitable for cable sheathing and, in many cases, for low-voltage insulation. It is recommended for the use in cables that must have an excellent weathering, ozone, oil and aging resistance as well as a good flame retardance. The thermal conductivity and coefficient of thermal expansion of **Baypren®** vulcanizates are comparable with other elastomers. The values obtained are, of course, largely influenced by the compound formulation. The thermal insulation is also similar to that of the majority of plastics used in the construction industry today.

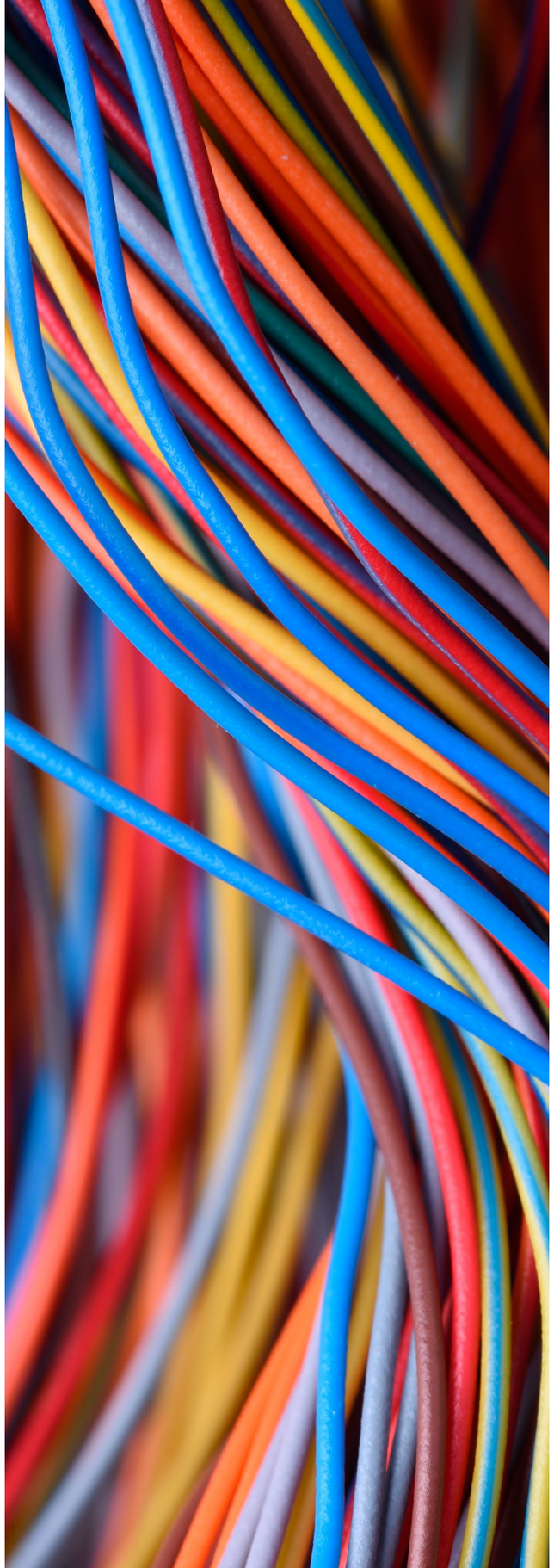
APPLICATIONS CABLE AND WIRE INDUSTRY

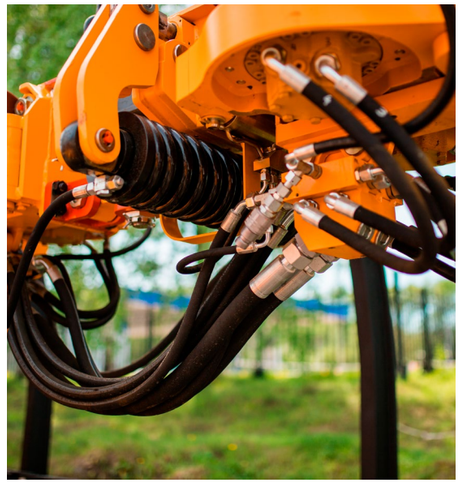
Effect of pre-crosslinking

- Reduction of the elastic resilience (snappiness) of the raw rubber and uncured compound
- Reduction of the die swell
- Improvement in calendering behavior
- Improvement of the surface smoothness of injection-molded and extruded articles
- Improvement of the dimensional stability, e. g. of uncured profiles

Cables and wires

- Rubber-sheathed flexible cables for heavy-duty applications in hoisting gear and transport and conveyor systems
- Rubber-sheathed flexible cables for heavy-duty applications in underground and surface mining applications
- Rubber-sheathed flexible cables for use in dry and wet conditions in domestic appliances and light-duty workshop equipment
- Rubber-sheathed flexible cables with suspension unit for elevators and conveyor systems
- Trailing cables for use in dry and wet conditions and also in underground applications where service conditions are severe
- Theater cables for mobile light fittings and light support structures
- Welding cables
- Flat flexible power and control cables for use in dry and wet conditions and also outdoors, especially for transport systems, machine tools and processing machines
- Flat flexible lighting cables





AUTOMOTIVE AND GENERAL INDUSTRY

HOSES

- Hydraulic hoses for high pressure and ultra-high pressure
- Reinforced hoses for medium pressure and low pressure
- Brake hoses
- Oil and fuel hoses
- Hoses for use in the petroleum industry
- Floating hoses

MOLDED PARTS

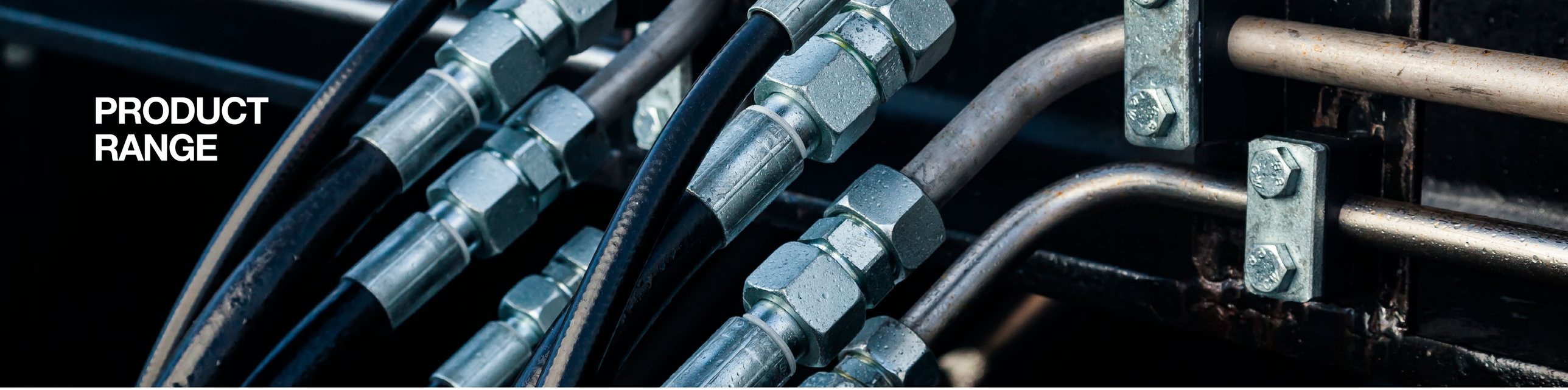
- Bellows and dust caps
- Axle boots
- Round-section sealing strips, O-ring seals and flat seals
- Membranes
- Air springs
- Dampers and bearings with and without metal inserts, e. g. load bearing pads for high buildings and bridges
- Windshield wiper blades

CONVEYOR AND TRANSMISSION BELTS

- Power transmission belts for the automotive and general industry
- Poly-V-belts
- Raw-edge V-belts
- Jacketed V-belts
- Timing belts
- Conveyor belts with steel cord and textile reinforcement for underground mining applications, steel works, mineral processing plants and the chemical industry

OTHER

- Foamed rubber sheets for wet suits and for the production of punched seals
- Covers for rollers in the printing industry and also in the textile and paper sectors
- Rubberized fabrics for all types of tarpaulins, containers and boats, and membranes in the automotive sector



PRODUCT RANGE

BAYPREN® GRADES PORTFOLIO

PRODUCT	CRYSTAL-LIZATION RATE	MOONEY VISCOSITY[1] ML (1+4)100°C	PACKAGING		REMARKS
General purpose grades					
Baypren® 110 M 41	very low	41	paper/PE	25 kg paper bags with PE[2] inner bags 40 bags pallet = 1,000 kg net; 35 bags pallet = 875 kg net; 20 kg PE[3] bags 50 bags per box = 1,000 kg net	Excellent physical properties, good oil resistance, flame retardancy and high weathering and ozone resistance; standard grades for best aging resistance
Baypren® 110 M 49	very low	49	paper/PE		
Baypren® 110 M 65	very low	65	PE		
Baypren® 210 M 43	medium	43	paper/PE		
Baypren® 210 M 48	medium	48	paper/PE		
Baypren® 211 M 39	medium	39	paper		
Baypren® 230 M 100	medium	100	paper		
Baypren® 230 M 108	medium	108	paper		
Xanthogen disulfide-modified grades					
Baypren® 116 M 45	very low to low	45	paper	see above	Excellent mechanical properties due to formation of perfect network
Baypren® 126 M 70	very low to low	70	paper/PE		
Baypren® 216 M 43	medium	43	paper		
Baypren® 216 M 49	medium	49	paper		
Precrosslinked grades					
Baypren® 114 M 62	very low	62	PE	see above	Especially designed for extrusion application
Baypren® 214 M 55	medium	55	paper		
Baypren® 215 M 50	medium	50	paper		
Sulfur-modified grades					
Baypren® 510 M 42	low to medium	42	paper	see above	Suitable for mastication; easy to process; for dynamic applications
Baypren® 611 M 43[4]	low to medium	43	paper		
Baypren® 611 M 48[4]	low to medium	48	paper		
Baypren® 711 M 48	low to medium	48	PE		
Baypren® 616 VP	low to medium	50	paper		Following its commitment to support high health, safety, and environmental standards, ARLANXEO is introducing its first commercially available N-Nitrosamine free sulfur modified CR.

[1] unmassed (ISO 289)
[2] PE-innerlayer 0.05 mm thick, Vicat softening point DIN 53460 ca. 75°C
[3] PE bag, 0.2 mm thick; Vicat softening point DIN 53460, ca. 66°C
[4] restrictions for shipment outside of Europe, for further advice kindly contact your local key account manager

Baypren® nomenclature

Baypren® 214

Brand

Tendency to crystallize
1 = low
2 = medium
5+6+7 = sulfur-modified grades

Viscosity
1 = low
2 = medium
3 = high

Special properties
0 = standard grades
1+2 = special characteristics, eg. regarding viscosity or crystallization
4 = pre-crosslinked grades
5 = pre-crosslinked and XD-modified grades
6 = XD-modified grades

ARLANXEO
Performance Elastomers

WWW.ARLANXEO.COM/EN/CONTACT-US

Portfolio/Edition 2023

mybusiness@arlanxeo.com
www.arlanxeo.com/en/contact-us

APAC
ARLANXEO Singapore Pte. Ltd.
3A International Business Park #07-14/17
ICON@IBP Tower B Singapore 609935

CHINA
ARLANXEO High Performance Elastomers
(Changzhou) Co. Ltd. Shanghai Branch
Shanghai, P.R. China

EMEA
ARLANXEO Deutschland GmbH
Dormagen, Germany

LATAM
ARLANXEO Brasil S.A.
São Paulo, Brazil

NORAM
ARLANXEO USA LLC
Pittsburgh PA, USA

WWW.ARLANXEO.COM

Trial Product:
(VP = Versuchsprodukt = trial product). The information contained herein is merely preliminary. Testing as to properties and applications is not final. Further information, including data which could change or add hazards with use, may be developed by the manufacturer, the user or a third-party institute. Such information may be needed to properly evaluate or use this product. Use is undertaken at the sole risk of the user.

Quality & Environmental Management:
All ARLANXEO products are produced under strict control regarding safety, environmental protection and quality. The whole supply chain, from production to customer service, is covered by ISO 9001 and ISO 14001 certification.

Product Safety:
Relevant safety data and references as well as the possibly necessary warning labels are to be found in the corresponding safety data sheets.

Health and Safety Information:
Appropriate literature has been assembled which provides information concerning the health and safety precautions that must be observed when handling the ARLANXEO products mentioned in this publication. For materials mentioned which are not ARLANXEO products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be followed. Before working with any of these products, you must read and become familiar with the available information on their hazards, proper use and handling. This cannot be overemphasized. Information is available in several forms, e.g., material safety data sheets and product labels. Consult us through your ARLANXEO representative.

Regulatory Compliance Information:
Some of the end uses of the products described in this publication must comply with applicable regulations, such as the FDA, BfR, NSF, USDA and CPSC. If you have any questions on the regulatory status of these products, contact your ARLANXEO representative.
The manner in which you use and the purpose to which you put and utilize our products, technical assistance and information (whether verbal, written or by way of production evaluations), including any suggested formulations and recommendations, is beyond our control.
Therefore, it is imperative that you test our products, technical assistance and information to determine to your own satisfaction whether they are suitable for your intended uses and applications. This application-specific analysis must at least include testing to determine suitability from a technical as well as health, safety, and environmental standpoint. Such testing has not necessarily been done by us. Unless we otherwise agree in writing, all products are sold strictly pursuant to the terms of our standard conditions of sale. All information and technical assistance is given without warranty or guarantee and is subject to change without notice. It is expressly understood and agreed that you assume and hereby expressly release us from all liability, in tort, contract or otherwise, incurred in connection with the use of our products, technical assistance and information.

Any statement or recommendation not contained herein is unauthorized and shall not bind us. Nothing herein shall be construed as a recommendation to use any product in conflict with patents covering any material or its use. No license is implied or in fact granted under the claims of any intellectual property right.