FUCHS Special Applications

RENOCAST

Concrete release agents for the construction industry

LUBRICANTS. TECHNOLOGY. PEOPLE. FUCHS

MOVING YOUR WORLD

FUCHS LUBRICANTS GERMANY

We don't just develop lubricants. For highly complex challenges in a wide range of industries, we develop innovative lubricant solutions that enable the mobility of tomorrow. Our goal: to keep our customers' world in motion. Efficient, sustainable, reliable. Today and tomorrow.

What can we move for you?

FUCHS LUBRICANTS GERMANY

Facts and figures

Company: FUCHS LUBRICANTS GERMANY GmbH, a company of the FUCHS Group

Locations: Mannheim, Kaiserslautern, Kiel and Wedel; approx. 1,400 employees

Product range: A full range of more than 3,000 products for all application areas

Certifications i. a.: ISO 9001, IATF 16949, ISO 14001, ISO 45001, ISO 50001, ISO 21469, HALAL, KOSHER (detailed certifications at www.fuchs.com/de/en)

FUCHS LUBRICANTS GERMANY is a subsidiary of FUCHS SE, the world's largest independent supplier of lubricant solutions. Around 1,400 specialists at all sites work with dedication on innovative lubricant solutions that enable the mobility of tomorrow.

The high level of technical consulting expertise combined with the largest, nationwide network of its own technical contacts makes FUCHS LUBRICANTS GERMANY a reliable local partner. A comprehensive product range, supplemented by digital offerings and Smart Services, as well as many years of lubricant expertise and a high level of research competence are the foundations for the innovative FUCHS lubricant solutions. They reduce wear and energy requirements, extend the running times and service life of machines, and thus keep the world moving - from industrial motors and e-cars to wind turbines and washing machines. FUCHS LUBRICANTS GERMANY is certified to a wide range of standards and, as a technology leader and development partner, places the highest demands on quality management.

Customers in all fields of application and key industries benefit from this commitment to quality. FUCHS makes a significant contribution to promoting sustainability with its climate neutrality strategy. Not only are lubricants manufactured using CO_2-compensated production, but the entire value chain is also considered from a sustainability perspective and is being gradually transformed with a view to a circular economy. FUCHS is also involved in research projects on sustainable raw materials and is working with suppliers and associations to develop certification standards.

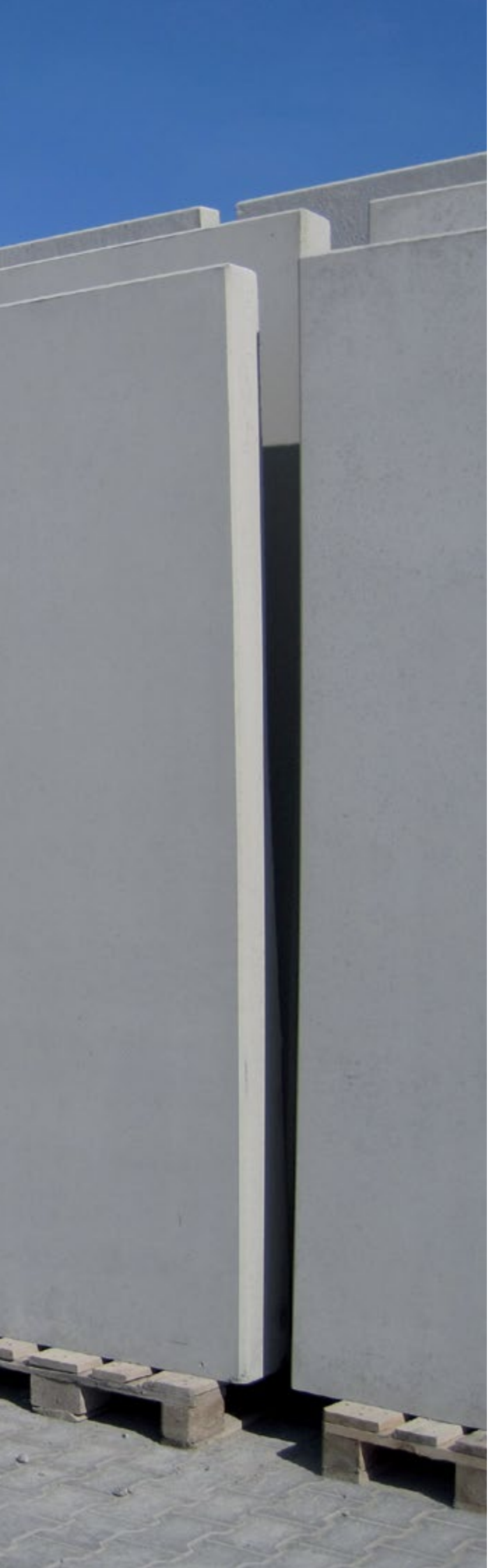
MOVING YOUR WORLD

RENOCAST

THE HIGH-PERFORMANCE BRAND FOR RELEASE AGENTS

High-quality concrete release agents are indispensable where the quality of a concrete surface is concerned. Based on our decades of experience, we have developed our high-performance SOK products in close cooperation with our customers. Today, these concrete release agents are utilised successfully around the world in precast plants as well as in structural and civil engineering. Effective release agents Effective immediately, the products in the SOK range will be marketed under the RENOCAST release agent brand together with the RENOCAST RA concrete release agent range in order to offer you clear guidance, greater transparency, and a globally uniform and clear product structure.

- The formulation of our proven products remains identical
- The unique performance profiles remain unchanged
- One thing remains the same: FUCHS continues to offer you an excellent, comprehensive portfolio of release agents for the concrete industry



Our concrete release agents reliably fulfil all the requirements for modern concrete release agents, such as:

- Easy separation of concrete and formwork
- Concrete surfaces without pores and shrink holes
- Light-colored concrete surfaces without discoloration
- Clean formwork
- Protection of the formwork and easy cleaning
- Temporary protection against corrosion on steel formwork
- Hygienic safety for the user
- Harmlessness for the environment
- Universal applicability
- Cost effectiveness
- Sustainability

The fact that we can provide eco-friendly, alternative water-based products, e.g. our RENOCAST AQUA range, as concrete release agents for almost all applications clearly displays and proves that quality, efficiency and environmental awareness can be reconciled.

Our product range is also constantly evolving through our close cooperation with those people who utilise our products. Continuous dialogue with our customers is important to us. This close cooperation, coupled with our years of experience in the field of release agents, ensures that we can continue to provide ongoing product optimisation for you. In case of sufficient quantities, we will develop concrete release agents for your specific applications and requirements. Please contact us!

The composition of concrete release agents

Concrete release agents consist of a base fluid in which the required additives are dissolved. This base fluid can be mineral oil with and without de-aromatised white spirit, ester/vegetable oil or, in the case of emulsions, water. Fatty acids and/or esters are usually used as separating substances. The fatty acids react chemically with the cations of the "concrete water" to produce metal soaps, which form the "predetermined breaking point" between concrete and formwork following the hardening of the concrete. The often utilised esters are saponified to form fatty acids and alcohol by the highly alkaline concrete (pH value 12.9).
The fatty acids react, as described, with the cations in the "concrete water". The alcohol is built into the cement matrix. Furthermore the concrete release agents contain additives for the minimisation of pores and shrink holes as well as a temporary corrosion protection for steel formwork.

The concrete release agents of the RENOCAST RA range are divided into the following three main groups:

Product	Group 1 Mineral oil basis, partly with solvents	Group 2 Emulsions	Group 3 Ester-oil release agent
Carrier substance	Mineral oils/partly with solvents (approx. 80 to 95%)	Water (approx. 65 to 85%)	Vegetable oils, ester oils (approx. 95 to 99%)
Chemically separating substance	Fatty acids and esters (approx. 2 to 15%)	Fatty acids and esters	Vegetable oils, esters (approx. 95 to 99%)
Additives for minimising pores and shrink holes	yes	yes	yes
Corrosion protection additives	yes	yes	yes
Other additives	-	Emulsifying agents	-

Mineral oil based release agents

Inexpensive release agents, whose technical effectiveness does not usually correspond to the performance of the products used in precast plants, are used for normal requirements in structural and civil engineering. Mineral oil based release agents with solvents are often used in precast plants. The technical requirements in this segment are very high. Corrosion quite often occurs on the steel formwork particularly in the production of ceilings and walls. FUCHS LUBRICANTS GERMANY has developed special concrete release agents with increased corrosion protection.

Ester or vegetable oil based release agents

Sustainable release agents based on ester or vegetable oil are not only suitable for applications in drinking water protection areas, but can also be used in many other areas.

Emulsion based release agents

For reasons of health and safety at work and environmental hygiene, water-based products are increasingly used in precast concrete plants. FUCHS LUBRICANTS GERMANY successfully brought emulsions onto the market years ago under the name RENOCAST AQUA. Intensive and sustained efforts are being made to further expand and promote the portfolio of emulsions under the name RENOCAST AQUA. It goes without saying that the concrete release agents in the RENOCAST RA range from FUCHS LUBRICANTS GERMANY comply with water hazard class 1 (WGK 1) at most and are partially readily biodegradable according to OECD tests.

Photo: Mederer

Instructions for the use and storage of concrete release agents

Application of concrete release agents

Concrete release agents can be used on all common formwork, e.g. steel formwork, plastic-coated wooden formwork, etc. The concrete release agents can be used for horizontal and vertical production processes. The upper limit of the temperature range of the release agents reaches a formwork temperature of about 130 °C, depending on the type. The performance of a release agent depends on the formwork temperature, the process technology and the concrete composition. When applying our ready-to-use concrete release agents, care must be taken that they are always applied thinly and evenly. The formation of drops and puddles on the formwork is to be avoided in every case. If necessary the formwork can be drawn off, for example with a rubber lip, or wiped with a clean cloth or mop.

Following the application of emulsions from the RENOCAST AQUA range, they “break” after a short time. This means that the colour of the release agent film changes from white to light yellow. The film is then oily. Concreting can take place on the emulsion once it has broken. The time required for this is 5 to 15 minutes, depending on the

temperature. With regard to the yield when spraying, the emulsions from FUCHS LUBRICANTS GERMANY behave similarly to solvent-based release agents. In other words, the emulsions are very economical in use.

The release agents are applied using manual spraying devices or stationary spraying systems. In the case of manual spraying devices, consumption values of up to 60 m²/l are possible when using our concrete release agents. Consumption values of up to about 100 m²/l can be achieved in optimally adjusted stationary spraying systems. The important factor is to maintain a spraying pressure of 4 to 6 bar. A proper spray pattern will usually not be generated at a lower pressure.

The selection of suitable spray nozzles is another critical factor for a good spray pattern. In the case of manual spraying devices, for example, the stainless steel nozzle fittings type TPU800067-SS from Spraying Systems Co. have proven themselves with our products in practice.

In the case of stationary spraying systems, nozzles with smaller diameters should always be chosen in accordance with the process conditions. In order to achieve optimum results with our release agents in terms of quality and consumption, it is very important for the spraying systems to be “correctly adjusted”.

If mineral-oil based products not requiring labelling in accordance with the CLP Regulation are utilised, then a higher spraying pressure of approx. 6 to 12 bar is necessary. We recommend nozzles such as the models TPU SS 1,100,067, 1,100,033 SS or SS 800,067 from Spraying Systems Co.

Our expert field representatives will be pleased to advise you on the choice of suitable release agents, pumps and nozzles for the optimization of stationary spraying systems.

Storage

Concrete release agents must always be stored in closed containers under cover and protected from frost and direct sunlight. The release agent containers are to be secured with a collection pan.

Fields of application of concrete release agents

Application areas for concrete release agents based on mineral oil (with and without solvent)
Concrete release agents based on mineral oils with and without solvents are still widely used in precast plants and in structural and civil engineering. These products are universally applicable. Precast plants often utilise solvent-based products for standard formwork to fulfil the high demands on the quality of concrete surfaces (up to exposed concrete class “SB4”) and cleanliness of the formwork. The products containing mineral oil are often also used as immediate demolding release agents. According to the dangerous and hazardous substances regulations, solvent-based products must be labelled.

Your benefits at a glance:

- Application temperature up to 130°C
- Reduce pore and shrink holes formation to a large extent
- Provide clean and homogeneous concrete surfaces
- Contain an effective corrosion protection
- Do not impair the adhesion of plaster, adhesives and paint
- Suitable for use in horizontal and vertical areas

Solvent-based concrete release agents are often utilised in precast plants on all common formwork such as steel


Photo: Otto Knecht GmbH

formwork, coated wooden boards, plastic formwork, etc. Some of these products can be utilised at formwork temperatures of up to 130°C. These products can also occasionally be found in structural engineering when exposed concrete is required.

FUCHS LUBRICANTS GERMANY has created a number of proven release agents which offer very high corrosion protection for steel formwork.

Inexpensive products based on spindle oil are utilised in structural and civil engineering for normal applications. The products, which are formulated for structural and civil engineering, exceed the technical requirements in those areas.

Application areas for concrete release agents based on ester oil

Products based on ester oil, which also include vegetable oils, are becoming more and more important for environmental reasons and are increasingly used for the production of precast concrete elements. These products can currently be found in various areas of application, such as ceiling and wall production, the use of spun concrete or for immediate demolding.

FUCHS LUBRICANTS GERMANY has developed RENOCAST RA 3107, RENOCAST RA 3105 and RENOCAST RA 3911 for requirements of this kind.

Some of our concrete release agents have also been awarded the EU Ecolabel, which is a well-known label for the use of eco-friendly products, especially with environmental authorities and in the context of environmental audits.

Emulsion-based concrete release agents

Emulsions which are utilised as concrete release agents are the latest product generation. The emulsions can be used in precast plants on all standard formwork such as steel formwork, plastic-coated wooden formwork etc. Compared with solvent-based concrete release agents, emulsions have distinct advantages thanks to their handling and application. Emulsions from the RENOCAST AQUA range are non-flammable and virtually odourless during spraying. The effects of the RENOCAST AQUA products in terms of concrete technology correspond in most cases to the concrete release agents containing solvents. The user therefore obtains flawless exposed concrete surfaces that are free of pores, shrink holes and stains. The concrete surfaces are bright and smooth. Furthermore, the formwork can be easily cleaned without too much effort.

FUCHS LUBRICANTS GERMANY has successfully managed to integrate a demonstrably increased corrosion protection in some products, for example, RENOCAST RA 4830 AQUA for utilisation on corrodible steel formwork.

Your benefits at a glance

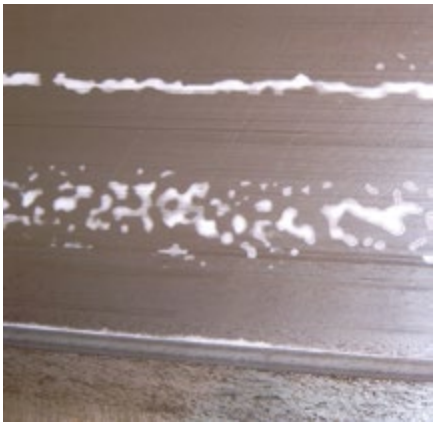
- Application temperature up to 70 °C (formwork temperature)
- Largely prevent pore formation
- Provide clean and uniform surfaces
- Contain very effective corrosion protection for steel formwork
- Do not impair the adhesion of plaster, adhesives or paint
- Suitable for use in horizontal and vertical areas
- Non-flammable
- Almost odourless in the applicatio
- Easily biodegradability

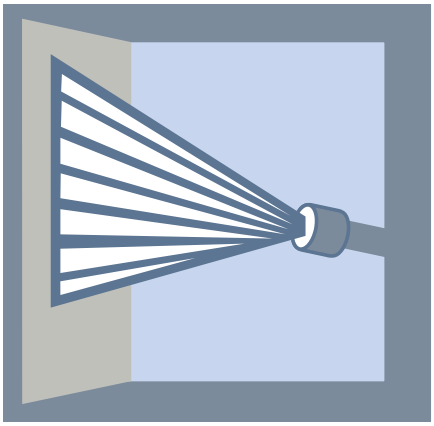
Application areas for emulsions

Emulsions can be utilised for horizontal and vertical production processes in precast part production. The temperature application range of the emulsion release agents is generally between room temperature and 70°C for the temperature of the formwork. The performance, as well as the maximum application temperature for an emulsion, depends on the process engineering and the concrete composition. Special, rain-resistant emulsion types are necessary for the structural and civil engineering sector. They have also been developed by FUCHS LUBRICANTS GERMANY, e.g. in the product RENOCAST RA 4090 AQUA.

Storage of emulsions

Emulsions must generally be stored under cover, protected from frost and direct sunlight. The products from FUCHS LUBRICANTS GERMANY are designed so that they will still be liquid at -5°C. However, if an emulsion freezes accidentally in winter, then it is ready to be used again after thawing and stirring.





The composition of emulsions

An emulsion is a mixture of finely distributed water and oil. The oil hereby forms very small droplets that "float" in the aqueous phase. For the production process and for the prevention of phase separation, the emulsions also include special tensides, referred to as emulsifiers. In addition to the emulsifiers, the release agents also contain additional components such as corrosion protection additives and stabilisers. An "oil-in-water emulsion" (“O/W” emulsion) is the usual choice for concrete release agents. The O/W emulsions are comparable to solvent-based concrete release agents due to their low viscosity and can be very finely applied to the formwork.

Functional principle of emulsions

If the "milk-coloured" emulsion is sprayed onto the formwork, then the emulsion will "break" after a short time. This means that the intended separation to the oil and water phase occurs. In this process, the oil phase with the active ingredients forms as a film on the formwork. The water from the emulsion floats on the oil layer and evaporates as defined. At this point in time, the oil phase remaining on the formwork has a clear appearance. The breaking of the emulsion is highly dependent on the temperature. The lower the ambient temperature, the longer the process takes. The concrete can be poured into the formwork after the breaking of the emulsion.

Benefits of emulsions in terms of safety

Compared to solvent-based release agents, RENOCAST AQUA products are subject to significantly lower demands for handling and storage when complying with regulations. Since the products of the RENOCAST AQUA range range do not present any appreciable risk to the employees, the containers may be stored in the production hall. Concrete release agent containers are to be secured with a collecting pan.

Product and application overview of our concrete release agents*

Concrete release agents for precast plants on the basis of aqueous emulsions

Product	Preferred application	Comment
RENOCAST RA 5502 AQUA	Walls, ceilings and slabs	Suitable for sustainability projects (e.g. fulfills quality level 4 requirements of the German Sustainable Building Council)
RENOCAST RA 5055 AQUA (Former: SOK AQUA 55 ES)	Garages, L-stones, beams, ceilings and walls	Mineral oil-free emulsion especially for use with high hydration heat development or heated formwork
RENOCAST RA 4090 AQUA (Former: SOK AQUA G PLUS)	Large pipes, concrete sleepers, manholes, ceilings, walls	Provides for particularly good concrete surfaces
RENOCAST RA 4470 AQUA (Former: SOK AQUA HF)	Beams, trusses, ceilings and walls	Emulsion containing mineral oil especially for use with high hydration heat development
RENOCAST RA 4830 AQUA (Former: SOK AQUA KS)	Ceilings, walls, concrete sleepers	Emulsion with enhanced corrosion protection for steel formwork
RENOCAST RA 5001 AQUA (Former: SOK AQUA TB 1)	Tubbings, filigree concrete slabs	Mineral oil and solvent-free release agent for very good concrete surfaces
RENOCAST RA 5075 AQUA (Former: SOK AQUA Z PLUS)	Precast slabs with in-situ topping, solid slabs and walls	Mineral oil-free emulsion with strong separating effect

Concrete release agents for precast plants

Product	Preferred application	Comment
RENOCAST RA 1270 (Former: SOK ULTRA)	Vertical productions, e.g. beams, trusses etc.	Usable up to a formwork temperature of 130 °C
RENOCAST RA 1280 (Former: SOK 128)	Beams, trusses, TT-slabs, SCC	Universal release agent for precast plants
RENOCAST RA 1290 (Former: SOK 912)	Beams, ceilings, walls	Higher release effect than SOK 128
RENOCAST RA 1470 (Former: SOK BTM UP/4)	Ceilings, walls, beams, trusses, SCC	Almost odourless during application; especially suitable for pigmented concrete
RENOCAST RA 3107 (Former: SOK ECO 107)	Ceilings, walls, beams	Mineral oil and solvent-free release agent; EU Ecolabel certified
RENOCAST RA 3911 (Former: SOK ECO 911)	Concrete sleepers, spun concrete, walls	Based on native raw materials
RENOCAST RA 2360 (Former: SOK STG)	Considerably heated garage formwork	Odourless during application; no labelling

Concrete release agents for precast plants with enhanced corrosion protection

Product	Preferred application	Comment
RENOCAST RA 1273 (Former: SOK U/K 105)	Ceilings, walls	Release agent with very good corrosion protection for steel formwork
RENOCAST RA 1276 (Former: SOK U/K 115)	Ceilings, walls	Trouble-shooter for solving acute rust problems with very strong corrosion protection
RENOCAST RA 1293 (Former: SOK 2/K 105)	Ceilings, walls	Slightly better release effect and more oily than SOK U/K105

Concrete release agent for block manufacturing

Product	Preferred application	Comment
RENOCAST RA 5100 C (Former: SOK AQUA 100)	Curb stones, paving slabs and paving stones	Individually and flexibly mixable emulsion concentrate based on renewable raw materials; suitable for all applications in stone production
RENOCAST RA 4470 AQUA (Former: SOK AQUA HF)	Curb stones and paving slabs	Economical ready-for-use emulsion with high release effect.
RENOCAST RA 4090 AQUA (Former: SOK AQUA G PLUS)	Curb stones and paving slabs	Ready-for-use emulsion with very high release effect.

Concrete release agents for immediate demolding

Product	Preferred application	Comment
RENOCAST RA 2520 (Former: SOK BTM HU 2)	Slatted floors, gardening and landscaping	Usable up to a water/cement ratio of < 0.41
RENOCAST RA 2530 (Former: SOK BTM HU 3)	Concrete sleepers, slatted floors, gardening and landscaping	Universally usable immediate demolding release agent
RENOCAST RA 2590 (Former: SOK HU2-E)	Gardening and landscaping, concrete sleepers, slatted floors	Almost odourless during application
RENOCAST RA 3210 (Former: SOK HU ECO)	Cable ducts, concrete sleepers, slatted floors	Mineral oil and solvent-free release agent based on esters; no labelling

Concrete release agents for structural and civil engineering

Product	Preferred application	Comment
RENOCAST RA 5502 AQUA	Cast-in-place ceilings, walls and columns	Suitable for sustainability projects (e.g. fulfills quality level 4 requirements of the German Sustainable Building Council)
RENOCAST RA 5100 C (Former: SOK AQUA 100)	Cast-in-place ceilings, walls and columns	Efficient emulsion concentrate based on renewable raw materials
RENOCAST RA 4005 C (Former SOK C 5)	Cast-in-place ceilings, walls and columns	Particularly economical and water-free concentrate based on mineral oil
RENOCAST RA 2350 (Former: SOK BTM E)	Cast-in-place ceilings, walls and columns	Universal release agent
RENOCAST RA 4090 AQUA (Former: SOK AQUA G PLUS)	Cast-in-place ceilings, walls and columns	Rain-resistant emulsion
RENOCAST RA 3105 (Former: PLANTO SCHALUNGSOEL N)	Cast-in-place ceilings, walls and columns	Mineral oil and solvent-free release agent; EU Ecolabel certified
RENOCAST RA 1280 (Former: SOK 128)	Cast-in-place ceilings, walls and columns	For the production of exposed concrete and SCC
RENOCAST RA 2072 (Former: SOK 72 S)	Bridges, exposed concrete with board structure	Special release agent for unplaned wooden formwork

Release agents for special applications

Product	Preferred application	Comment
RENOCAST RA 3840 (Former: SOK MULTITRENN)	Release agent for polystyrene foam in wall and ceiling production and for special applications	Blue-coloured release agent based on ester oil; no labelling
RENOCAST RA 2650 WAX (Former: SOK WAX 1)	For geometrically complex formwork (e.g. chamfer strips, undercuts)	Pasty formwork wax based on mineral oil
RENOCAST RA 3670 WAX (Former: SOK WAX ECO)	For geometrically complex formwork	Pasty formwork wax; free of mineral oil and solvent
RENOCAST RA 2740 (Former: SOK MT)	Pipe production	Release agent for bottom pallets
RENOCAST V 9020 (Former: SOK GM)	Smoothing aid for fresh concrete surfaces	Also suitable for SCC, ECC and UHPC; reduces crack formation and efflorescence

* This is only an extract from our release agent portfolio and general recommendations for use.
We are happy to advise you on finding the release agent that is best suited for your application.

FUCHS LUBRICANTS GERMANY

Every release agent application needs experienced advice

Every use of release agents should be preceded by comprehensive advice on the respective application. Only in this way can the desired result be achieved. Our experienced engineers will not only give advice on the application, but will also be pleased to inform you about our complete range of products.

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