

QUALITY PERFORMS.



**Release agents and
tire marking paints**



X **Rhenodiv**[®]

X **Rhenomark**[®]

QUALITY WORKS.

LANXESS
Energizing Chemistry

RELEASE AGENTS AND TIRE MARKING PAINTS: RHENODIV® AND RHENOMARK®

The production of high-performance tires and molded elastomer products relies on the use of effective release agents. Process safety and low scrap rates are key for the efficient production of compounds and molded elastomer articles. LANXESS has the solutions, market understanding, production knowledge and comprehensive service to support clients at every stage of the process chain. We focus on improving quality and driving down costs.

Rhenodiv® release agents and Rhenomark® tire marking paints are water-based, solvent-free* and free of volatile organic compounds (VOCs) and, therefore, environmentally less hazardous.

LANXESS is where the rubber industry is, with local production sites, technical centers and a qualified sales force to serve you and to meet your demands. We provide your staff with technical support whenever necessary. Customers with globalized structures benefit from a global network of production sites and globally uniform specifications.

LANXESS operates manufacturing sites and technical centers for release agents in Europe, Asia and the Americas:

- Mannheim, Germany
- Burzaco/Buenos Aires, Argentina
- Qingdao, China
- Jhagadia, India

With our global network of production sites in every world region and an effective logistics network, we are the partner of choice for the global tire and rubber industry. LANXESS usually can offer the same product from different production sites and in accordance with the same product specifications. Together with partners in Germany, the U.S. and Japan we cater to the global tire and rubber industry with release agents and tire marking paints.

Our global team of technical sales representatives supports customers in various functions, from procurement to plant operators. In our technical centers for release agents we develop specific solutions that precisely fit customer requirements. Our teams of application technology specialists support customers with technical advice and customized solutions.

An optimal release agent is more than just a product, it is a solution to a certain challenge, either in the production process, storage and handling, HE&S, procurement, or elsewhere.

Rhenodiv® release agents and Rhenomark® tire marking paints are offered in appropriate packing units fitting the requirements and equipment of the rubber industry. Many of our products are packed on plastic pallets, a requirement particularly important for tire manufacturers.

* With the exception of Rhenodiv® BC-638/1, which, for technical reasons, is solvent-based.

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RELEASE AGENTS IN TIRE PRODUCTION

APPLICATION MATRIX

Department	Product type	Specific solution	Description		
Mixing	Batch-off	Rhenodiv® BO-1016	Filler-free, batch-off liquid		
		Rhenodiv® BO-1050	Filler-free, batch-off liquid		
		Rhenodiv® BO-3300	Anti-tack powder		
		Rhenodiv® BO-3300 Pearls	Anti-tack pearls		
		Rhenodiv® BO-3400	Anti-tack powder		
		Rhenodiv® BO-3400 GV	Anti-tack powder		
		Rhenodiv® BO-501-2	Anti-tack powder		
		Rhenodiv® BO-505-2	Anti-tack powder		
Extrusion	Tread marking paints	Rhenomark® MP+	High-density tread marking paint		
		Rhenomark® PI	Performance tread marking paint		
Curing	Single-release inside tire lubes	Rhenodiv® BP-160	Low-filled mica, silicone-based, reactive H2		
		Rhenodiv® BP-161	Low-filled mica, silicone-based, reactive H2		
		Rhenodiv® BP-165	Medium-filled mica, silicone-based, reactive H2		
		Rhenodiv® BP-166	Medium-filled mica, silicone-free, H2-free		
		Rhenodiv® BP-286	High-filled mica, silicone-based		
		Rhenodiv® BP-2864	High-filled mica, silicone-based		
		Rhenodiv® BP-3091	Unfilled, silicone-based, reactive H2		
		Rhenodiv® BP-337	Unfilled, silicone-based, reactive H2-free		
		Rhenodiv® BP-338	Unfilled, silicone-based, reactive H2-free		
		Rhenodiv® BP-338/1	Unfilled, silicon-based, reactive H2-free, suitable for spinning disc		
		Rhenodiv® BP-450	High-filled mica, silicone-based		
		Rhenodiv® BP-5100-2	Medium-filled mica, silicone-base		
		Rhenodiv® BP-550	High-filled mica, silicone-based		
		Rhenodiv® BP-70	High-filled mica, silicone-based, reactive H2		
		Rhenodiv® BP-8000	Modified mica, silicone-based, H2-free		
		Rhenodiv® BP-9092	High-filled mica, silicone-based		
		Rhenodiv® BP-9094	High-filled mica, silicone-based		
		Rhenodiv® BP-9095	Unfilled, silicone-based, reactive H2-free		
		Rhenodiv® BP-9096	High-filled mica, silicone-based		
		Rhenodiv® BP-9500	Unfilled, silicone-free, H2-free		
		Rhenodiv® BP-9535	Unfilled, silicone-free, H2-free		
			Semi-permanent inside tire lubes	Rhenodiv® SP-1003	Silicone-based, reactive H2
				Rhenodiv® SP-1010	Silicone-based, reactive H2
				Rhenodiv® SP-1010/1	Silicone-based, reactive H2
				Rhenodiv® SP-1020	Silicone-based, reactive H2
				Rhenodiv® SP-2010	Silicone-based, reactive without H2
				Rhenodiv® SP-289	Silicone-based, reactive H2
				Rhenodiv® SP-2891	Silicone-based, reactive H2
				Rhenodiv® SP-2892	Silicone-based, reactive H2
				Rhenodiv® SP-2893	Silicone-based, reactive H2
			Bladder coatings	Rhenodiv® BC-1069	Blend of reactive silicones dissolved in a hydrocarbon solvent, H2-free
				Rhenodiv® BC-1700	Blend of reactive silicones H2
Rhenodiv® BC-1800	Blend of reactive silicones H2				
Rhenodiv® BC-6033	Blend of reactive silicones H2				
Rhenodiv® BC-638-1	Blend of reactive silicones dissolved in a hydrocarbon solvent, H2-free				
Rhenodiv® BC-700/2	Blend of reactive silicones H2				
Rhenodiv® BC-730	Blend of reactive silicones H2				
Rhenodiv® BC-750	Blend of reactive silicones H2				
Rhenodiv® BC-792	Blend of reactive silicones H2				
Rhenodiv® BC-800	Blend of reactive silicones H2				
Rhenodiv® BC-825	Blend of reactive silicones H2				
	Outside tire paints	Rhenodiv® OP-600	Outside tire paint for green tire application		
		Rhenodiv® OP-787	Outside tire paint for green tire application		
		Rhenodiv® OP-9150	Outside tire paint for green tire application		
		Rhenodiv® OP-9160	Latex-free outside tire paint for green tire application		
		Rhenodiv® OP-9208	Outside tire paint for green tire application		
		Rhenodiv® OP-9218	Outside tire paint for green tire application		
		Rhenodiv® OP-94	Outside tire paint for green tire application		
		Rhenodiv® OP-9430	Outside tire paint for green tire application		
Rhenodiv® OP-98	Outside tire paint for green tire application				
Final inspection	Finishing paints	Rhenodiv® FP-26	Cosmetic outside paint (anti-blemish)		
		Rhenodiv® FP-41	Cosmetic outside paint (anti-blemish)		
		Rhenodiv® FP-45	Cosmetic outside paint (anti-blemish)		
		Rhenodiv® FP-61	Cosmetic outside paint (anti-blemish)		
		Rhenodiv® FP-900C	Cosmetic outside paint (anti-blemish)		



TIRE SYSTEMS

Modern tire manufacturing requires state-of-the-art tire release solutions. Effectiveness, efficiency, scrap reduction and economic use of resources typically are what tire manufacturers are demanding. Automated and continuous processes require adequate and reliable solutions. Occupational safety is also of major concern as is the long-term availability of release agents in view of global and regional HE&S regulations.

LANXESS meets these demands by providing the tire industry with tailored technical solutions:

- Single-release inside tire lubes, filled and non-filled, reactive and non-reactive, with silicone or without, water-based and free of VOC
- Semi-permanent inside lubes for multiple release of tires – aqueous and solvent-free silicone emulsions
- We provide operators with ready-to-use solutions
- Handy packaging solutions, appropriate for product and application
- Formulations in accordance with the regulations of chemical inventories and the Global Harmonized System (GHS)

Another approach to tire release agents is coating the tire curing bladder rather than the inside of the tire. LANXESS is promoting this technology approach since it offers many advantages. Through the use of bladder coatings the application of silicone-based release agents by spray gun can be avoided. This offers manifold benefits, e. g. reduced house-keeping, silicone-free tires, no tire washing and no disposal of waste water, etc.

Single-release inside tire lubes

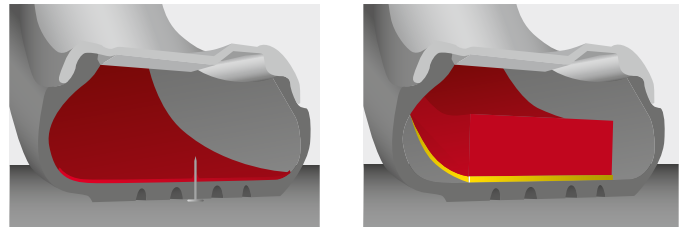
State-of-the-art single-release inside tire lubes allow for efficient processes and economic use in the mass production of all kinds of tires. **Rhenodiv® BP** single-release inside tire lubes provide tire manufacturers with solutions tailored for the respective tire category, e. g. PCR, LCV, TBR, OTR, AGR and MOTO.

- Easy handling, optimal application
- Effective lubrication resulting in economic use
- Variety of packaging types and sizes to fit your requirements
- Portfolio including low-filled (**Rhenodiv® BP-161, BP-165**) and filler-free grades (**Rhenodiv® BP-337, BP-338, BP-3091, BP-9500, and BP-9535**).

Rhenodiv® BP single-release inside tire lubes are water-based and solvent-free and therefore environmentally less hazardous. Silicone-free systems allow for an effective release action – for a clean tire, an efficient process without washing and a clean working area.

To ensure the adhesion of sealing layers, noise-reducing foam and sensors, the inner liners of tires must be subject to thorough cleaning with lasers or chemicals. Use of suitable filled **Rhenodiv® BP** types can reduce the effort involved in the cleaning step without sacrificing the advantages of enhanced air bleed during vulcanization.

- **Rhenodiv® BP-166** and **Rhenodiv® BP9500/BP-9535** are 100% silicone-free single-release insides lubes.
- **Rhenodiv® BP-286** and **BP-2864** are ideal solutions for sealant and noise-reduced tires where a clean inner liner is mandatory. **Rhenodiv® BP-286** and **BP-2864** are easy to clean with laser and other methods.



Picture 1: Sealant tire equipped with an additional sealant layer
Picture 2: Silent tire equipped with a noise-reducing foam

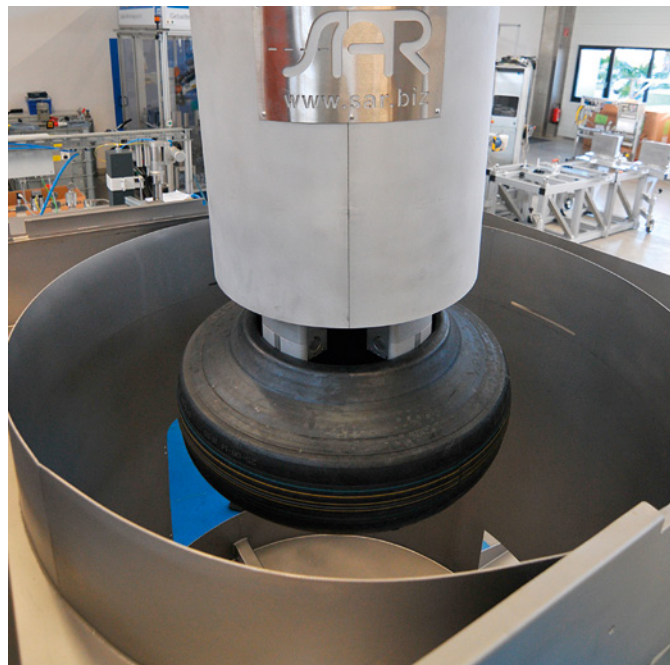


Product	Chemical composition	Appearance, supply form	Characteristics	Solid content %	Reactive H ₂	Reactive H ₂ -free	PCR, LCV, Moto	TBR	OTR, AGV
Rhenodiv® BP-160	Aqueous dispersion of mineral filler in reactive silicones	Amber-silver liquid	Product to be applied on every tire. The residual lubricity left on the bladder might last for the following cure cycle	20	■		++	+	+
Rhenodiv® BP-161¹⁾	Aqueous dispersion of mineral filler in reactive silicones	Amber-silver liquid	Product to be applied on every tire. The residual lubricity left on the bladder might last for the following cure cycle	29	■		++	+	+
Rhenodiv® BP-165	Aqueous dispersion of mineral filler in reactive silicones	Black liquid	Product to be applied on every tire. The residual lubricity left on the bladder might last for the following cure cycle	35	■		++	+	+
Rhenodiv® BP-166	Aqueous dispersion of mineral fillers, silicone-free	Amber-silver liquid	Product to be applied on every tire.	28	■		++	+	+
Rhenodiv® BP-286	Thixotropic aqueous dispersion of inorganic fillers	Black liquid	Good release and excellent slip properties, excellent air bleeding	44			++	+	++
Rhenodiv® BP-2864	Thixotropic aqueous dispersion of inorganic fillers	Jetblack liquid	Good release and excellent slip properties, excellent air bleeding	44			++	+	++
Rhenodiv® BP-3091	Unfilled, aqueous formulation of partly crosslinkable silicone polymers	Milky white liquid	Improved load-carrying capacity and lubricity, particularly for demanding applications	14	■		++	++	+
Rhenodiv® BP-337	Unfilled, water-based product, containing silicones, H ₂ -free	Milky white liquid	Provides suitable lubricity and shiny finish	23		■	++	++	+
Rhenodiv® BP-338	Unfilled, water-based product, containing silicones, H ₂ -free	Milky white liquid	Provides suitable lubricity and shiny finish	23		■	++	++	+
Rhenodiv® BP-338/1	Unfilled, water-based product, containing silicones, H ₂ -free	Milky white liquid	Provides suitable lubricity and shiny finish, suitable for spinning disc applications	23		■	++	++	+
Rhenodiv® BP-450 F, N, GT¹⁾	Aqueous dispersions of mineral filler in non-reactive silicones	Amber-silver liquid	Provides suitable lubricity, high release properties and improves the inside appearance of the cured tire	45			++	+	++
Rhenodiv® BP-5100-2¹⁾	Aqueous suspension of inorganic pigments, non-reactive silicone polymers and emulsifiers	Greyish liquid	Inside lube, espec. for run-on-flat, sealant, and noise-reduced tires; excellent slippage of the bladder into the green tire	27			++	+	+
Rhenodiv® BP-550 N, T	Thixotropic aqueous dispersion with inorganic fillers	Gray-black liquid, amber-silver liquid	Suitable lubricity, high release properties, outstanding air bleeding; improves inside appearance of cured tire	50			++	+	++
Rhenodiv® BP-70/R,N,S¹⁾	Aqueous dispersion of mineral filler in reactive silicones	Gray-black liquid, black liquid	Good release and excellent slip properties, the crosslinkable silicone prevents flaking of the release agent from the cured tire and the bladder	45	■		++	+	++
Rhenodiv® BP-8000	Aqueous dispersion of mineral filler on specific silicones pre-linked over de mica surface	Amber silver liquid	Product to be applied on every tire. The special mica surface modification gives the product a particular lubricity	40			++	++	+
Rhenodiv® BP-9092/ G, W	Aqueous suspension of inorganic pigments, polydimethylsiloxanes and additives	Gray-white liquid of high viscosity	Very good slip of bladders; excellent air bleed and bladder release; short drying time and low consumption	50			++	+	++
Rhenodiv® BP-9094/1	Aqueous suspension of inorganic pigments, silicone polymers and emulsifiers	Gray liquid of medium viscosity	Easy molding and demolding; novel formulation with favorable effects on inner liner splice; long bladder life	43			++	+	++
Rhenodiv® BP-9095¹⁾	Aqueous emulsion of reactive silicone polymers and emulsifiers, filler-free	White liquid of medium viscosity	High lubricity for easy molding and demolding; long bladder life	8		■	++	++	+
Rhenodiv® BP-9096	Aqueous suspension of inorganic pigments, silicone polymers and emulsifiers	Gray-black liquid of medium viscosity	High lubricity for easy molding and demolding; long bladder life	45			++	+	++
Rhenodiv® BP-9500	Unfilled, silicone-free product based on glycol and vegetable oils	Translucent yellow liquid	Inside lube, espec. designed for run-on-flat, sealant, and noise-reduced tires; can be washed with water	0			++	++	+
Rhenodiv® BP-9535	Unfilled, silicone-free emulsion of glycol and vegetable oils	White to yellowish emulsion	Inside lube, espec. designed for run-on-flat, sealant, and noise-reduced tires; can be washed with water	0			++	++	+

¹⁾ Not available in EMEA

Multiple-release inside tire lubes

Unlike single-release inside tire lubes, semi-permanent inside tire lubes allow for multiple curing cycles per single application of the release agent. Depending on the respective application, this facilitates processes in the plant. **Rhenodiv® SP** grades allow the spraying of 1 out of 3, and up to 1 out of 20 tires. The release agent is sprayed on to the inner liner of the tire where it is partly transferred by the curing bladder from the sprayed tire to subsequent tires. **Rhenodiv®** semi-permanent inside tire lubes contain reactive silicones. Besides a variety of hydrogen emitting grades for different requirements, the technology without hydrogen emission found its place in **Rhenodiv® SP** portfolio. All **Rhenodiv® SP** grades are water-based and free of VOC and therefore environmentally less hazardous.



Product	Chemical composition	Appearance, supply form	Characteristics	Solid content %	Reactive H ₂	Reactive H ₂ -free	Frcy. of appl.	PCR, LCV, Moto	TBR	OTR, AGV
Rhenodiv® SP-1003	Aqueous emulsion of vinyl and phenyl-silicones with hydrogen terminal crosslinker	Milky white liquid	The combination of different silicones gives the product a particular film with high temperature resistance and good lubricity	8	■		1/3	++	+	+
Rhenodiv® SP-1010	Aqueous emulsion of reactive silicones	Milky white liquid	Semi-permanent lubricant release agent for multiple curing per application	12	■		1/6 – 1/12	++	+	+
Rhenodiv® SP-1010-1	Aqueous emulsion of vinyl and phenyl-silicones with hydrogen terminal crosslinker	Milky white liquid	This product with low viscosity was developed to be applied with disc atomizer. The recommended application frequency is one every 10 tires	12	■		1/10	++	+	+
Rhenodiv® SP-1020	Aqueous emulsion of reactive silicones	Milky white liquid	Semi-permanent lubricant release agent for multiple curing per application	17.5	■		1/15 – 1/20	++	+	+
Rhenodiv® SP-2010	Aqueous emulsion of hydroxy fluids and silicone's resins	Milky white liquid	This new semipermanent crosslinking with silicone's resins leads to a semipermanent reactive H ₂ free to be applied with a frequency of one every 10 tires	27		■	1/10	++	+	+
Rhenodiv® SP-289	Aqueous formulation of crosslinkable silicones	Milky white liquid	Semi-permanent inside tire lube for multiple releases of tire	50	■		1/15	++	++	+
Rhenodiv® SP-2891	Aqueous formulation of crosslinkable silicones	Milky white liquid	Semi-permanent inside tire lube for multiple releases of tire	29	■		1/6	++	+	+
Rhenodiv® SP-2892	Aqueous formulation of crosslinkable silicones	Milky white liquid	Semi-permanent inside tire lube for multiple releases of tire	46	■		1/10	++	++	+
Rhenodiv® SP-2893	Aqueous formulation of crosslinkable silicones	Milky white liquid	Semi-permanent inside tire lube for multiple releases of tire	50	■		1/15	++	++	+
Rhenodiv® SP-640¹⁾	Water-based emulsion of reactive silicones	Milky white liquid	Semi-permanent inside tire lube for multiple releases of tire	23	■		1/10	++	+	+

¹⁾ Not available in EMEA

Bladder coatings

Besides single-release and semi-permanent release agents, LANXESS offers bladder coatings for protection and improvement of the service life of curing bladders. These bladder coatings can be used as primers in combination with them or by themselves for multiple releases of tires. With **Rhenodiv® BC** grades it is feasible to cure a high number of tires before a renewal of the coating is necessary. With its technical expertise about bladder coatings LANXESS has been a pioneer in its own bladder production and introduced permanently coated **Rhenoshape®** bladders to the world market which allow for a lifetime use of the bladder without additional use of release agents. Furthermore, LANXESS **Rhenodiv®** BP- and SP-grades show outstanding performance in bladder life and application efficiency in combination with our permanently-coated bladders.

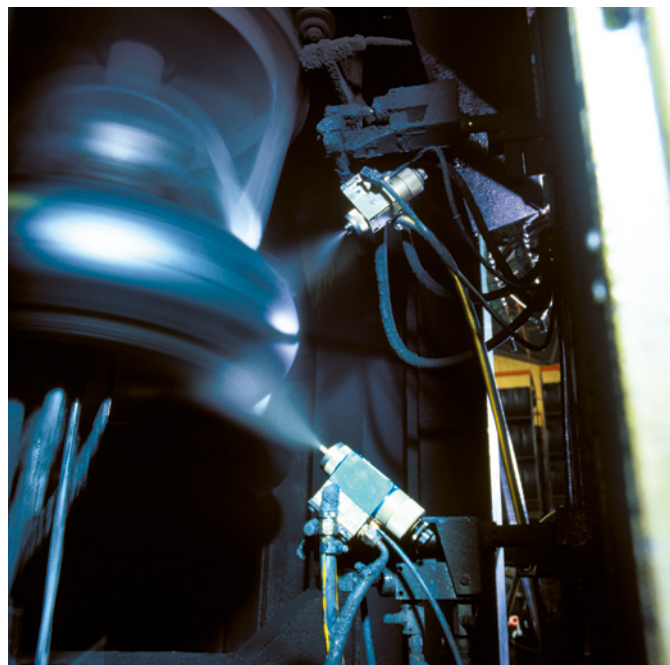


Product	Chemical composition	Appearance, supply form	Characteristics	Solid content %	Reactive H ₂	Reactive H ₂ -free
Rhenodiv® BC-1069	Blend of reactive silicones	Opaque liquid	Basic multi-release coating for tire curing bladders to enhance their overall lifetime and facilitate the first curing cycles of new bladders, H ₂ -free	50		■
Rhenodiv® BC-1700	Aqueous emulsion of reactive silicones	Milky white liquid	Water-based bladder coating free of VOC. High anti-adherent effect for facilitated release of tires, especially during the initial curing cycles of new bladders	18	■	
Rhenodiv® BC-1800	Aqueous emulsion of reactive silicones	Milky white liquid	Water-based bladder coating free of VOC. High anti-adherent effect for facilitated release of tires, especially during the initial curing cycles of new bladders. Long-lasting.	18	■	
Rhenodiv® BC-6033	Aqueous emulsion of reactive silicones	Milky white liquid	Water-based bladder coating free of VOC. High anti-adherent effect for facilitated release of tires, especially during the initial curing cycles of new bladders. Long-lasting.	31	■	
Rhenodiv® BC-638-1	Reactive silicones dissolved in a hydrocarbon solvent	Whitish cloudy solution	Effective semi-permanent bladder coating for tire and air spring production, H ₂ -free	16		■
Rhenodiv® BC-700/2	Water-based emulsion of reactive silicones	White, cloudy suspension	Semi-permanent bladder coating	11	■	
Rhenodiv® BC-700/3	Water-based emulsion of reactive silicones	White, cloudy suspension	Semi-permanent bladder coating	15	■	
Rhenodiv® BC-730¹⁾	Water-based emulsion of reactive silicones	White, cloudy suspension	Semi-permanent bladder coating	3	■	
Rhenodiv® BC-750¹⁾	Water-based emulsion of reactive silicones	White, cloudy suspension	Semi-permanent bladder coating	5	■	
Rhenodiv® BC-792	Water-based emulsion of reactive silicones	White, cloudy suspension	Semi-permanent bladder coating	18	■	

¹⁾ Not available in EMEA

Outside tire paints

Outside tire paints are a means for the removal of blemishes on the outside surface of tires. All **Rhenodiv® OP** grades are water-based and free of VOC.



Product	Chemical composition	Appearance, supply form	Characteristics	Solid content %	Latex-free OP
Rhenodiv® OP-600	SBR compound with mineral filler	Black liquid	Outside antiblemish paint	18	
Rhenodiv® OP-720¹⁾	SBR compound with mineral filler	Black liquid	Outside antiblemish paint	42	
Rhenodiv® OP-787¹⁾	SBR compound with mineral filler	Black liquid	Outside antiblemish paint	24	
Rhenodiv® OP-9150-2A¹⁾	Aqueous suspension of fillers, binders and surfactants	White low-viscosity suspension	High-adhesion water-based green tire outside paint	12	
Rhenodiv® OP-9150-3¹⁾	Aqueous suspension of fillers, binders and surfactants	White high-viscosity suspension	High-adhesion water-based green tire outside paint	12	
Rhenodiv® OP-9160	Aqueous dispersion of fillers and surfactants	Gray-black low-viscosity dispersion	Transparent water-based green tire outside paint	14	■
Rhenodiv® OP-9208	Aqueous suspension of fillers and bonding agents	Black low-viscosity suspension	High-adhesion water-based green tire outside paint	17	
Rhenodiv® OP-9218¹⁾	Aqueous suspension of fillers and bonding agents	Black low-viscosity suspension	High-adhesion water-based green tire outside paint	11	
Rhenodiv® OP-94¹⁾	SBR compound with mineral filler	Black liquid	Outside antiblemish paint	22	
Rhenodiv® OP-9430¹⁾	SBR compound with mineral filler	Black liquid	Outside antiblemish paint	25	
Rhenodiv® OP-98	SBR compound with mineral filler	Black liquid	Water-based, non-flammable blemish removal agent	12	

¹⁾ Not available in EMEA

Finishing and protection paints

Rhenodiv[®] tire finishing and protection paints are outside tire paints for cosmetic repairs of cured tires (non-glossy). All Rhenodiv[®] FP grades are water-based and free of VOC.

Rhenodiv[®] FP grades provide a tire finish closely matching the appearance of the original new tire. They combine excel-

lent cover properties with excellent fixing, high stability and easy application. Rhenodiv[®] FP grades dry to a permanent, flexible film that resists cracking or peeling even during flexing or stretching. Rhenodiv[®] FP grades are resistant to water and detergent washings.

Product	Chemical composition	Appearance, supply form	Characteristics	Solid content %	PCR, LCV, Moto
Rhenodiv[®] FP-26¹⁾	Water-soluble polymer, pigment	Blue liquid	Water-removable paint to provide protection on tire white sidewalls and other cured rubber surfaces	18	■
Rhenodiv[®] FP-41	Mixture of SBR latex with mineral fillers and carbon black	Black liquid	Non-glossy outside tire paint for masking small touch-up buffings or for repairs on cured tires	25	■
Rhenodiv[®] FP-45	Water-based dispersion of polymers, fillers and pigments	Black liquid	Paint for masking of minor cosmetic, touch-up buffing or repairs on cure tires, compatible with any type of rubber compound, excellent fixing and covering properties	25	■
Rhenodiv[®] FP-61	Water-based dispersion of polymers, fillers and pigments	Black liquid	Paint for masking of minor cosmetic, touch-up buffing or repairs on cured tires, compatible with any type of rubber compound, excellent fixing and covering properties	20	■
Rhenodiv[®] FP-900C¹⁾	Preparation of polymers with mineral fillers and carbon black	Black liquid	Water-based, ready-to-use outside tire paint for masking small touch-up buffings or for repairs to cured tires	25	■
Rhenodiv[®] OP-20¹⁾	Water-soluble polymer, pigment	Blue liquid	Water-removable paint to provide protection on white tire sidewalls and other cured rubber surfaces	15	■

¹⁾ Not available in EMEA



Tire marking paints

Rhenomark® tire marking paints have outstanding properties:

- 11 brilliant colors plus white (special color grades upon request)
- Easy to apply, short drying time
- Completely water-based, solvent-free, and free of VOC and heavy metals
- The brilliance of the colors endures curing of the tire and lasts throughout the storage time of the tires

A notorious problem with tread marking paints is mold fouling. LANXESS has developed a special formula to reduce mold-fouling, even in tread compounds including liquid polymers.

LANXESS offers two high-performance lines of tire marking paints:

- **Rhenomark® MP+**: the high-end marking paint for tires with the reduced-mold-fouling formula. 11 colors – brilliant and opaque.
- **Rhenomark® PI**: performance tire marking paints – brilliant colors, effective and economic



Product	Product sub-group	Chemical composition	Appearance, supply form	Colors	Characteristics	Solid content %
Rhenomark® MP+	High-density tire marking paints, no-mold-fouling formulation	Aqueous dispersion of pigments, containing polymers	Medium-viscous liquid	White, red, green, blue, yellow, brown, orange, purple, pink, lime, gray	High-density water-based tread marking paint, free of VOC, anti-mold-fouling formulation	±55
Rhenomark® PI (-L, -B)	Performance tire marking paints	Aqueous dispersion of pigments, containing polymers	Medium-viscous liquid	White, red, green, blue, yellow, brown, orange, purple, pink	High-density water-based tread marking paint, free of VOC	PI-L 16-19 PI-B 32-36



BATCH-OFF RELEASE AGENTS

Batch-off release agents are essential for easy separation of uncured rubber sheets. Compounds, milled to sheets after mixing, are dipped in an aqueous anti-tack dispersion of release-active substances. During the so-called batch-off process, the uncured sheets are coated, dried and stacked on pallets. The batch-off release agent needs to provide the stacked sheets with sufficient anti-tack properties lasting over the entire storage time. Sufficient in this context means that the anti-tack properties of the batch-off release agent have to ensure easy separation of the sheets and safe stacking without slipping of the sheets during transport and likewise storage. Also, the batch-off release agent needs to be fully compatible with the elastomers of the compound during downstream mixing steps.

Depending on the quantity of rubber compound produced, batch-off release agents are typically consumed in large volumes. The bigger the consumption of anti-tack materials, the more important the handling properties of these materials are. Most batch-off release agents are supplied in powder form. The powder is mixed and dispersed in a tank filled with water equipped with a stirrer.

Since the loading of the powder normally is accompanied by the formation of dust, LANXESS has introduced batch-off grades in pearls form. The handling of these grades is basically the same but without the heavy dust formation of powders.

Pre-dispersed batch-off release agents either in liquid or paste form offer the advantage of facilitated handling without dust formation. They can either be applied manually or in an automated process.

Powder grades

Rhenodiv® BO powder release agents facilitate the preparation of uncured rubber sheets for storage and downstream processing, e. g. in a batch-off process. They are combinations of inorganic fillers and surface-active substances. Rhenodiv® BO powders are easy to disperse in water. The work concentration in water usually is in the range between 1–3%.



Product	Chemical composition	Concentration in water [%]	Appearance, supply form	Characteristics
Rhenodiv® BO-3300¹⁾	Unfilled fatty acid compound, free of silicones and phosphates	1-1.5	White to amber powder	Compound release agent in powder form for batch-off operations.
Rhenodiv® BO-3400¹⁾	Unfilled fatty acid compound, free of silicones and phosphates	1-1.5	White to amber powder	Compound release agent in powder form for batch-off operations, soluble in cold water.
Rhenodiv® BO-3400¹⁾ GV	Unfilled fatty acid compound, free of silicones and phosphates	1-1.5	White to amber powder	Compound release agent in powder form for batch-off operations, soluble in cold water.
Rhenodiv® BO-501-2	Combination of inorganic fillers, synthetic fillers and surfactants	1.5-3	Grayish powder	Forms a thin, flexible and non-dusting film on the surface of rubber sheets; non-dusty; minimal build-up on equipment.
Rhenodiv® BO-505-2	Combination of inorganic fillers, synthetic fillers and surfactants	1.5-3	Grayish powder	Forms a thin, flexible and non-dusting film on the surface of rubber sheets; non-dusty; minimal build-up on equipment.
Rhenodiv® BO-719A¹⁾	Combination of inorganic fillers, calcium stearate and surface active substance	3-4	Gray-beige powder	Forms a thin, flexible film on the surface of uncured rubber sheets providing good release properties without dust formation
Rhenodiv® BO-7665-10¹⁾	Combination of inorganic fillers, calcium stearate, and surface active substances	3-4	Gray-beige powder	Forms a thin, flexible film on the surface of uncured rubber sheets providing good release properties without dust formation
Rhenodiv® BO-7665-2¹⁾	Combination of inorganic fillers, calcium stearate, and surface active substances	3-4	Beige powder	Forms a thin, flexible film on the surface of uncured rubber sheets providing good release properties without dust formation
Rhenodiv® BO-7668-1	Combination of inorganic fillers, salts of fatty acids and surface active substances	6-9	Beige powder	Forms a thin, flexible film on the surface of the rubber pellets

¹⁾ Not available in EMEA

Pearls

Rhenodiv® batch-off grades supplied as pearls are unfilled anti-tack solutions. These grades offer several advantages:

- No dust formation
- Loadable by spiral conveyor
- Excellent anti-tack characteristics without slip

Rhenodiv® BO-3300 Pearls is filler-free, offering the following advantages:

- Transparent surface of rubber sheets
- No sedimentation
- Clean batch-off equipment
- Reduced abrasion of mechanical parts

Rhenodiv® BO-3300 Pearls is used in a concentration of 1–2% in water.



Product	Chemical composition	Concentration in water [%]	Appearance, supply form	Characteristics
Rhenodiv® BO-3300 Pearls	Fatty acid compound, free of silicones and phosphates	1-2	Yellowish pearls	Filler-free anti-tack agent that provides high temporary tack insulation between green rubber sheets; free of silicone and phosphates, soluble in water >50 °C. Respirable crystalline silica content (RCS): <0.1%



Liquid grades

Rhenodiv® BO liquid batch-off release agents are dispersions of fatty acid salts in combination with fillers in water. They are easy to dissolve in water. The working concentration usually is in a range of 4–10%. Rhenodiv® BO liquid grades are applicable for batch-off processes, too.

Product	Chemical composition	Concentration in water [%]	Appearance, supply form	Characteristics
Rhenodiv® BO-1016 ¹⁾	Combination of fatty acid salts/free of silicones and phosphates	5-10	White-yellow dispersion	Batch-off release agent for uncured rubber sheets
Rhenodiv® BO-1050 ¹⁾	Combination of fatty acid salts/free of silicones and phosphates	2-4	White-yellow dispersion	Batch-off release agent for uncured rubber sheets
Rhenodiv® BO-7672-1	Combination of salts of fatty acids and calcium stearate	4-10	White-yellow dispersion	Liquid compound release agent for sheets
Rhenodiv® BO-7672-2	Aqueous solution of a blend of fatty acid salts with water-soluble high-molecular substances	5-10	White to yellow viscous liquid	Liquid compound release agent for uncured rubber sheets
Rhenodiv® BO-LL	Aqueous solution of a blend of fatty acid salts with water-soluble high-molecular substances	5-20	White to yellow viscous liquid	Liquid compound release agent for uncured rubber sheets

¹⁾ Not available in EMEA

OTHER RELEASE AGENTS

Lubricants and hose release agents

This category includes specialty release agents for selected applications, e.g.

- Rhenodiv® HR-795, a mixture of high-molecular-weight surfactants and polyfunctional alcohols, is an effective release agent for hoses and latex mattresses.
- Rhenodiv® DALE 667, an internal compound release agent based on a combination of fatty acids and synthetic waxes.



Product	Chemical composition	Concentration in water [%]	Appearance, supply form	Characteristics
Rhenodiv® HR-687-5 ¹⁾	Mixture of polyfunctional alcohols	1:2	Yellowish liquid	Liquid hose-release agent facilitating mounting and the removal of the hose on and/or from the mandrel; silicone-free
Rhenodiv® HR-795	Mixture of high-molecular-weight surfactants and polyfunctional alcohols	Hose: '50; Mattresses: '8-10	Yellowish liquid	Facilitates both the mounting of the uncured hose on the mandrel and likewise the demounting of the cured hose from the mandrel
Rhenodiv® DALE 667	Combination of fatty acids and synthetic waxes	1-3 phr	White-yellow pellets	Lowers the compound viscosity and exhibits a tendency to migrate to the surface of the uncured rubber compound

¹⁾ Not available in EMEA

Mold release agents

Rhenodiv® SI-V is an aqueous emulsion of medium-viscosity silicone oil in combination with other release active substances. Rhenodiv® MR grades are silicone-based mold release agents. Rhenodiv® MR-30/1 is silicone-free.



Product	Chemical composition	Concentration in water [%]	Appearance, supply form	Characteristics
Rhenodiv® SI-V	Aqueous emulsion of a medium-viscosity silicone oil and of substances for enhanced release properties	1:1	White turbid liquid	Rhenodiv® SI-V is particularly used where a stronger release is required and where only slight mold fouling can be tolerated. Vulcanizates demolded by use of Rhenodiv® SI-EM are characterized by high gloss and pleasant haptic.
Rhenodiv® SI-EM	Aqueous emulsion of a medium viscosity silicone oil	1:5 - 1:15	White liquid	Vulcanizates demolded by use of Rhenodiv® SI-EM are characterized by high gloss and pleasant haptic
Rhenodiv® MR-30/1	Dispersion of an alkali salt of a fatty acid derivative in water	1:12 - 1:65	Thixotropic, whitish dispersion	Silicone-free release agent for demolding natural and synthetic rubber vulcanizates
Rhenodiv® MR-60	Aqueous emulsion of reactive silicone polymer and special surfactants	1:5 - 1:15	White liquid	Demolding agent vulcanizates made of natural and synthetic rubber
Rhenodiv® MR-1000	Water-based emulsion of polymeric active ingredients	1:1	White liquid	Silicone-free release agent for tire curing molds

¹⁾ Not available in EMEA



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