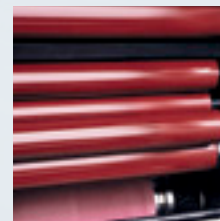
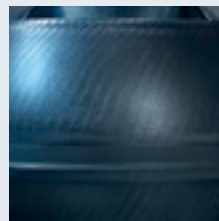
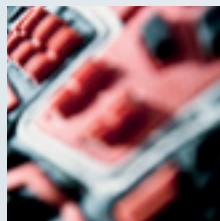
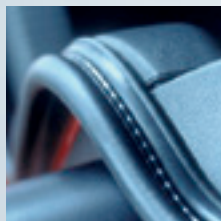
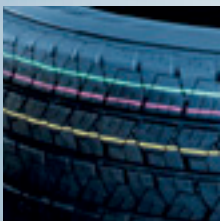


GLOBAL RUBBER PERFORMANCE. PRODUCT CATALOG.



For a world in motion.

As a leading supplier of rubber additives, release agents, and tire curing bladders, Rhein Chemie operates production plants in all relevant regions of the rubber world. This ensures access to local raw materials and thus flexible supply to our customers.

The quality requirements on all our production sites are equivalent – as it is our global mission to manufacture products with consistent quality on the highest possible level. We are continuously working on the development of solutions for the rubber industry. As a partner of the rubber industry, we develop tailor-made solutions to improve rubber processing across the entire production chain. Thus, rubber manufacturers can rely on Rhein Chemie as supplier of rubber products that determines the quality of their rubber compounds and the finished rubber articles.

Beyond products, our customers worldwide can always be assured to achieve qualified technical assistance in their respective local language. Legal requirements as well as aspects on safety and environment are mandatorily respected.

It is our true understanding to support our customers in achieving their goals – to a mutual benefit. An added value that is well appreciated throughout the global rubber industry.

This brochure gives an overview of all products that Rhein Chemie offers to the rubber industry worldwide.



■ Headquarters
■ Production Site

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Rhenogran® – pre-dispersed rubber chemicals and additives

With Rhenogran®, Rhein Chemie has set the industry standard for pre-dispersed rubber chemicals and additives. Selected raw materials and a specially designed elastomer binder (EPDM/EVA) ensure top dispersibility with an excellent compatibility in most standard polymers. The binder system provides optimal dispersibility and long-lasting storage and transport stability at the same time. Free-flowing granules for easy handling allow more precise weighing and dosing, making automated, continuous processes feasible. The consistent quality of ready-mixed batches is crucial for a trouble-free process during subsequent production steps and an overall improved product quality. Reject rates are then minimized and costly reworking processes can be avoided.

Rhenogran® is dust-free, keeping the working area clean and free of toxic chemical dusts, a prerequisite for the production of high-performance rubber parts and a requirement not only of the automotive industry. Many toxic or otherwise critical additives found in Rhenogran® carry a more favorable labeling than the classification of the respective powder chemical. For easy identification, selected Rhenogran® grades are equipped with a specific color code.

Rhenogran® Geniplex-70, an activator for the sulfur curing of EPDM and other diene rubbers that also provides activation for blowing agents, has an activating effect on accelerators. Processing safety of rubber compounds containing Rhenogran® Geniplex-70 is increased, and curing improved. Thiurams and carbamates forming carcinogenic N-nitrosamines can be replaced by Rhenogran® Geniplex-70 without any negative effects in terms of processing safety or mechanical properties.

Rhein Chemie's dithiophosphates are not only the additives of choice for N-nitrosamine-free curing which is nowadays mandatory in state-of-the-art automobiles. They also provide versatile solutions to various problems from improving reversion resistance to coping with dispersibility and efficiency problems owing to their high solubility in all kinds of rubber. One of such products is Rhenogran® TP-50 – a world-famous evergreen for the N-nitrosamine-free curing of EPDM extrudates: In combination with standard accelerators, Rhenogran® TP-50 has set standards in realizing economies of scale in EPDM extrusion while keeping reject rates low. In particular, the considerably high solubility (up to 6 phr) provides high flexibility in a wide range of formulations.

A real multitalent is Rhenogran® CLD-80: This original Rhein Chemie invention is a sulfur donor. Unlike ordinary sulfur, Rhenogran® CLD-80

ensures an extremely stable vulcanization network by forming exclusively mono and disulfidic bridges. This results in an excellent heat aging resistance of the vulcanizates and prevents premature reversion. Unlike thiurams or morpholine, Rhenogran® CLD-80 does not generate carcinogenic N-nitrosamine during vulcanization, nor do the vulcanizates tend towards blooming. Compounds containing Rhenogran® CLD-80 exhibit an excellent broad and sustainable curing plateau. Therefore, Rhenogran® CLD-80 is particularly preferred for rubber parts that are exposed to extreme conditions such as high operating temperatures combined with high dynamic loads (e.g. high-performance tires, seals or anti-vibration elements).

Specialty elastomers, which are becoming more and more common even in standard rubber components, usually require special curing systems. Rhein Chemie offers various curing agents, activators and stabilizers. Rhenogran® HMDC-70/AEMD, a cross-linking agent for ethylene acrylic rubber (AEM), is the curing agent of choice for oil-resistant seals and hoses based on AEM, ECO/CO and ACM rubber for use in vehicles and engineering.

As reinforcing materials, Rhein Chemie has developed pre-dispersed short-fiber pulp master batches that allow a homogeneous dispersion of the entangled strands in the compound. Rhenogran® AFP-40/EPDM is an oil-free pre-dispersed aramid fiber pulp that is used for reinforcement, e.g. in belts, hoses, tires and footwear. Unlike the raw aramid pulp, products of the Rhenogran® AFP series can be incorporated easily and disperse homogeneously in the compound.



Accelerators and Accelerator Combinations

Product	Chemical Composition	Polymer Binder	Appearance/Supply Form	Function/Applications
Rhenogran® AP 7	synergistic combination of zinc dithiophosphate-, benzothiazole- and dibenzyl dithiocarbamate-type accelerators	EPDM/EVA	gray-beige granules	Additive package for cross-linking synthetic rubber free from secondary amines that can form hazardous N-nitrosamines (scorch shorter than with AP 8)
Rhenogran® AP 8	synergistic combination of zinc dithiophosphate-, benzothiazole- and dibenzyl dithiocarbamate-type accelerators	EPDM/EVA	gray-beige granules	Additive package for cross-linking synthetic rubber free from secondary amines that can form hazardous N-nitrosamines (scorch longer than with AP 7)
Rhenogran® CBS-80	N-cyclohexyl-2-benzothiazole sulfenamide	EPDM/EVA	blue granules	Basic accelerator for sulfur-cured diene rubbers, e.g. EPDM, NR, BR, SBR, especially for application in tires and anti-vibration elements
Rhenogran® DETU-80	diethyl thiourea	EPDM/EVA	beige granules	Accelerator for the very rapid vulcanization of CR, CO, ECO, and CM
Rhenogran® DOTG-70	di-ortho-tolyl guanidine	EPDM/EVA	white to gray granules	Accelerator for the vulcanization of natural and synthetic rubbers, particularly used for the diamine-activated cross-linking of AEM or ACM
Rhenogran® DPG-80	diphenylguanidine	EPDM/EVA	purple granules	Accelerator for the vulcanization of natural and synthetic rubbers, particularly used as a co-accelerator with sulfenamides for tire tread compounds and in silica compounds
Rhenogran® DPTT-70	dipentamethylene thiuram tetrasulfide	EPDM/EVA	white to yellowish granules	Ultra accelerator for the vulcanization of natural and synthetic rubbers, and curing agent for sulfur-less or low-sulfur vulcanization; most rapid cure among thiurams, sulfur donor, also suitable for CSM in combination with MBTS
Rhenogran® DPTU-80	diphenyl thiourea	EPDM/EVA	white to gray granules	Secondary accelerator for CR, EPDM and other diene rubbers, aiming at a fast cure and a high degree of cross-linking with little sulfur or by means of sulfur donors
Rhenogran® EPC-80	synergetic combination of conventional accelerators of the dithiocarbamate, benzothiazole, thiuram and thiourea class	EPDM/EVA	yellow to brown granules	Non-blooming special accelerator for the rapid vulcanization of compounds based on EPDM, particularly extruded articles, such as profiles, seals and foils
Rhenogran® F-80	combination of dibenzothiazyl disulfide with basic accelerators	EPDM/EVA	white to yellow or beige granules	Accelerator combination for compounds based on NR, IR, SBR, and NBR, especially adequate for intricately shaped moldings
Rhenogran® Geniplex-70	zinc dicyanato diamine	EPDM/EVA	off-white to greenish granules	N-nitrosamine-free ultra accelerator for sulfur cure; also providing activation for blowing agents, very high cross-linking density in EPDM, particularly used for EPDM sponge compounds
Rhenogran® HEXA-80	hexamethylenetetramine	EPDM/EVA	beige granules	Co-accelerator and methylene donor for resorcinol-based compounds for hardening or steel cord adhesion
Rhenogran® MBS-80	N-morpholino-2-benzothiazole sulfenamide	EPDM/EVA	pink granules	Semi-ultra accelerator for the vulcanization of natural and synthetic rubbers
Rhenogran® MBT-80*	mercaptobenzothiazole	EPDM/EVA	light-brown granules	Rapid curing speed, accelerator for the vulcanization of natural and synthetic rubbers; extruded profiles and other delicate technical rubber components where dispersion of the MBT is critical; acts as a retarder in sulfur modified CR

* Product also available in slab form (Rhenoslab®)



Rhenogran® CBS-80



Rhenogran® Geniplex-70



Rhenogran® MBT-80

Accelerators and Accelerator Combinations (continued)

Product	Chemical Composition	Polymer Binder	Appearance/Supply Form	Function/Applications
Rhenogran® MBTS-70	mercaptobenzothiazole disulfide	EPDM/EVA	green granules	Semi-ultra accelerator for the vulcanization of natural and synthetic rubbers; moderate curing speed; acts as a retarder in sulfur-modified CR; extruded profiles and other delicate technical rubber components where dispersion of the MBTS is critical
Rhenogran® MBTS-75*	mercaptobenzothiazole disulfide	EPDM/EVA	green granules	Semi-ultra accelerator for the vulcanization of natural and synthetic rubbers; moderate curing speed; acts as a retarder in sulfur-modified CR
Rhenogran® MBTS-80	mercaptobenzothiazole disulfide	EPDM/EVA	green granules	Semi-ultra accelerator for the vulcanization of natural and synthetic rubbers; moderate curing speed; acts as a retarder in sulfur-modified CR
Rhenogran® MBTS active-90	synergistic combination of mercaptobenzothiazole disulfide and zinc dialkyldithiophosphate	EPDM/EVA	green granules	Semi-ultra accelerator for the vulcanization of natural and synthetic rubbers, activating vulcanization; highly dispersible for premium-quality technical rubber components where dispersion of the MBTS is highly critical
Rhenogran® MPTD-70	dimethyl-diphenyl thiuram disulfide	EPDM/EVA	beige granules	Ultra accelerator for the sulfur vulcanization of natural and synthetic rubbers, excellent heat-aging resistance and low compression set especially in NR, SBR, BR, and EPDM
Rhenogran® MTT-80	3-methyl-thiazolidine-thione-2	EPDM/EVA	gray-beige granules	Vulcanization accelerator for polychloroprene rubber; accelerator for curing systems where ETU must be replaced
Rhenogran® TBBS-80	N-tert.butyl-2-benzothiazole sulfenamide	EPDM/EVA	beige granules	Basic accelerator for sulfur-cured diene rubbers, e.g. EPDM, NR, BR, SBR, especially for tire and anti-vibration applications
Rhenogran® TBzTD-70	tetrabenzyl thiuram disulfide	EPDM/EVA	beige granules	N-nitrosamine-free sulfur donor and accelerator; ultra accelerator for the vulcanization of natural and synthetic rubber; curing agent for vulcanization without free sulfur or for low-sulfur vulcanization
Rhenogran® TETD-75 F	tetraethyl thiuram disulfide	EPDM/EVA	beige-gray granules	Scorch-safe ultra accelerator for the vulcanization of natural and synthetic rubbers, and curing agent for sulfur-less, or low-sulfur, vulcanization
Rhenogran® TMTD-70/-80*	tetramethyl thiuram disulfide	EPDM/EVA	orange granules	Ultra accelerator for the vulcanization of natural and synthetic rubbers and curing agent for sulfur-less or low-sulfur vulcanization
Rhenogran® TMTM-80	tetramethyl thiuram mono-sulfide	EPDM/EVA	yellow granules	Ultra accelerator for the vulcanization of natural and synthetic rubbers and curing agent for low-sulfur vulcanization
Rhenogran® ZBEC-70	zinc dibenzyl dithiocarbamate	EPDM/EVA	white to gray granules	Ultra accelerator for the vulcanization of natural and synthetic rubbers, especially for continuous vulcanization of EPDM
Rhenogran® ZDBC-80*	zinc dibutyl dithiocarbamate	EPDM/EVA	white to yellow granules	Ultra accelerator for the vulcanization of natural and synthetic rubbers, in order to avoid blooming, usually kept below 1 phr and combined with other carbamates
Rhenogran® ZDEC-80	zinc diethyl dithiocarbamate	EPDM/EVA	gray to yellowish granules	Ultra accelerator for the vulcanization of natural and synthetic rubbers, in order to avoid blooming, usually kept below 1 phr and combined with other carbamates
Rhenogran® ZDMC-80*	zinc dimethyl dithiocarbamate	EPDM/EVA	gray to yellowish granules	Ultra accelerator for the vulcanization of natural and synthetic rubbers, in order to avoid blooming, usually kept below 1 phr and combined with other carbamates
Rhenogran® ZEPC-70	zinc ethylphenyl dithiocarbamate	EPDM/EVA	white to gray granules	Ultra accelerator for the vulcanization of natural and synthetic rubbers, in order to avoid blooming, usually kept below 1 phr and combined with other carbamates

* Product also available in slab form (Rhenoslab®)



Rhenogran® MBTS-70

Curing Agents and Specialty Accelerators

Product	Chemical Composition	Polymer Binder	Appearance, Supply Form	Function/Applications
Rhenogran® ADT-50	amine dialkyldithiophosphate	EPDM/EVA	beige granules	Non-staining special accelerator for the rapid vulcanization of compounds based on EPDM, especially the EN grades free from secondary amines that can form hazardous N-nitrosamines
NEW Rhenogran® BCA-40/IIR (GE 2012)	combination of metal chlorides and fillers	IIR	gray granules	Curing activator for butyl rubber and halogenated rubbers; leads to improved aging properties of resin-cured butyl compounds
NEW Rhenogran® CLA-55 (GE 2111)	synergistic combination of activated amine with retarder	acrylic copolymer	red to brown granules	Accelerator and cross-linking activator for AEM and ACM; can replace DOTG in formulations based on acrylate rubbers
Rhenogran® CLD-80	caprolactam disulfide	EPDM/EVA	off-white to gray granules	Non-staining sulfur donor for the vulcanization of heat-resistant sulfur-cured compounds in N-nitrosamine-free curing systems; best replacement for DTDM
Rhenogran® CUT-50	copper dithiophosphate	EPDM/EVA	dark-green granules	Special accelerator for the vulcanization of EPDM and other diene rubbers not containing any secondary amines that can form N-nitrosamines
Rhenogran® DTDM-80	dithiodimorpholine	EPDM/EVA	gray granules	Non-staining sulfur donor for the vulcanization of natural and synthetic rubber compounds
Rhenogran® Diuron-80/ACM	N'-(3,4-dichlorophenyl)-N,N-dimethyl urea	ACM	grayish granules	Cross-linking agent for acrylate rubber (ACM)
Rhenogran® HMDC-70/AEMD	hexamethylene diamine carbamate	AEMD	white granules	Cross-linking agent for ethylene acrylic rubber (AEM)
Rhenogran® HPCA-50	combination of aminic co-activator and antioxidant	EPDM/EVA	off-white granules	Cross-linking activator and stabilizer for CR, HIIR, ECO, CO, and other halogenated polymers
Rhenogran® IS 90-65	sulfur (min. 90% of sulfur is insoluble sulfur)	EPDM/EVA	yellow granules	Vulcanizing agent for natural and synthetic rubber compounds
NEW Rhenogran® DPBM-70 (GE 2241)	diphenylmethane-4,4'-bismaleimide	EPDM/EVA	off-white granules	Peroxide co-agent for all kinds of rubbers
Rhenogran® PCZ-70/IIR	combination of alkyl-phenol resin and zinc oxide	IIR	off-white granules	Curing agent for butyl and other rubbers; especially suitable for the vulcanization of bladders and curing bags based on IIR
Rhenoslab® S-70	sulfur	EPDM/EVA	light-yellow slabs	Curing agent for all natural and synthetic rubbers
Rhenogran® S-80*	sulfur	EPDM/EVA	yellow granules	Curing agent for all natural and synthetic rubbers
Rhenogran® SDT-50	dithiophosphoryl polysulfide	EPDM/EVA	off-white to amber granules	Non-staining sulfur donor for the vulcanization of natural and synthetic rubbers not containing any secondary amines that can form N-nitrosamines; anti-reversion agent, especially for molded parts of NR
Rhenogran® TAC-50	triallyl cyanurate	EPDM/EVA	beige-gray granules	Activator for the peroxide vulcanization of synthetic rubbers
Rhenogran® TDD-70/CM	thiadiazole derivative	CM	light-gray granules	Cross-linking agent for the peroxide-free vulcanization of CM and other saturated halogen-containing elastomers
Rhenogran® TP-50	zinc dialkyldithiophosphate	EPDM/EVA	dark-blue granules	Non-staining special accelerator for the rapid vulcanization of diene rubbers not containing any secondary amines that can form N-nitrosamines

* Product also available in slab form (Rhenoslab®)

Curing Agents and Specialty Accelerators (continued)

Product	Chemical Composition	Polymer Binder	Appearance, Supply Form	Function/Applications
Rhenogran® Triazine TM-70/AEMD	2,4,6-trimercapto-s-triazine	AEMD	yellow granules	Cross-linking agent for CO and ECO and other polymers with halogen cure site
Rhenogran® WBC-41/IIR	combination of alkyl-phenol resin and zinc oxide	IIR	off-white granules	Curing agent for butyl and other rubbers; especially suitable for the vulcanization of bladders and curing bags based on IIR
Rhenogran® XLA-60	synergistic combination of activated amine with retarder	acrylic copolymer	red to brown granules	Accelerator and cross-linking activator for AEM and ACM; can replace DOTG in formulations based on acrylate rubbers; also suitable as ultra accelerator in EPDM sulfur formulations
Rhenogran® ZADT-50	zinc dialkyldithiophosphate, activated	EPDM/EVA	off-white granules	Non-staining specialty accelerator for rapid vulcanization of EPDM and other diene rubbers not containing any secondary amines that can form N-nitrosamines
Rhenogran® ZAT-70	zinc amine dialkyldithiophosphate	EPDM/EVA	gray granules	Ultra accelerator for the vulcanization of EPDM and other diene rubbers; not containing any secondary amines that can form N-nitrosamines
Rhenogran® ZBOP-50	zinc dialkyldithiophosphate	EPDM/EVA	beige granules	Special accelerator for the vulcanization of EPDM and other diene rubbers not containing any secondary amines that can form N-nitrosamines
Rhenogran® ZDT-50	zinc dialkyldithiophosphate	EPDM/EVA	beige granules	Non-staining specialty accelerator for rapid vulcanization of EPDM and other diene rubbers not containing any secondary amines that can form N-nitrosamines

Retarders

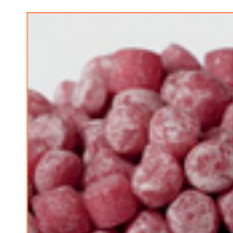
Product	Chemical Composition	Polymer Binder	Appearance, Supply Form	Function/Applications
Rhenogran® Benzoessäure-80	benzoic acid	EPDM/EVA	gray-white granules	Delays scorching and increases hardness of vulcanizates
Rhenogran® CTP-80	N-(cyclohexylthio)-phthalimide	EPDM/EVA	beige granules	Pre-vulcanization inhibitor for natural and synthetic rubbers
Rhenogran® Retarder E-80	sulfonamide derivative	EPDM/EVA	off-white to beige granules	Retarder for natural and synthetic rubber, offering improved physical properties



Rhenogran® CLD-80



Rhenogran® TP-50



Rhenogran® XLA-60

Metal Oxides and Cross-Linking Activators

Product	Chemical Composition	Polymer Binder	Appearance, Supply Form	Function/Applications
Rhenogran® CaO-80	calcium oxide	EPDM/EVA	gray granules	Desiccant for rubber compounds of all kinds to prevent porosity
Rhenogran® Fe-Red-70	iron (III) oxide	EPDM/EVA	red-brown granules	Iron oxide pigment for coloring compounds based on natural and synthetic rubbers
Rhenogran® KST-50/ACM	potassium stearate	ACM	white granules	Cross-linking activator for acrylate rubber (ACM)
Rhenogran® Li₂CO₃-50/HNBR (GE 2058)	lithium carbonate	HNBR	gray-white granules	Technical rubber articles based on HNBR, e.g. automotive coolant circuits, automotive fluid circuits
Rhenogran® MgO-75	magnesium oxide (Rhenofit® 2060)	EPDM/EVA	white-gray granules	Curing activator and acid acceptor, particularly suitable for polychloroprene rubber (CR) and adhesives
Rhenogran® Na₂CO₃-70/CO	sodium carbonate	CO	gray-white granules	Vulcanizing agent and acid acceptor for CO and ECO
Rhenogran® NAST-50/ACM	sodium stearate	ACM	white granules	Cross-linking activator for acrylate rubber (ACM)
Rhenogran® Pb₃O₄-80	red lead oxide	EPDM/EVA	orange granules	Curing activator for chloroprene (CR) and butyl rubber (IIR) as well as chlorosulfonated polyethylene (CSM). Filler in compounds for protective covering, because of the high absorption capacity to X-rays
Rhenogran® Pb₃O₄-80/ECO	red lead oxide	ECO	red granules	Vulcanization activator and acid acceptor for CO and ECO
Rhenogran® Pb₃O₄-90/EPM	red lead oxide	EPDM	red granules	Vulcanization activator and acid acceptor. Cable compounds, linings, and other technical articles
Rhenogran® Pb₃O₄-90/EPDM	red lead oxide	EPDM	red granules	Vulcanization activator and acid acceptor. Cable compounds, linings, and other technical articles
Rhenogran® PbO-80	lead (II)-oxide (calcinated litharge)	EPDM/EVA	orange granules	Curing activator and stabilizer for chlorosulfonated polyethylene (CSM) and chloroprene rubber (CR); also suitable as filler in compounds for X-ray proofing
Rhenogran® Sb₂O₃-80	antimony trioxide	EPDM/EVA	white granules	Flame-retardant; all kinds of flame-resistant articles
Rhenogran® ZnO-80	zinc oxide	EPDM/EVA	white granules	Curing activator for use in natural and synthetic rubbers
Rhenogran® ZnO aktiv-80	zinc oxide active with high surface area	EPDM/EVA	white granules	Universal vulcanization activator, especially for sulfur-cured EPDM compounds; higher cure rate and cross-link density compared to standard zinc oxide
Rhenogran® ZnOR-80	combination zinc oxide and retarder	NBR	white granules	Highly effective curative masterbatch for carboxylated rubber. For use in all XNBR compounds where scorch safety might be a problem under plant processing conditions

Adhesion Promoters

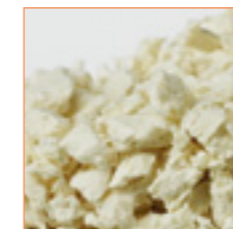
Product	Chemical Composition	Polymer Binder	Appearance, Supply Form	Function/Applications
Rhenogran® HEXA-80	hexamethylenetetramine	EPDM/EVA	beige granules	Methylene donor for resorcinol-based adhesion compounds for hardening or steel cord adhesion
Rhenogran® Resorcin-80	resorcinol	EPDM/EVA	off-white to brown granules	Steel cord adhesion compounds, e.g. for bonding systems of methylene donor with silica
Rhenogran® Resorcin-80/SBR	resorcinol	SBR	off-white to brown granules	Steel cord adhesion compounds, e.g. for bonding systems of methylene donor with silica; also available in big bags

Fiber Dispersions

Product	Chemical Composition	Polymer Binder	Appearance, Supply Form	Function/Applications
Rhenogran® AFP-40/EPDM (GE 1909)	aramid fiber pulp (type: Twaron®)	EPDM	yellowish chips	Highly pre-dispersed aramid chopped fiber pulp for reinforcing natural, synthetic and thermoplastic rubber compounds, e.g. automotive belts and hoses
Rhenogran® P91-40/EPDM	aramid fiber pulp (type: Twaron®)	EPDM	yellowish chips	Pre-dispersed aramid chopped fiber pulp for reinforcing natural, synthetic and thermoplastic rubber compounds, e.g. automotive belts and hoses
Rhenogran® P91-40/NBR	aramid fiber pulp (type: Twaron®)	NBR	yellowish flakes	Pre-dispersed aramid chopped fiber pulp for reinforcing natural, synthetic and thermoplastic rubber compounds, e.g. rollers, hoses, gaskets
Rhenogran® P91-40/NR	aramid fiber pulp (type: Twaron®)	NR	yellowish flakes	Pre-dispersed aramid chopped fiber pulp for reinforcing natural, synthetic and thermoplastic rubber compounds, e.g. tires and belting
Santoweb® D	cellulose fiber pulp (bleached hardwood)	SBR	black fibers	Raw edge V-belt base compounds, low-pressure hoses, gaskets, diaphragms, tire bead apex compounds and other technical rubber articles, where fiber reinforcement is helpful; regulated for use in articles in contact with food as specified under BgVV XXI, Category 4
Santoweb® DX	cellulose fiber pulp (bleached hardwood)	SBR	black fibers	Tire tread compounds for highway truck and OTR tires, tire bead wrap, power transmission belts, uncured roof sheeting, and static rubber articles requiring cut growth resistance; regulated for use in articles in contact with food as specified under BgVV XXI, Category 4
Santoweb® H	cellulose fiber pulp (bleached hardwood)	EPDM	black fibers	Low-pressure hoses, gaskets, and diaphragms; regulated for use in articles in contact with food as specified under BgVV XXI, Category 4
Santoweb® W	cellulose fiber pulp (bleached hardwood)	PVC	light-gray to cream fibers	Low-pressure PVC hoses, medium-pressure NBR hoses, gaskets, diaphragms, and vinyl flooring; regulated for use in articles in contact with food as specified under BgVV XXI, Category 4



Rhenogran® NAST-50/ACM



Rhenogran® AFP-40/EPDM



Rhenogran® PCD-50/EVA

NEW

NEW

NEW

NEW

Antioxidants

Product	Chemical Composition	Polymer Binder	Appearance, Supply Form	Function/Applications
Rhenogran® BPH-80/L	2,2'-methylene-bis-(4-methyl-6-tert.butyl phenol)	EPDM/EVA	white-gray granules	Non-staining antioxidant for vulcanizates based on natural and synthetic rubbers
Rhenogran® MBI-80	2-mercaptobenzimidazole	EPDM/EVA	white-gray granules	Non-staining antioxidant for vulcanizates based on natural and synthetic rubbers
Rhenogran® MMBI-70	methyl-2-mercaptobenzimidazole	EPDM/EVA	beige granules	Non-staining antioxidant for vulcanizates based on natural and synthetic rubbers; synergistic effects in combination with other antioxidants
Rhenogran® PCD-50/EVA	polycarbodiimide	EVA	beige granules	Antioxidant effective against hydrolysis, preferably for polymers containing ester groups, e.g. ethylene vinyl acetate copolymers, polyurethane
Rhenogran® ZMMBI-50	zinc methyl-2-mercaptobenzimidazole	EPDM/EVA	beige granules	Non-staining antioxidant for vulcanizates based on natural and synthetic rubbers

Custom-Made NBR Binder System

Product	Chemical Composition	Polymer Binder	Appearance, Supply Form	Function/Applications
Rhenoslab® CBS-65/NBR CBS-70/NBR	N-cyclohexyl-2-benzothiazole sulfenamide	NBR	white slabs	Basic accelerator for sulfur-cured rubber, especially for applications made of NBR rubber
Rhenoslab® DTD-70/NBR	dithiodimorpholine	NBR	gray slabs	Non-staining sulfur donor for the vulcanization of natural and synthetic rubber compounds, especially designed for NBR compounds
Rhenoslab® MBTS-70/NBR MBTS-75/NBR	mercaptobenzothiazole disulfide	NBR	green slabs	Moderate curing speed, accelerator for vulcanization of natural and synthetic rubber, especially designed for NBR compounds
Rhenoslab® PTFE-80/NBR	polytetrafluoroethylene	NBR	white slabs	Any molded or extruded technical rubber part where surface tack of the cured part is a detriment, e.g. roll compounds, extruded window channels
Rhenogran® RZNO-60/NBR	combination of zinc oxide and retarder	NBR	white granules	Curative masterbatch for carboxylated rubber. For use in all XNBR compounds where scorch safety might be a problem under plant processing conditions
Rhenoslab® S-75/NBR S-80/NBR	sulfur	NBR	light yellow slabs	Curing agent especially for technical rubber parts made of NBR
Rhenoslab® TETD-70/NBR	tetraethyl thiuram disulfide	NBR	beige-gray slabs	Basic accelerator for sulfur-cured rubber, especially for applications made of NBR rubber
Rhenoslab® TIO2-80/NBR	titanium dioxide (rutile)	NBR	white slabs	White pigment for white or light-colored rubber compounds, especially NBR
Rhenoslab® TMTD-70/NBR	tetra methyl thiuram disulfide	NBR	orange slabs	Ultra accelerator for the vulcanization of natural and synthetic rubbers. Curing agent for vulcanization without free sulfur or low-sulfur vulcanization of NBR compounds
Rhenoslab® TMTM-70/NBR	tetra methyl thiuram mono-sulfide	NBR	yellow slabs	Ultra accelerator for the vulcanization of natural and synthetic rubbers. Curing agent for vulcanization without free sulfur or low-sulfur vulcanization of NBR compounds
Rhenogran® ZMAM-70/NBR	combination of zinc methyl-2-mercaptobenzimidazole (ZMMBI) and a low temperature reaction product of diphenylamine and acetone	NBR	tan granules	A combination of antioxidants which work together systematically to protect natural and synthetic rubber compounds. NBR articles where high temperature resistance is a requirement
Rhenogran® ZNO-85/NBR*	zinc oxide	NBR	white granules	Vulcanizing activator for use in sulfur-cured compounds, especially NBR

* Product also available in slab form (Rhenoslab®)

Custom-Made SBR Binder System

Product	Chemical Composition	Polymer Binder	Appearance, Supply Form	Function/Applications
Rhenogran® CBS-80/SBR	N-cyclohexyl-2-benzothiazole sulfenamide	SBR	brown granules	Basic accelerator for sulfur-cured diene rubbers, e.g. BR, SBR, especially for application in tires and anti-vibration elements
Rhenogran® HEXA-80/SBR	hexamethylene tetramine	SBR	blue granules	Co-accelerator and methylene donor for resorcinol-based compounds for hardening or steel cord adhesion
Rhenogran® IS-80/SBR	sulfur (min. 90% insoluble sulfur)	SBR	yellow granules	Vulcanizing agent for natural and synthetic rubber compounds
Rhenogran® MBTS-80/SBR	mercaptobenzothiazole disulfide	SBR	violet granules	Moderate curing speed, accelerator for the vulcanization of natural and synthetic rubbers, acts as a retarder in sulfur modified CR
Rhenogran® Resorcinol-80/SBR	resorcinol	SBR	off-white to brown granules	Steel cord adhesion compounds, e.g. for bonding systems of methylene donor with silica
Rhenogran® S-80/SBR	sulfur	SBR	orange granules	Curing agent for all natural and synthetic rubbers

Custom-Made ECO Binder System

Product	Chemical Composition	Polymer Binder	Appearance, Supply Form	Function/Applications
Rhenogran® ETU-70/ECO	diethyl thiourea	ECO	white granules	Curing agent for ECO/CO
Rhenogran® MBTS-70/ECO	mercaptobenzothiazole disulfide	ECO	gray granules	Accelerator for the vulcanization of ECO/CO rubbers
Rhenogran® Pb304-80/ECO	red lead oxide	ECO	red granules	Vulcanization activator and acid acceptor for CO and ECO
Rhenogran® S-70/ECO	sulfur	ECO	light-yellow granules	Curing agent for ECO/CO rubbers
Rhenogran® TMTM-70/ECO	tetramethyl thiuram mono-sulfide	ECO	yellow granules	Accelerator for the vulcanization of ECO/CO
Rhenogran® Triazine TM-70/ECO	2,4,6-trimercapto-s-triazine	ECO	yellow granules	Curing agent for ECO/CO



Rhenoslab® MBTS-75/NBR



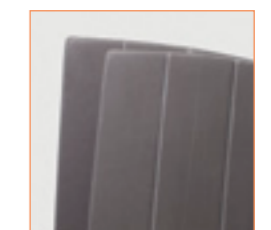
Rhenoslab® DPTT-70



Rhenoslab® ETU-80



Rhenoslab® TMTD-70/NBR



Rhenoslab® TMTD-80

Improving the efficiency of compound mixing and processing

Processing promoters are additives based on environmentally friendly raw materials, most of which are based on renewable raw materials and can be recycled. They enable producers of tires and technical rubber goods to improve the efficiency of compound mixing and processing, making it easier, or even possible in the first place, to perform difficult manufacturing processes.

The average elastomer content of rubber articles is 50%, while the rest accounts for fillers, plasticizers, chemicals and additives. This often means processing of more than 10 ingredients with different chemical structures, effects, polarities and consistencies to form a homogeneous compound. Processing promoters regulate plasticity, homogeneity and flow properties, with positive effects on the quality of the finished article.

The use of processing promoters to optimize the process also helps to cut costs:

- Power consumption and machine wear are reduced because less power is required for mixing
- Mixing and molding cycles are shortened because of the improved flow properties of the mix
- Reject rates are reduced due to the high quality of extruded and injection-molded articles

Dispersants and Lubricants

Aktioplast® products are characterized by their high solubility in diene rubbers. This improves dispersion of the ingredients. **Aktioplast®** affects vulcanization because it provides soluble zinc. Due to their low solubility and the associated lubricant effects, **Aflux®** products optimize the manufacture and processing of rubber compounds. **Aflux®** has no effect on vulcanization. All **Aflux®** grades are zinc-free.

With **Aktioplast®** and **Aflux®**, Rhein Chemie not only offers simple dispersants and lubricants but also a number of specialties – as solutions for practical challenges in rubber compounding.

- **Aflux® 37** is especially designed for silica compounds based on SSBR, BR, NR, and combinations thereof. Owing to its defined polarity, **Aflux® 37** enables silica to be easily incorporated into silica-based rubber compounds while not affecting critical physical parameters. Moreover, higher extrusion rates are obtained due to reduced compound viscosity.
- **Aflux® 54** decreases the viscosity of rubber compounds, resulting in easier processing and faster compounding, especially of mixes based on CO, ECO, and FPM. It noticeably reduces the sticking of the compounds to the mixing units. **Aflux® 54** improves the incorporation of all kinds of fillers and the extrusion properties of the compounds.
- **Aflux® 18** is a dispersant/lubricant especially suited for acrylic rubbers like AEM, ACM, and EVM. **Aflux® 18** significantly reduces tackiness/stickiness of rubber compounds based on AEM, ACM, and EVM toward metal surfaces. When used in combination with diamine cross-linking systems (e.g. **Rhenogran® HMDC-70/AEMD**), scorch times can be extended. Flowability of compounds is improved.
- **Aktioplast® 79** is an effective reclaiming agent for natural and synthetic rubber scrap. **Aktioplast® 79** decreases the risk of cyclization and reduces the reclaiming time. It can be applied in rubber scraps of all kinds.
- **Aktioplast® PP** is a versatile peptizer and processing promoter for elastomer compounds, e.g. for tires. It decreases the viscosity of compounds based on NR resulting in easier processing. This leads to higher extrusion rates, better dimensional stability and a constant level of die swell.

Factice

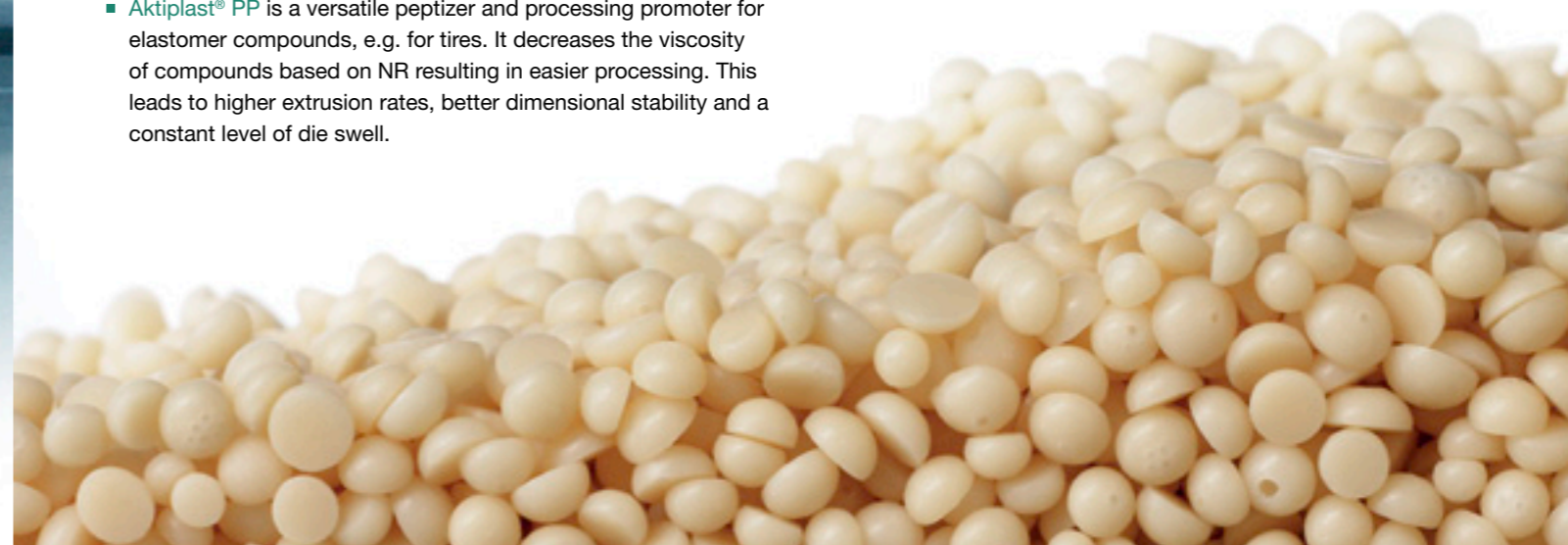
Rhenopren® grades, polymerized vegetable oils, promote the dispersion of fillers and absorption of plasticizers. They enhance the stability of the unvulcanized mixture. The build-up of pressure in the extruder leads to nonporous end articles, a high extrusion rate and reduced swelling, particularly with large-volume extrudates. The surface appearance can be adjusted individually.

- **Rhenopren® EPS** is a processing promoter for natural and synthetic rubber compounds based on vegetable oil, cross-linked without sulfur and chlorine. **Rhenopren® EPS** acts as a polymer plasticizer, giving raw compounds reliable dimensional stability and excellent processability. Owing to its minimal influence on vulcanization, **Rhenopren® EPS** can be used both for sulfur and peroxide cross-linking.

Resins and Plasticizers

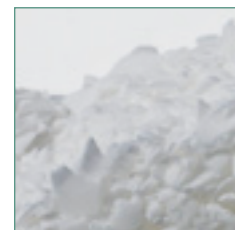
The **Rhenosin®** range comprises reinforcing, dispersing and bonding resins. **Rhenosin®** resins are used to adjust viscosity and to create tack in the manufacture of tires and technical rubber goods. They improve processing characteristics during mixing, extrusion, and finishing processes. They act as phase mediators and filler dispersants in rubber blends. They improve the homogeneity of these mixes and reduce batch-to-batch variation.

Under the brand name **Rhenosin®**, Rhein Chemie also offers special plasticizers based on selected ethers/esters. Particularly in polar rubber grades, e.g. NBR, HNBR, ACM, and AEM, **Rhenosin®** plasticizers improve the low-temperature flexibility and elasticity of technical rubber components. **Rhenosin®** plasticizers are highly stable even under conditions of high ambient temperatures. This stabilizes the properties of technical rubber goods at elevated temperatures. With **Rhenosin® W 65**, Rhein Chemie offers an eco-friendly plasticizer based on renewable raw materials without sacrificing on performance.



Dispersants and Lubricants (Zinc-Free)

Product	Chemical Composition	Approx. melting range [°C]	Appearance/Supply Form	Function/Applications
Aflux® 12	combination of fatty acid esters with inorganic carriers	-	whitish pellets	Provides processing improvement and better dispersion for all kinds of technical molded and extruded goods. Usually used in carbon black loaded compounds
Aflux® 16	calcium salts of naturally occurring fatty acids blended with an amide ester wax	80–100	beige granules	Polymer compounds, primarily based on EPDM, CR, and IIR. Reduces the viscosity of rubber mixes; reduces sticking to mixing units; supports the removal of vulcanizates from the mold
Aflux® 18	primary fatty amine	50–60	white pastilles	Significantly reduces tackiness/stickiness of rubber compounds based on AEM, ACM, and EVM towards metal surfaces; improves demolding, extends scorch time in HMDC-based cross-linking systems
Aflux® 25	combination of isoalkanes with fatty acids	65–75	whitish pastilles	Lubricant for NR and specialty rubbers such as ACM, CR, FPM, HNBR, NBR, etc. For molded and extruded goods of all types, articles for food contact applications (compliance with BgVV recommendations). Suitable for extrusion and injection molding
Aflux® 28 E	selected blend of fatty acids, alcohol and esters	82–97	light-brown pastilles	Processing promoter designed for EVA and EVM compounds
Aflux® 37	blend of silica surface active substances with fatty acids	57–63	white pastilles	Silica tire treads, compounds based on highly active white fillers. Reduces compound viscosity; reduces interaction between filler particles, improves silica dispersion
Aflux® 42	blend of fatty acids, fatty alcohols and fatty esters	90–100	light-brown to brown pastilles	For all rubbers including EPDM and CR. For molded and injected technical articles of all types, footwear. For continuous vulcanization processes (LCM, UHF) and injection molding
Aflux® 42 M	blend of fatty acids, fatty alcohols and fatty esters	80–90	light-brown to brown pastilles	For all rubbers including EPDM and CR. For molded and injected technical articles of all types, footwear. For continuous vulcanization processes (LCM, UHF)
Aflux® 42 S Aflux® 52	blend of fatty acids, fatty alcohols and fatty esters		light-brown to brown pastilles	For all rubbers including EPDM and CR. For molded and injected technical articles of all types, footwear. For continuous vulcanization processes (LCM, UHF)
Aflux® 43	anhydrous blend of fatty alcohols and fatty acid esters	92–102	light-brown to brown pastilles	Applicable in continuous vulcanization processes (LCM, UHF) and in injection molding. Technical rubber goods, e.g. profiles
Aflux® 54	pentaerythrityltetrastearate	58–65	whitish micro pearls	Particularly suitable for AU, CO, ECO, and FPM, molded and extruded technical articles. Reduces the viscosity of rubber mixes. Reduces sticking to mixer units, aids removal of vulcanizates from the mold



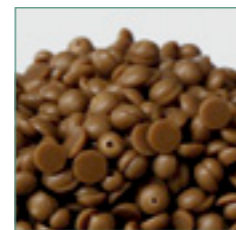
Aflux® 18



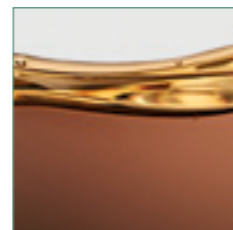
Aflux® 37



Aflux® 42/Aflux® 42 M



Aktioplast® 8



Aktioplast® 79

Dispersants and Lubricants

Product	Chemical Composition	Approx. melting range [°C]	Appearance/Supply Form	Function/Applications
Aktioplast®	combination of zinc salts of unsaturated fatty acids	77–91	light-brown pastilles	Molded and extruded goods of all types, expanded rubber articles, hard rubber, rubber articles for food contact applications (compliance with BgVV recommendations). Peptizing effect in NR and IR (> 60 °C). Retards scorch and accelerates vulcanization
Aktioplast® AP	zinc salts of high molecular weight fatty acids	95–107	light-brown pastilles	Processing promoter with peptizing effect for elastomer compounds, especially based on natural rubber. Recommended for use in the internal mixer
Aktioplast® GT	zinc salts of selected, high-molecular weight, mainly saturated fatty acids	99–107	light-brown pastilles	Lubricant for highly filled synthetic diene rubber compounds; particularly suitable for compounds containing high-activity silica: Tire treads, technical molded articles
Aktioplast® PP	combination of zinc salts of saturated fatty acids	101–111	light-brown pastilles	Tires, molded and extruded articles of all types, hard rubber. Peptizing effect in NR and IR (> 60 °C). Retards scorch and can accelerate vulcanization
Aktioplast® ST	blend of hydrocarbons, zinc soaps and fillers	100–110	light-brown pastilles	Dispersant and lubricant for highly filled synthetic diene rubber compounds; particularly suitable for compounds containing high-activity silica, e.g. tire treads, molded technical rubber articles
Aktioplast® T	combination of zinc salts of unsaturated fatty acids	78–96	brown pastilles	Peptizing effect in NR and IR (> 60 °C). Retards scorch and accelerates vulcanization. Molded and extruded goods of all types, expanded rubber articles, hard rubber
Aktioplast® T-60	combination of zinc salts of unsaturated fatty acids with calcium carbonate	75–90	light-brown to brown pastilles	Molded and extruded goods of all types, expanded rubber articles, hard rubber. Peptizing effect in NR and IR above 60 °C. Retards scorch and accelerates vulcanization
Aktioplast® TC	blend of zinc salts of high molecular weight, mostly unsaturated fatty acids	75–95	brown pastilles	Molded and extruded goods of all types, expanded rubber articles, hard rubber. Peptizing effect in NR and IR above 60 °C. Retards scorch and accelerates vulcanization
Aktioplast® TX	blend of zinc salts of high molecular, mostly unsaturated fatty acids with inorganic fillers	70–94	light-brown to brown pastilles	Molded and extruded goods of all types, expanded rubber articles, hard rubber. Peptizing effect in NR and IR above 60 °C. Retards scorch and accelerates vulcanization

Functional Processing Promoters

Product	Chemical Composition	Approx. melting range [°C]	Appearance/Supply Form	Function/Applications
Aktioplast® 8	metal complex on organic carrier	85–97	brown pastilles	Tires and technical rubber goods; peptizer for natural rubber at low and high temperatures
Aktioplast® 79	dialkylpentasulfide	-	light-colored, low-viscosity liquid	Reclaiming agent for natural and synthetic rubber scrap
Aktioplast® F	combination of zinc salts of unsaturated fatty acids with an activator	77–91	brown pastilles	Molded and extruded articles of all types, conveyor belts, tire compounds. Stronger peptizing effect than Aktiplast. Retards scorch and accelerates vulcanization. Counteracts cyclization, e.g. of SBR
Aktioplast® M	activated combination of zinc salts of high molecular weight, mainly saturated fatty acids	95–110	brown pastilles	Processing promoter with a viscosity-reducing and filler-dispersing effect. For tire and rubber-to-metal bonding applications; especially suitable for compounds based on natural rubber and rubber blends
Aktioplast® MS	combination of zinc salts of selected, high molecular weight fatty acids with activator and peptizer	95–110	dark-brown pastilles	Multifunctional processing promoter for diene rubbers, especially suitable for compounds based on NR and IR blends

NEW

Dispersing and Homogenizing Resins

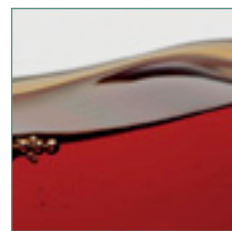
Product	Chemical Composition	Softening range [°C]	Appearance/ Supply Form	Function/Applications
Rhenosin® 145 145 A	polymerized blend of paraffinic, naphthenic and aromatic hydrocarbons	90–100	dark-brown to black flakes	Dispersing agent and softening resin for compounds based on natural and synthetic rubber. Improves processability and compound homogeneity. Especially suitable for butyl and halobutyl compounds, increases gas impermeability of tire inner liner
Rhenosin® TT 100	aromatic hydrocarbon resin	95–105	yellow pastilles	Dispersing and tackifying resin for solid rubbers and bonding solutions. Usage for tires and all kinds of technical rubber goods
Rhenosin® GE 3071	aromatic hydrocarbon resin	90–100	yellow to brown pastilles	Dispersing and tackifying resin for solid rubbers and bonding solutions. Usage for tires and all kinds of technical rubber goods
Rhenosin® 260	Aromatic hydrocarbon specialty resin	95–105	yellow pastilles	Homogenizing agent for polymer blends, improves phase morphology. Softening resin for compounds based on natural and synthetic rubber

Adhesion Promoter Resins

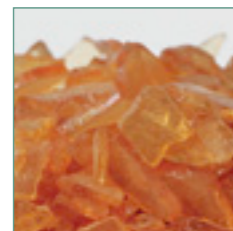
Product	Chemical Composition	Softening range [°C]	Appearance/ Supply Form	Function/Applications
Rhenosin® T	pre-condensed resorcinol formaldehyde resin, 40% in aqueous solution	-	reddish brown liquid	Bonding agent for rubber-to-fabric applications, e.g. tires, belts, and reinforced hoses. Ready to use for RFL dipping

Reinforcing Resins

Product	Chemical Composition	Softening range [°C]	Appearance/ Supply Form	Function/Applications
Rhenosin® A	phenolic resin (Novolak) containing hardening agent	-	white to yellow powder	Hardening during vulcanization without reacting with the polymer. Solid tires, technical rubber goods where high hardness is required
Rhenosin® RB	phenolic resin (Novolak) without hardener	50–100	yellow to brown flakes	Improves processing of compounds with high hardness. Hardening during vulcanization without reacting with the polymer. Solid tires, technical rubber goods which require high hardness



Rhenosin® T



Rhenosin® RB

Specialty Plasticizers

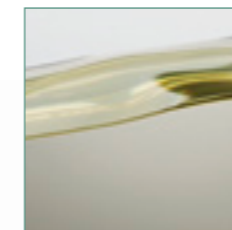
Product	Chemical Composition	Active ingredient [%]	Appearance/ Supply Form	Function/Applications
Rhenosin® BA	dibenzyl ether	100	colorless liquid	Synthetic plasticizer for natural and synthetic rubber; compounds for friction materials or other very elastic compounds, especially when based on NBR; extruded and injected technical articles with maximum resilience
Rhenosin® FH-70	70% aromatic polyether (Vulkano® FH) 30% silica filler	70	white non-dusting powder	Synthetic plasticizer for mixes based on natural and synthetic rubber; technical goods, e.g. conveyor belts, V-belts, roll covers, etc. also in foodstuff quality
Rhenosin® VU-90	di-2-ethylhexyl-thio-di-glycolate	100	clear, brownish liquid	Plasticizer specially designed to improve the low temperature flexibility of NBR and CR vulcanizates
Rhenosin® W-65	fatty acid ester	100	clear, colorless liquid	Plasticizer made from renewable resources for natural and synthetic rubber
Rhenosin® W-759*	ether/ester compound	100	slightly yellowish liquid	Plasticizer to improve the low-temperature flexibility of elastomer vulcanizates; seals and gaskets in vehicle construction, fuel pipes, wire sheathing, rubber articles in vehicle parts
Rhenosin® W-90 B*	polyether	100	clear, low-viscosity liquid	Plasticizer to improve the low-temperature flexibility of elastomer vulcanizates; fuel pipes, wire sheathing, sponge rubber, extruded and molded articles
Rhenosin® W-95*	adipic diester	100	slightly yellowish liquid	Plasticizer to improve the low-temperature flexibility of elastomer vulcanizates; refrigerator seals, hoses, ribbons, V-beltting, gas meter membranes

NEW

* Only available in Europe

Antistatic Plasticizers

Product	Chemical Composition	Active ingredient [%]	Appearance/ Supply Form	Function/Applications
Rhenosin® RC 100	fatty alkyl ester of polyethylene glycol	100	yellowish, slightly turbid liquid	Antistatic plasticizer to prevent accumulation of electrostatic charges on natural and synthetic rubber products as well as on plastics, particularly PVC



Rhenosin® W-759



Rhenosin® W-65

White Factice

Product	Chemical Composition	Total sulfur [%]	Appearance/ Supply Form	Function/Applications
Rhenopren® EPS	vegetable oil cross-linked without sulfur and chlorine	-	yellowish white powder	Gives green compounds good stability, very good processing characteristics and injection capacity. Since Rhenopren EPS is inert, it can be used in either sulfur and peroxide cross-linking systems
Rhenopren® MB	refined rapeseed oil cross-linked with sulfur and blended with mineral oil and inorganic stabilizers	4.5–6.5	off-white, ground material	Eraser rubber compounds (can also be hot-cured with basic accelerators); cold-cured goods such as light-colored calendered sheeting and rubberized textiles

Yellow Factice

Product	Chemical Composition	Total sulfur [%]	Appearance/ Supply Form	Function/Applications
Rhenopren® Asolvan	castor oil cross-linked with sulfur	13.5–15.5	ground, brown	For NBR, CR, CSM, and other specialty rubbers. Fuel- and mineral oil-resistant goods, e.g. rollers, fuel hoses, and articles for food contact applications (for food contact qualities, max. 20% calculated on the finished article)
Rhenopren® Asolvan T	castor oil cross-linked with sulfur and blended with refined rapeseed oil.	16.5–19.5	ground, elastic, brown	For NBR, CR, CSM, and other specialty rubbers. Fuel- and mineral oil-resistant goods such as rollers, fuel hoses
Rhenopren® C	refined rapeseed oil cross-linked with sulfur and hardened	16–18	light yellow, finely ground	For bright-colored molded and extruded goods, rubber goods for medical, household, camping and sports applications (for food contact qualities, max. 20% calculated on the finished article)



Rhenopren® EPS

Brown Factice

Product	Chemical Composition	Total sulfur [%]	Appearance/ Supply Form	Function/Applications
Rhenopren® 10	refined rapeseed oil cross-linked with sulfur	13–15	crushed material	Open-cured profiles and hoses, medical and food contact qualities (e.g. bottle- and jar-sealing rings, wine and beer hoses), rubber bands, rollers, handmade articles (for food contact qualities, max. 20% calculated on the finished article)
Rhenopren® HF	pure rapeseed oil cross-linked with sulfur	10.5–12.5	crushed material	Open-cured profiles and hoses, bicycle valve tubing, rubber threads, printers' rollers, handmade goods; surface layer for rubber boots, fabric proofing; articles for food contact applications (for food contact qualities, max. 20% calculated on the finished article)
Rhenopren® 14	refined rapeseed oil cross-linked with sulfur	16–18	crushed material	Extended polymer blends based primarily on EPDM. For cellular and micro-cellular articles based on all elastomers, especially blown profiles. Suitable for food contact applications. Promotes the formation of a skin with sponge rubber (for food contact qualities, max. 20% calculated on the finished article)
Rhenopren® ZD	refined rapeseed oil cross-linked with sulfur in a mineral oil	12–15	crushed material	Molded and extruded technical goods, shoe uppers and cable compounds



Rhenocure® and Rhenofit® – Practical solutions for compounders

Rhenocure® standard and specialty accelerators and curing agents include a selection of specialties, e.g. dithiophosphates, as dry liquids. An assortment of standard accelerators in powder or liquid form completes this product line. Dithiophosphates are multi-functional solutions to various challenges in rubber compounding. Whatever the task is, e.g. N-nitrosamine-free curing systems, formulations for reversion-stable networks, high solubility in rubber, fast curing rates in EPDM extrusion or replacement of otherwise eco-critical chemicals – dithiophosphates from Rhein Chemie are the handy solution for every compounder.

- Rhenocure® TP/S is a non-staining specialty accelerator for the rapid vulcanization of compounds based on EPDM and other diene rubbers. Rhenocure® TP/S causes a high degree of cross-linking. Vulcanizates accelerated by Rhenocure® TP/S generally do not show any signs of blooming. EPDM compounds containing Rhenocure® TP/S are easy to process and show particularly good flowing properties, even in complicated molds. In the efficient vulcanization of NR and other rubbers, such as IR, SBR, NBR, and IIR, Rhenocure® TP/S provides vulcanizates with extraordinarily good heat aging resistance. It offers an economic solution for various problems, not only in the tire industry.

- Rhenocure® SDT/S, a dithiophosphate-based sulfur donor, is recommended as a co-accelerator for various challenges in rubber compounding, e.g. an accelerator for N-nitrosamine-free EV curing systems, an anti-reversion agent for heat-resistant vulcanizates, or for the replacement of standard accelerators. It offers an economic solution for various problems, not only in the tire industry.

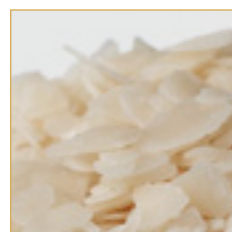
Rhenofit® is Rhein Chemie's brand for a wide assortment of functional additives including antioxidants, filler and blowing agent activators, cross-linking activators, desiccants and magnesium oxide. Depending on the respective raw material and its handling requirements, these products are offered either in powder, pellet, liquid or dry liquid form. If not specified otherwise, liquid additives are offered as dry liquids on inert, inorganic white filler material as a free-flowing white powder for easy handling and mixing conditions.

- Rhenofit® CF, a specially treated, distinctively separated calcium hydroxide, is a cross-linking activator particularly for fluoro elastomers. It is applied to achieve optimal compression set values at higher temperatures. Since calcium hydroxide is hygroscopic, Rhenofit CF is supplied in a special packaging that keeps the material absolutely dry. Rhenofit® CF is the preferred cross-linking activator for fluoro elastomers.

- Rhenofit® STA/S, a combination of activating polar substances bound to highly reinforcing silica, acts as a curing activator and processing promoter for silica and other white fillers. Rhenofit® STA/S helps to properly disperse all polar compound ingredients and simultaneously activates silica and other white reinforcing fillers. The vulcanization is accelerated and cure efficiency is improved to an extent that Rhenofit® STA/S may be used as a secondary accelerator. Rhenofit® STA/S increases the modulus of vulcanizates.

Standard Accelerators

Product	Chemical Composition	Appearance/ Supply Form/ Binder System	Function/Applications
Rhenocure® 1000 C	o-tolyl biguanide (OTBG)	white powder, oil-coated	Accelerator for natural and synthetic rubber
Rhenocure® CA	diphenyl thiourea (DPTU)	white to yellowish crystalline powder	Very fast secondary accelerator for diene rubbers, e.g. CR, EPDM
Rhenocure® CRV/LG	3-methyl-thiazolidine-thione-2 (MTT)	white to beige-brownish pellets, oil-coated	Accelerator for ETU-free curing of CR
Rhenocure® DOTG/C	di-ortho-tolylguanidine (DOTG)	white to very light gray, low-dusting powder, oil-coated	Slow accelerator or co-agent for curing of AEM and ACM
Rhenocure® DPG	diphenyl guanidine (DPG)	white to light pink powder	Accelerator for the vulcanization of natural and synthetic rubbers
Rhenocure® DPG/C	diphenyl guanidine (DPG)	white to light pink powder, oil-coated	Accelerator for the vulcanization of natural and synthetic rubbers
Rhenocure® HX	cyclohexylethylamine	colorless to pale yellowish liquid	Mild accelerator
Rhenocure® L	zinc dimethyl dithiocarbamate (ZDMC)	white to yellowish powder	Ultra accelerator
Rhenocure® LDB/C	zinc dibutyl dithiocarbamate (ZDBC)	white to yellowish powder	Ultra accelerator
Rhenocure® NPV/C	ethylene thiourea	white to yellowish-white powder, oil-coated	Molded and extruded technical articles, e.g. cable sheathings, foils, rubberized fabrics, mainly based on CR
Rhenocure® Thiuram MS/C	tetramethyl monosulfide (TMTM)	ground powder, oil-coated	Fast accelerator for low sulfur curing
Rhenocure® Thiuram MS/EG/C	tetramethyl monosulfide (TMTM)	extruded granules, oil-coated	Fast accelerator for low sulfur curing
Rhenocure® TIBTD	tetraisobutyl thiuram disulfide	white to off-white powder	Extremely low nitrosamine generating accelerator and sulfur donor for curing natural and synthetic rubber. Replacement for TMTD. Especially suitable for low sulfur cross-linking systems, particularly in NBR
Rhenocure® ZP	zinc-N-pentamethylene dithiocarbamate (Z5MC)	white powder	Ultra accelerator for NR and SR



Rhenocure® CRV/LG

Curing Agents and Specialty Accelerators

Product	Chemical Composition	Appearance/ Supply Form/ Binder System	Function/Applications
Rhenocure® SDT/S	70% phosphoryl polysulfide, 30% high-activity silica	white to light gray/blue powder	Non-staining sulfur donor for the vulcanization of natural and synthetic rubbers
Rhenocure® TP/S	67% zinc dialkyl dithiophosphate, 33% silica	white, crumbling, free-flowing powder	Non-staining specialty accelerator for the rapid vulcanization of compounds based on NR, EPDM, and other diene rubbers
Rhenocure® ZDT/S	zinc dialkyl dithiophosphate	white powder	Non-staining specialty accelerator for rapid vulcanization of EPDM and other diene rubbers not containing any secondary amines which can form N-nitrosamines
Rhenocure® ZBOP/S	75% zinc dialkyl dithiophosphate, 25% silica	white powder	Non-staining specialty accelerator for rapid vulcanization of EPDM and other diene rubbers not containing any secondary amines which can form N-nitrosamines

Magnesium Oxides

Product	Chemical Composition	Appearance/ Supply Form/ Binder System	Function/Applications
Rhenofit® 2060	fine particle-sized magnesium oxide	light-gray powder	Curing activator and acid acceptor, particularly suitable for CR and adhesives
Rhenofit® D/A	highly reactive magnesium oxide	white powder	Curing activator and acid acceptor, particularly suitable for CR and adhesives
Scorchguard O	Activated magnesium oxide approx. 74%	buff-gray bars	Curing activator and acid acceptor, particularly suitable for CR, CIIR, CSM, CM, and other halogenated polymers

Desiccants

Product	Chemical Composition	Appearance/ Supply Form/ Binder System	Function/Applications
Rhenofit® C	95% calcium oxide, 5% special dispersing agents	gray, non-dusting powder	Desiccant to prevent porosity for rubber compounds of all kinds
Rhenofit® F	calcium oxide, specially treated and finely divided	white powder	Cross-linking modifier and desiccant for use in fluoro elastomers



Rhenocure® TP/S



Rhenofit® D/A

Antioxidants and Anti-Hydrolysis Agents

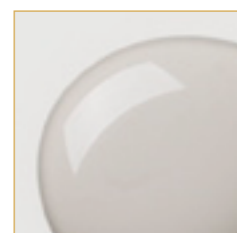
Product	Chemical Composition	Appearance/ Supply Form/ Binder System	Function/Applications
Rhenofit® DDA	diphenylamine derivative	yellow to reddish-brown viscous liquid	Antioxidant for NR and SR, especially for CR
Rhenofit® DDA-50 EM	50% diphenylamine derivative (aqueous emulsion of Rhenofit® DDA)	reddish-beige viscous liquid	Antioxidant for latex compounds and adhesives
Rhenofit® DDA-70	70% diphenylamine derivative, 30% silica	white to reddish-brown, non-dusting powder	Antioxidant for NR and SR, especially for CR
Rhenofit® OCD	octylated diphenylamine	light brown pastilles	Antioxidant especially for CR and for NR, IR, BR, SBR, and EVM
Rhenofit® PAN	phenyl-a-naphthylamine	pale brown to pale violet powder	Antioxidant for natural and synthetic rubber
NEW Rhenofit® SXL (GE 2102)	monomeric carbodiimide	slightly yellowish crystallized melt	Retarder for the vulcanization of AEM and ACM with diamine (HMDC) cure systems

Filler and Blowing Activators

Product	Chemical Composition	Appearance/ Supply Form/ Binder System	Function/Applications
Rhenofit® 1987	combination of activating substances based on urea and surface-active agents, bound to highly reinforcing silica	white powder	Curing activator and promoter for reinforcing fillers
Rhenofit® 1987 A	combination of activating substances based on urea and surface-active agents	white pellets	Curing activator and promoter for reinforcing fillers, white filled shoe sole compounds
Rhenofit® 3555	combination of activating substances based on amines, bound to highly reinforcing silica	white powder	Vulcanization activator and promoter for reinforcing fillers
NEW Rhenofit® STA/S	combination of activating polar substances bound to highly reinforcing silica	white, non-dusting powder	Curing activator and processing promoter for silica and other white fillers
Rhenofit® TSH	toluene sulphonyl hydrazide	white to pale greyish powder	Chemical blowing agent for all kinds of cellular rubber e.g. cellular rubber profiles and soft cellular rubber (packagings, seals), expanded microcellular soling sheets
Rhenofit® ZBS	benzenesulfinic acid, zinc salt	white to yellowish powder	Organic zinc salt for the activation of the decomposition of ADC based blowing agents



Rhenofit® DDA



Rhenofit® DDA-50 EM



Rhenofit® DDA-70

Curing Agents

Product	Chemical Composition	Appearance/ Supply Form/ Binder System	Function/Applications
Rhenocure® IS 60	insoluble/soluble sulfur in a 60:40 ratio	yellow powder	Vulcanizing agent for natural and synthetic compounds
Rhenocure® IS 60-5	insoluble/soluble sulfur in a 60:40 ratio plus 5% oil	non-dusting yellow powder	Vulcanizing agent for natural and synthetic compounds
Rhenocure® IS 60-10	insoluble/soluble sulfur in a 60:40 ratio plus 10% oil	non-dusting yellow powder	Vulcanizing agent for natural and synthetic compounds
Rhenocure® IS 90-20	insoluble/soluble sulfur in a 90:10 ratio plus 20% oil	non-dusting yellow powder	Vulcanizing agent for natural and synthetic compounds
Rhenocure® IS 90-33	insoluble/soluble sulfur in a 90:10 ratio plus 33% oil and filler	yellow powder	Non-blooming sulfur for the tire industry
Zic Stick 85	zinc oxide	mineral oil	Universal vulcanization activator, especially in the presence of fatty acids

Cross-Linking Activators

Product	Chemical Composition	Appearance/ Supply Form/ Binder System	Function/Applications
Rhenofit® BDMA/S	70% 1,4-butandiol dimethacrylate, 30% silica	white, non-dusting powder	Activator for peroxide vulcanization
Rhenofit® CF	specialty treated, finely divided calcium hydroxide	white powder	Cross-linking activator for fluoroelastomers
Rhenofit® EDMA/S	70% ethylene glycol dimethacrylate, 30% silica	white, non-dusting powder	Activator for peroxide vulcanization
Rhenofit® NAST	80% sodium stearate, 20% inorganic dispersing agent	white powder	Cross-linking activator for acrylate rubber
Rhenofit® NC	fatty acid amide with amino groups	yellowish pellets	Accelerator activator for the cross-linking of chlorinated polyethylene (CM) by the thiadiazole derivative Rhenogran® TDD-70
Rhenofit® TAC/S	70% triallyl cyanurate, 30% silica	white, fine crumbling powder	Activator for peroxide vulcanization
Rhenofit® TAIC/S	triallyl isocyanurate	white powder	Technical molded and extruded articles based on EPDM, EPM, CM, and other, e.g. profiles, seals, cable coverings and bushings
Rhenofit® TRIM/S	70% trimethylolpropane triallyl isocyanurate, 30% silica	white powder, non-dusting	Activator for peroxide vulcanization



Rhenofit® CF

Antilux® – the protector of choice against weathering and oxidation

Antilux®, widely used in the tire industry, is the protector of choice against the effects of weathering and oxidation when rubber articles are exposed to light and ground ozone. Antilux® migrates to form a self-regenerating, sealed protective film on the surface of the article. This film is elastic, flexible at low temperatures and has good adhesion properties. Antilux® provides optimal protection against oxidation under dynamic stress. The molecular weight distribution of the paraffins determines the ratio of migration to solubility. The protective effects of Antilux® can therefore be adjusted to the in-service temperature of the finished article.

Antilux®, anti-sun check waxes and anti-ozonants are blends of selected paraffins and micro-waxes comprising grades of different molecular weight distribution and congealing ranges. Supplied as free-flowing pellets, regular in size and color, they ensure easy handling in weighing and mixing. For technical rubber articles that come into contact with foodstuffs or toys and medical rubber articles, two grades with special approval for such applications are available.

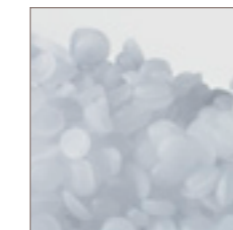
The Antilux® 500 grades are suitable for technical rubber goods with low in-service temperatures. The broad-band Antilux® 654 provides excellent protection for tires in all climates at high and low in-service temperatures. Both grades are in compliance with the regulations of BZgA for food contact applications.

Anti-Sun Check Waxes and Anti-Ozonants

Product	Chemical Composition	Congealing range [°C]	Appearance/ Supply Form (Binder System)	Function/Applications
Antilux® 110	blend of selected paraffins and micro-waxes with medium-broad molecular weight distribution	60–64	light-blue pastilles	Anti-sun check wax to protect rubber articles against cracking caused by ozone and weathering influences
Antilux® 111	blend of selected paraffins and micro-waxes with broad molecular weight distribution	63–68	light-green flakes	Anti-sun check wax to protect rubber articles against cracking caused by ozone and weathering influences
Antilux® 500	blend of selected paraffins and micro-waxes with medium-broad molecular weight distribution	53–58	white to yellowish flakes	Anti-sun check wax to protect rubber articles against cracking caused by ozone and weathering influences
Antilux® 500 L	blend of selected paraffins and micro-waxes with medium-broad mol. weight distribution	53–57	white pastilles	Rubber articles and articles which come in contact with food-stuffs, toys, surgical, and pharmaceutical rubber articles
Antilux® 500 PE	blend of selected paraffins and micro-waxes with medium-broad molecular weight distribution with 2% low molecular polyethylene	54–59	white to yellowish pastilles	Rubber articles and articles which come in contact with food-stuffs, toys, surgical, and pharmaceutical rubber articles
Antilux® 550	blend of selected paraffins and micro-waxes with narrow molecular weight distribution	56–61	light-yellow pastilles	Anti-sun check wax to protect rubber articles against cracking caused by ozone and weathering influences
Antilux® 600	blend of selected paraffins and micro-waxes with narrow molecular weight distribution	57–62	light-yellow pastilles	Anti-sun check wax to protect rubber articles against cracking caused by ozone and weathering influences
Antilux® 654	blend of selected paraffins and micro-waxes with medium-broad molecular weight distribution	62–67	white to yellowish pastilles	Anti-sun check wax to protect rubber articles against cracking caused by ozone and weathering influences
Antilux® 654 L	blend of selected paraffins and micro-waxes with medium-broad molecular weight distribution	63–67	white pastilles	Rubber articles and articles which come in contact with food-stuffs, toys, surgical, and pharmaceutical rubber articles
Antilux® 654 A	blend of selected paraffins and micro-waxes with medium-broad molecular weight distribution and 2% low molecular weight polyethylen	64–69	white to yellowish pastilles	Anti-sun check wax to protect rubber articles against cracking caused by ozone and weathering influences



Antilux® 111



Antilux® 654

Urepan® – for maximum strength and excellent resistance

Urepan® are polyurethane-based synthetic rubbers. Urepan® combines the advantages of polyurethane elastomers and high-performance rubbers, i.e. maximum strength and excellent resistance to chemicals. Urepan® products are processed using the standard machinery and methods applied in the rubber industry.

Vulcanizates based on Urepan® demonstrate the following qualities:

- Excellent abrasion resistance
- Top tear and tensile strength
- Excellent fuel and oil resistance
- Excellent ozone and weather resistance
- Low gas permeation
- Good low-temperature behavior

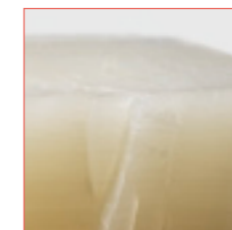
Urepan® grades for peroxide cross-linking also demonstrate above-average resistance to high temperatures. Rhein Chemie also offers functional additives for cross-linking Urepan® under the brand name of Rhenocure®.

Millable Polyurethane

Product	Chemical Composition	Supply Form	Function/Applications
Urepan® 50 EL 06 G	polyether polyurethane rubber (EU)	granules	PU rubber for sulfur or peroxide cross-linking for use in the manufacture of technical rubber goods; excellent hydrolytic stability
Urepan® 600	polyester polyurethane rubber (AU)	bales	PU rubber for isocyanate cross-linking for the manufacture of vulcanizates in the high-hardness range with high mechanical strength and elasticity
Urepan® 640 G	polyester polyurethane rubber (AU)	granules	PU rubber for peroxide cross-linking for use in technical rubber goods; excellent gas impermeability
Urepan® 641 G	polyester polyurethane rubber (AU)	granules	PU rubber for peroxide cross-linking for use in the manufacture of technical rubber goods; excellent hydrolytic stability
Urepan® 643 G	polyester polyurethane rubber (AU)	granules	PU rubber for peroxide cross-linking for use in the manufacture of technical rubber goods; excellent low-temperature performance

Functional Additives

Product	Chemical Composition	Appearance/Supply Form	Function/Applications
Rhenocure® AUR	combination of zinc chloride and mercaptobenzothiazole disulfide	yellowish powder	Curing agent for Urepan® 50 EL 06 G
Rhenocure® BDMC/C (GE 2201)	organic bismuth salt	off-white to light-yellow powder	Ultra accelerator for sulfur-cure systems and activator for compounds based on isocyanate cross-linkable polyurethane rubber Urepan® 600
Rhenocure® TT	dimeric toluylene-2,4-diisocyanate	white to yellowish powder	Cross-linking agent for Urepan® 600



Urepan® 600



Urepan® 640 G

NEW

Release Agents, Tire Marking Inks

Rhenodiv® and Rhenomark® – for safe and reliable handling

Release agents are selected individually to suit the manufacturing process, type, and shape of the finished product and any finishing the vulcanizate may require. This is why we attach particular importance to applied customer service to provide close cooperation.

Modern Rhenodiv® release agents are designed to do far more than prevent adhesion of mechanically processed uncured rubber compounds. Applied to the surface by spraying, dipping or wiping processes, appropriate Rhenodiv® release agents prevent sticking of green slabs, sheets, tubes, etc. For the vulcanization of molded articles or tires, tailor-made solutions from Rhein Chemie ensure easy release from the mold together with good surface quality.

Rhenodiv® release agents provide safe and reliable handling at every stage of the production process. This means no dusting, rapid dispersion, reduced foaming, low mold and plant contamination and rapid drying combined with improved quality, safety, and health at work.

- Rhenodiv® batch-off release agents prevent the adhesion of uncured rubber, milled sheets, blanks and pellets, and are available in liquid or solid form.

- Rhenodiv® mold release agents prevent rubber vulcanizates from adhering to the molds, thereby allowing easier release, and are available in silicone-free or silicone-containing form (Levaform®, Rhenodiv®).

- Rhenodiv® hose release agents facilitate the fitting and removal of hoses (vulcanized in autoclaves) from the metal mandrels.

- Rhenodiv® tire systems allow environmentally friendly molding and vulcanization of tires (lubrication, venting, release). According to customer requirements, outside/inside paints, semi-permanent products and bladder coatings are available.

Rhenomark® is the Rhein Chemie brand name for tread marking inks that feature brilliant colors, freedom of VOC and non-inflammability. In order to meet the specific demands of our customers and to provide the utmost benefit, we offer the different series Rhenomark® MP and PI. Viscosity and total solid content are the main differences in these grades. The application can be carried out with a wheel-type system or with a nozzle. The brilliance of the color remains even after the tire has been cured and lasts throughout the storage time of the tires.

Release Agents

Batch-Off Release Agents: Liquid Grades

Product	Chemical Composition	Work concentration in water [%]	Appearance/ Supply Form	Application
Rhenodiv® BO-7672-1	combination of fatty acid salts and calcium stearate, free of mineral fillers	4–10	white-yellow dispersion	Mixing process, dipping baths, and batch-off equipment
Rhenodiv® BO-7672-2	aqueous dispersion of a combination of fatty acid salts, contains no fillers	5–10	white to yellow viscous liquid	Mixing process, dipping baths, and batch-off equipment
Rhenodiv® BO-LL	aqueous solution of a combination of fatty acid salts, contains no fillers	5–20	white to yellow viscous liquid	Mixing and extruding processes; highly soluble
Rhenodiv® BO-ZB	very fine-particle zinc stearate, dispersed in water	3–5	stable white suspension, low viscosity	Mixing process, dipping baths, and batch-off equipment, preparation of blanks in Barwell extruders; low viscosity, can be diluted directly to required concentration
Rhenodiv® BO-ZB-C	aqueous suspension of particularly fine zinc stearate	4–10	stable white suspension	Dipping baths, batch-off-lines, for the production of blanks in Barwell extruders

Batch-Off Release Agents: Powder Grades

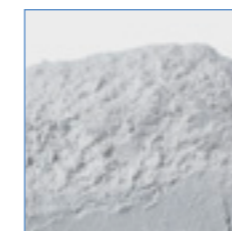
Product	Chemical Composition	Work concentration in water [%]	Appearance/ Supply Form	Application
Rhenodiv® BO-501-2	combination of synthetic and inorganic fillers and surface-active substances	1.5–3	grayish powder	Mixing process, batch-off equipment; very efficient at low consumption, very little foam formation
Rhenodiv® BO-505-2	combination of synthetic and inorganic fillers and surface-active substances	1.5–3	grayish powder	Mixing process, batch-off equipment; very efficient at low consumption, very little foam formation
Rhenodiv® BO-3300	combination of fatty acid salts and fillers, free of silicones and phosphates	1–1.5	white to amber powder	Mixing process, batch-off equipment; easily dispersible in water, no significant foam generation; ensures a very clean batch-off operation – dust-free
Rhenodiv® BO-7665-1	blend of surface-active substances with film-forming substances bound to fillers	2–4	grayish powder	Mixing process for batch-off equipment and dipping baths of all types; fast drying release film, very easy to disperse
Rhenodiv® BO-7665-2	blend of surface-active substances with film-forming substances bound to fillers	2–4	gray-beige powder	Mixing process, batch-off equipment, and dipping baths of all types
Rhenodiv® BO-7665-10	blend of inorganic fillers, fatty acid salts and surface-active substances	2–4	gray-beige powder	Mixing process, batch-off equipment, and dipping baths of all types; low foam formation and very easy to disperse

Mold Release Agents

Product	Chemical Composition	Work concentration in water [%]	Appearance/ Supply Form	Application
Levaform® SI-EM	aqueous emulsion of medium-viscosity silicone oil	< 1	white liquid	Effective mold release agent; spraying application preferred
Levaform® SI-V	aqueous emulsion of medium-viscosity silicone oil and release effect intensifier	< 1	milky-white liquid	Very effective mold release agent; spraying application preferred
Rhenodiv® MR-30/1	dispersion of fatty acid derivative, alkali salt, silicone-free	0.3–1.5	thixotropic, whitish dispersion	Mold release agent for natural and synthetic rubber vulcanizates including silicone rubber
Rhenodiv® MR-60	aqueous emulsion of reactive silicone polymers and special surfactants	< 1	white liquid	Mold release agent for natural and synthetic rubber vulcanizates. Semi-permanent release agent, does not have to be applied at every cycle
Rhenodiv® MR-80 SI-N	emulsion of silicone oil in water	0.5–1	white liquid	Mold release agent, very little mold fouling
Rhenodiv® MR-181	mixture of silicones	ready-to-use	colorless liquid	Release agent for surface treatment of tire cure molds

Hose Release Agents

Product	Chemical Composition	Viscosity at 20°C [mPas]	Appearance/ Supply Form	Application
Rhenodiv® HR-687-5	mixture of polyfunctional alcohols and surfactants	approx. 1,500	yellowish liquid	Easy mounting and demounting of hoses from mandrels for nearly all rubber mixtures, including ECO; very efficient on EPDM, CR, and CM
Rhenodiv® HR-708 GT	gel consisting of polyfunctional alcohols and surfactants	> 5,000	white viscous paste	Injected onto inner surface of a hose during the extrusion process; liquifies at 60 °C and gives a high slippage for mounting the hoses on mandrels
Rhenodiv® HR-850	mixture of polyfunctional alcohols	approx. 1,500	yellowish liquid	Hose release agent designed for EPDM and ECO, works well with most other rubbers; biodegradable
Rhenodiv® HR-7645-2	mixture of polyfunctional alcohols, emulsifiers and surface-active agents	approx. 1,200	yellowish viscous liquid	Hose release agent for EPDM and NBR; biodegradable



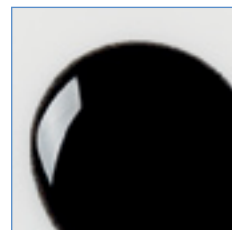
Rhenodiv® BO-505-2



Levaform® SI-EM

Tire Systems: Aqueous Outside Tire Paints

Product	Chemical Composition	Total solids [%]	Appearance/ Supply Form	Application
Rhenodiv® OP-360	aqueous suspension of SBR compound with fillers and bonding agents	24	black liquid	Specially formulated to have fast-drying, high-bleed and better adhesion properties; resists mold fouling under adverse conditions. No rub-off or transfer from green tires after drying or from cured tires
Rhenodiv® OP-600	aqueous suspension of SBR compound with mineral filler	18	black liquid	Latex-containing black outside tire release agent for outstanding adhesion and good air bleeding
Rhenodiv® OP-787	aqueous suspension of SBR compound with mineral filler	25	black liquid	Dark black latex-containing outside tire release agent with anti-blemishing effect; excellent air-bleeding properties
Rhenodiv® OP-9150-2A	aqueous suspension of fillers, binders, and surfactants	12	white low-viscosity suspension	High-adhesion water-based green tire outside paint to reduce blemishes and defects; transparent and clear after drying, so color codes and bar codes are easy to read
Rhenodiv® OP-9160	aqueous suspension of fillers and surfactants	15	gray-black low-viscosity dispersion	Outside tire release agent, outstandingly low tendency for mold fouling; allows strong rubber-to-rubber adhesion in the splice regions; color codes and bar codes are easy to read
Rhenodiv® OP-9208	aqueous suspension of inorganic fillers and surfactants	17	black low-viscosity suspension	High-adhesion outside tire release agent, outstandingly low tendency for mold fouling; allows strong rubber-to-rubber adhesion in the splice regions; color codes and bar codes are easy to read
Rhenodiv® OP-9430	aqueous suspension of SBR compound with mineral filler	25	black liquid	Anti-blemish agent, helps to get a uniform external tire surface; fewer molding defects than usually appear during the curing process



Rhenodiv® OP-9160

Tire Systems: Single Release Band Plys (Inside Tire Paints)

Product	Chemical Composition	Total solids [%]	Appearance/ Supply Form	Application
Rhenodiv® BP-70	water-based product, containing mica and reactive silicones	46	gray-black liquid	Good release and excellent slip properties; formed silicone resin prevents flaking of the release agent from the cured tire and the bladder
Rhenodiv® BP-104	water-based product, containing reactive silicones, non-filled	5	milky-white liquid	Unfilled product to be applied in every tire, interface lubricant between the inside of the tire and the curing bladder; the remnant lubricity left on the bladder might enable for an alternative use
Rhenodiv® BP-140	water-based product, containing mica and reactive silicones	40	gray liquid	Product to be applied in every tire, the remnant lubricity left on the bladder might enable for an alternative use
Rhenodiv® BP-286	water-based product, containing mica and non-reactive silicones	44	black dispersion	Good release and excellent slip properties; prevents flaking of the release agent from the cured tire and the bladder; colored black to produce a pleasing aspect of vulcanized inner surface of the tire
Rhenodiv® BP-309	water-based product, containing reactive silicones, non-filled	8	milky-white liquid	Band ply product to be applied in every tire; remnant lubricity left on the bladder might enable for an alternative use
Rhenodiv® BP-450	water-based product, containing mica and non-reactive silicones	50	amber-silver liquid	Provides suitable lubricity, high release properties and improves the inside appearance of the cured tire
Rhenodiv® BP-550 N	water-based product, containing mica and non-reactive silicones	50	gray-black liquid	Provides suitable lubricity, high release properties and outstanding air bleeding; improves the inside appearance of the cured tire
Rhenodiv® BP-2831	water-based product, containing mica and non-reactive silicones	47	black dispersion	Good release and excellent slip properties; prevents flaking of the release agent from the cured tire and the bladder; colored black to produce a pleasing aspect of vulcanized inner surface of the tire
Rhenodiv® BP-5100-2	aqueous suspension of inorganic pigments, silicone polymers, and emulsifiers	25	grayish liquid	Specially developed for runflat tires, shows low consumption and short drying time; after drying, the inside of the tire is transparent and smooth, making any labels easily visible
Rhenodiv® BP-9092 W	aqueous suspension of inorganic pigments, silicone polymers, and additives	50	gray-white, high-viscosity liquid	Gives a very good slippage of the bladder into the green tire, shows very good air bleed and prevents the bladder from sticking to the inner liner; due to its white color, it is easy to detect and the spray pattern is easy to control
Rhenodiv® BP-9094/1	aqueous suspension of inorganic pigments, silicone polymers, and emulsifiers	45	gray liquid of medium viscosity	Very good surface slip and air bleed, high bladder life; the spray pattern is easily recognized in the tire blanks; provides a favorable effect on the inner liner splice
Rhenodiv® BP-9095	aqueous emulsion of reactive silicone polymers and emulsifiers	8	white, medium-viscosity liquid	Excellent slippage of the bladder into the green tire, very good release effect after the cure; inner liner splices are not affected because the active ingredient shows no negative separation observed with regular silicone oil
Rhenodiv® BP-9096	aqueous suspension of inorganic pigments, silicone polymers, and emulsifiers	45	black-gray liquid of medium viscosity	Excellent release effect between the tire inner liner and the bladder, prolongs bladder life; the spray pattern is easily recognized in the tire blanks; low consumption and short drying time
Rhenodiv® BP-9098	aqueous suspension of inorganic pigments, silicone polymers, and emulsifiers	54	white liquid of medium viscosity	Very good surface slip and air bleed, high bladder life; the spray pattern is easily recognized in the tire blanks; provides a favorable effect on the inner liner splice



Rhenodiv® BP-286



Rhenodiv® BP-9094/1



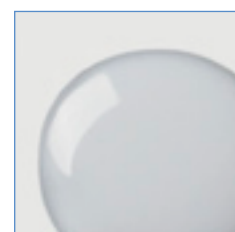
Rhenodiv® BP-9098

Tire Systems: Semi-Permanent Inside Tire Paints

Product	Chemical Composition	Total solids [%]	Appearance/ Supply Form	Application (dosage stated needs to be optimized for every process. Figures mentioned are only rough guidelines.)
Rhenodiv® SP-110	water-based silicone emulsion	10	milky-white liquid	Semi-permanent release agent (frequency 1 : 4 to 1 : 8)
Rhenodiv® SP-112	water-based silicone emulsion	11	milky-white liquid	Semi-permanent release agent (frequency 1 : 4 to 1 : 8)
Rhenodiv® SP-289	aqueous formulation of cross-linkable silicone polymers	50	milky-white liquid	Semi-permanent (frequency 1 : 6 to 1 : 10)/start-up coating/bladder coating; effective release, excellent slip and increased productivity
Rhenodiv® SP-656	water-based silicone emulsion	27	milky-white liquid	Semi-permanent release agent (frequency 1 : 8 to 1 : 30, depending on tire size)
Rhenodiv® SP-2891	aqueous formulation of cross-linkable silicone polymers	26	milky-white liquid	Semi-permanent, lubricating release coat for the tire curing bladder (frequency 1 : 6 to 1 : 10)
Rhenodiv® SP-2893	aqueous formulation of cross-linkable silicone polymers	50	milky-white liquid	Semi-permanent/start-up coating/bladder coating; effective release, excellent slip and increased productivity (frequency 1 : 6 to 1 : 10, depending on the tire size)
Rhenodiv® SP-9700-2	water-based emulsion of silicone polymers	40	white, cloudy suspension	Hydrogen-free semi-permanent release agent (frequency 1 : 4 to 1 : 15)

Tire Systems: Bladder Coating

Product	Chemical Composition	Total solids [%]	Appearance/ Supply Form	Application (dosage stated needs to be optimized for every process. Figures mentioned are only rough guidelines.)
Rhenodiv® BC-638-1	reactive silicone polymers	approx. 16	cloudy solution	Strong adhesion to the bladder; material amount should be: 2 x 35 to 45 g/m ²
Rhenodiv® BC-700-2	water-based emulsion of reactive silicone polymers	approx. 11	white, cloudy suspension	Semi-permanent bladder coating, does not contain any inflammable solvents; 2 to 3 coats (35 to 45 g/m ²) are applied onto the cold bladder
Rhenodiv® BC-750	water-based emulsion of reactive silicone polymers	5	white, cloudy suspension	Semi-permanent bladder coating, does not contain any inflammable solvents; 2 to 3 coats (35 to 45 g/m ²) are applied onto the cold bladder
Rhenodiv® BC-828	water-based silicone emulsion	22	milky-white liquid	High-performance characteristics, high anti-adherent effect avoids adhesion especially during the initial curing cycles of new bladders, allowing an easier release of the tires; material amount should be 20 to 30 g/m ²
Rhenodiv® BC-1069	mixture of different silicones reacting with atmospheric humidity	50	opaque liquid	Basic coating for tire curing bladders, enhances overall lifetime, or helps with the first critical cures of new bladders; material amount should be 35 to 45 g/m ²
Rhenodiv® BC-1090	mixture of different silicones reacting with atmospheric humidity	25	opaque liquid	Basic coating for tire curing bladders, enhances overall lifetime, or helps with the first critical cures of new bladders; material amount should be 75 to 90 g/m ²



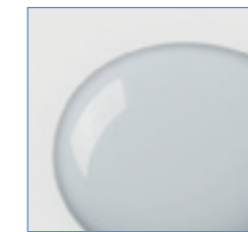
Rhenodiv® BC-700-2

Tire Systems: Finishing and Protection Paints

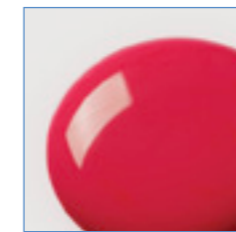
Product	Chemical Composition	Total solids [%]	Appearance/ Supply Form	Application
Rhenodiv® FP-30	polyacrylate compound with filler	24	dark blue	Water-removable paint to protect white tire sidewalls and other cured rubber surfaces; easily removable, not affecting the original color of the rubber compound
Rhenodiv® FP-41	water-based dispersion of polymers, fillers and pigments	25	black liquid	Provides effective masking of small cosmetic touch-up buffing or repairs on cured tires; free of VOC, this is a paint compatible with any type of rubber compound; excellent fixing and covering properties
Rhenodiv® FP-61	SBR compound with mineral filler	20	black liquid	Paint for masking small cosmetic touch-up buffing or repairs on the cured tires, compatible with any type of rubber compound; excellent fixing and covering properties
Rhenodiv® FP-444	solvent-free, silicone-based	28	black liquid	Provides excellent wetting, leveling and spreading on rubber surfaces, little tendency to run during application; dries to a smooth coat, giving the tire a uniform appearance and covers cosmetic defects

Tire Marking Inks

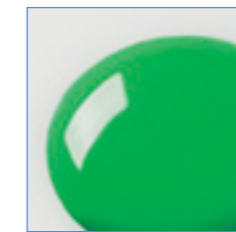
Product	Chemical Composition	Active content [%]	Appearance/ Supply Form	Application
Rhenomark® MP-11, 21, 31, 41, 51, 61, 71, 81, 91	aqueous dispersion with dyes and pigments (white, red, green, blue, yellow, brown, orange, purple, pink)	approx. 55	colored dispersion of medium viscosity	Typically applied after extrusion onto the hot tread of the tire; all colors show a short drying time; after curing very bright appearance of the color stripes; can be applied with all well-established methods, 1.2 kg PE bottles can be directly used onto a BEUGLER striper
Rhenomark® PI-1B, 2B, 3B, 4B, 5B, 6B, 7B, 8B, 9B, 14B	water-based dispersion of organic pigments (white, yellow, red, green, blue, orange, sky blue, pink, brown, violet)	approx. 37	colored dispersion of medium viscosity	Water-based, heavy metals-free identification paints, to be used after extrusion onto the hot tread; the pigments are selected to remain without changes in color after vulcanization; VOC-free; fast drying



Rhenomark® MP-11



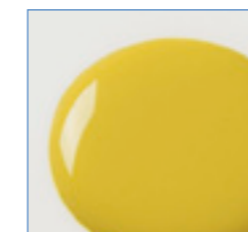
Rhenomark® MP-21



Rhenomark® MP-31



Rhenomark® MP-41



Rhenomark® MP-51



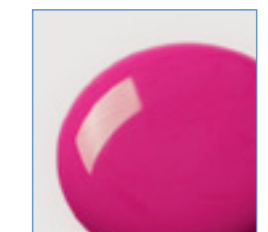
Rhenomark® MP-61



Rhenomark® MP-71



Rhenomark® MP-81



Rhenomark® MP-91

Tire Curing Bladders

Superb Performance. Higher Productivity.

Rhenoshape® curing bladders – together with the comprehensive portfolio of release agents – provide tire manufacturers a one-stop solution for all their needs: Rhein Chemie is the only global player to offer release agents and high-performance curing bladders from a single source. The push for increased productivity in the tire industry has led to shorter tire cure times by higher vulcanization temperatures and diminishing bladder wall gauge. Both factors demand premium-quality high-performance bladders that can withstand these changes and maintain their uniformity.

Rhenoshape® bladders have additional comparative advantages that will provide customers with a more efficient curing process. Our improved design in bladder thickness and our innovative thermally conductive compound formulation offer better heat transfer, which results in shorter curing cycles, consistent uniformity and longer bladder life.

We deliver superior-quality products and services backed with capacious and versatile technical expertise to ensure excellent technical support in the industry. Standard and custom-made products and services are offered to meet specific needs. Bladders can be tailored for specific tire curing applications using Rhein Chemie's innovative compounds.

Pre-treated Bladders

A common problem with new bladders is the adhesion of their surface to the tire. It is standard practice in the industry to apply an arbitrary silicone release agent to reduce this initial tackiness. The first tires cured with these bladders tend to stick to them, shortening bladder life and even pulling them off their clamping, thus increasing overall costs. Rhein Chemie offers semi-permanent and permanent bladder coatings as well as pre-treated bladders. The coatings reduce tire defects and increase overall bladder life, while also eliminating bladder tackiness.

To ensure easy unfolding of the new bladders, all Rhenoshape® bladders are coated on the inside.

Wide Product Range

Rhein Chemie manufactures over 300 different bladder sizes ranging in rim diameter from 4" to 42". These cover industrial, small farm, motorcycle, passenger, light truck, large truck, agriculture and OTR tires being produced with compression and injection molding presses ranging from 36" to 60" width.

The broad product line of Rhenoshape® curing bladders encompassing bias and radial tire applications is offered for Bag-O-Matic, Krupp, NRM/Autoform, Autolok and Kobe presses.

We are constantly developing new sizes and models of bladders to suit the needs of tire manufacturers. Rhein Chemie also produces bladders using customer-supplied molds.

Great Experience for Great Advantages

Rhenoshape® provides various advantages:

Increased productivity in tire curing:

- In terms of longer bladder life ensured by high-quality bladder compound
- In terms of shorter cure cycles

Enhanced appearance in tire finishing:

- By innovative bladder venting design that reduces defects
- By constant quality and uniformity



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