

SASOL

# Industrial Waxes

## Rubber & Tire

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Sasol Performance Chemicals



## About us

Sasol's Performance Chemicals business unit markets a broad portfolio of organic and inorganic commodity and speciality chemicals. Our business employs about 1300 people in four key business divisions: Organics, Inorganics, Wax and PCASG (Phenolics, Carbon, Ammonia and Speciality Gases). Our offices in 18 countries serve customers around the world with a multi-faceted portfolio of state-of-the-art chemical products and solutions for a wide range of applications and industries.

Our key products include surfactants, surfactant intermediates, fatty alcohols, linear alkyl benzene (LAB), short-chain linear alpha olefins, ethylene, petrolatum, paraffin waxes, synthetic waxes, cresylic acids, high-quality carbon solutions as well as high-purity and ultra-high-purity alumina. Our speciality gases sub-division supplies its customers with high-quality ammonia, hydrogen and CO<sub>2</sub> as well as liquid nitrogen, liquid argon, krypton and xenon gases.

Our products are as individual as the industrial applications they serve, with tailor-made solutions creating real business value for customers. Ongoing research activities result in a continuous stream of innovative product concepts that help our customers position themselves successfully in future markets.

Our products are used in countless applications in our daily lives to add value, security and comfort. Typical examples include detergents, cleaning agents, personal care, construction, paints and coatings, leather and metal processing, hot-melt adhesives, bitumen modification and catalyst support for automotive catalysts and other diverse specialty applications including oil and gas recovery, aroma production, plastic stabilisation, and polymer production. Every day, our researchers explore ways to improve our products and develop innovations that improve the quality of people's lives.



## At a glance

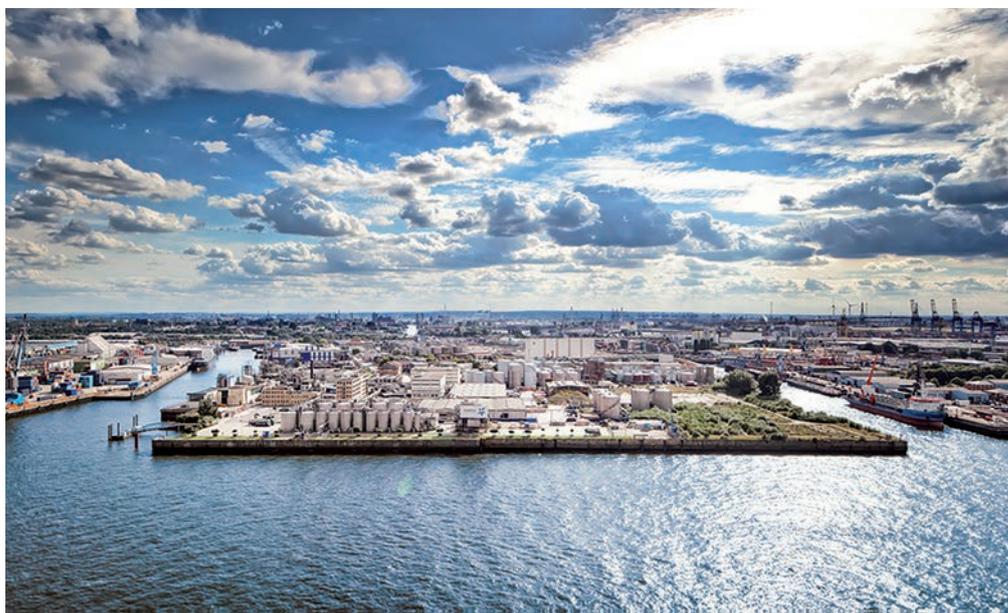
The Wax Division of Sasol Performance Chemicals is the leading specialist in innovative wax technology.

For many decades the Wax Division of Sasol Performance Chemicals has focussed on the development and sales of paraffin waxes, micro waxes, synthetic waxes and blends or emulsions thereof. Today we serve different industries like inks, paints & coatings, rubber & tire, paper & packaging, textiles, cosmetics as well as road construction, candles and many others.

Micro and macro crystalline waxes are renowned for a wide range of possible applications. Their use ranges from rather simple applications to process oriented tailor-made blends for state of the art production equipment. Specialties are created for innovative solutions.

Refined paraffin waxes are blends of saturated hydrocarbons, purified by modern, environmental friendly technologies. All our products are constantly monitored by a stringent quality control system and are nontoxic. Their environmental properties are characterized by good biodegradability and non-cumulative effects.

## Wax solutions for every process.



## Paraffin Waxes in the rubber and tire industry

The greatest naturally occurring threats to tires and all other synthetic and natural rubbers are ozone and ultraviolet (UV) light. Ozone is an odorless gas and part of the atmosphere. Highest levels are found in cities and industrialized centers.

For ozone protection manufacturers add waxes to their compounds at common dose rates between 1 and 3 phr. During operation the tire bends and flexes. This activates the migration of the antiozonant wax to the surface of the tire forming a thin, protective wax film. This migration intensifies with increasing temperature. Ozone attack on rubber compounds occurs in a temperature range between 0 °C and 55 °C. Below this temperature range the ozone does not have a high enough activation energy to react with the rubber. Above it ozone levels in the atmosphere decrease to minimal levels.

Antiozonant waxes are complex and thoroughly designed blends. They consist of unbranched straight chain n-paraffins as well as branched iso-paraffins of different chain length. Compared to iso-paraffins n-paraffins with a similar number of carbon atoms have a greater migration tendency. Generally the 'solubility' of antiozonant waxes in rubber increases with decreasing molecular weight (carbon atom number). Paraffin waxes with high n-paraffin content provide rapid protection for newly produced goods. Micro waxes especially with high molecular weight iso-paraffins guarantee slow release and long lasting protection.

Antiozonant waxes with a high micro wax content are used e. g. for tire sidewall protection. Additionally antiozonant waxes may act as a transport medium for other antiozonants and antioxidants (like amines and phenolic derivatives).

UV light protection of rubber goods is preferably achieved by the addition of carbon black. This gives tires the typical colour. Also some high performance chemical UV absorbers are used. UV stabilizers are generally used up while they perform their function. Tires turn from black to grey while the carbon black is loosing its function and the degradation of the rubber material takes place. This makes the rubber turn brittle and leads to the formation of cracks.



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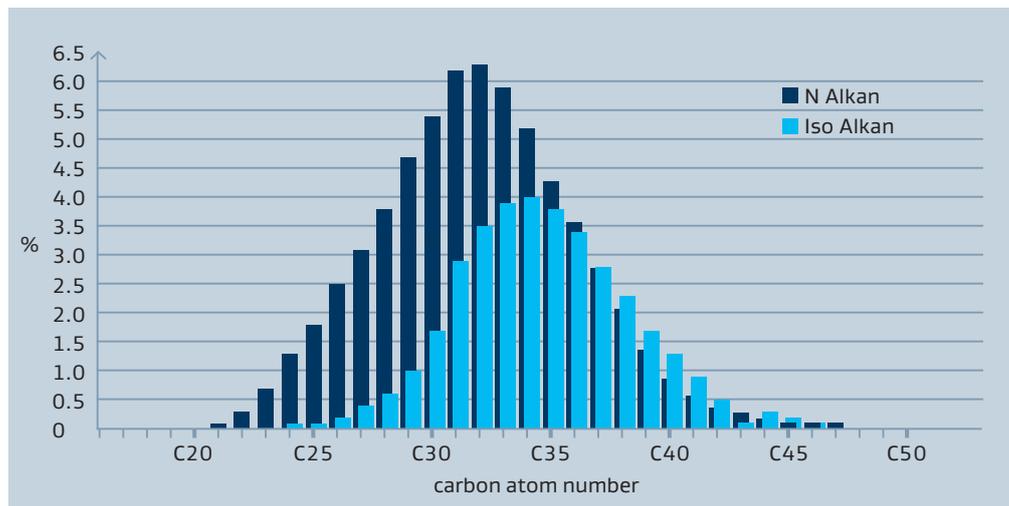
# Technical Data

## VARAZON 5998

**VARAZON 5998** is the tire industries first choice when it comes to ozone protection. Especially in a temperature range of 10-50 °C the protection against ozone attack is outstanding. Additionally with its fine balance between straight and iso components an excellent migration behaviour is achieved. This ensures the formation of a thin layer of wax on the surface of the tire. Quick acting and long lasting. **VARAZON 5998** features UV-protection and good processability as well as anti blocking behaviour.

	Congeeing Point [°C]	Penetration at 25°C [1/10 mm]	n-paraffin Content [%]	C max	Color
<b>VARAZON 5998</b>	64 - 68	14 - 19	60 - 70	30 - 32	White

Typical Gas Chromatogram of VARAZON 5998



Besides that **Sasol Performance Chemicals** produces a wide variety of different products for the rubber and tire industry. All of these waxes combine the finest properties in their function as anti ozonants, mould release agents, plasticizers and lubricants. Additionally **Sasol** is able to blend waxes according to the special needs of our customers.

	Congeeing Point [°C]	Penetration at 25°C [1/10 mm]	n-paraffin Content [%]	C max	Color
<b>VARAZON 5138</b>	64 - 68	14 - 20	56 - 64	30 - 32	White
<b>VARAZON 4959</b>	63 - 69	16 - 21	55 - 74	31 - 33	Blue
<b>VARAZON 6066</b>	61 - 67	14 - 20	65 - 75	30 - 32	Yellowish
<b>VARAZON 0299</b>	60 - 62	50 - 60	42 - 50	30 - 33	Yellowish
<b>VARAZON 2396</b>	60 - 62	15 - 17	70 - 80	28 - 30	White
<b>VARAZON 8080</b>	70 - 74		37 - 53	36 - 38	Brown
<b>VARAZON 6403</b>	62 - 66	16 - 22			White
<b>VARAZON 6050</b>	59 - 61	55 - 65			White
<b>VARAZON 5605</b>	54 - 56	20 - 24			White

## Synthetic waxes from Sasol Wax

Up to now anti ozonant waxes are typically petroleum based waxes. They are used to minimize cracking in tires by protecting the polymeric back bone of the rubber against ozone attack. Usually anti ozonant waxes are blended from intermediate waxes, paraffin and micro crystalline waxes to specification. Their iso alkane content may vary between twenty and sixty percent. Depending on the congealing point and the iso alkane content of the wax, blooming is more or less intense.

From now on synthetic anti ozonant waxes are also available from Sasol Performance Chemicals. They are produced by synthesis from either natural gas or coal gasification products and may be blended with petroleum based waxes to gain specific properties. A variety of products have been composed with materials available at present as well as potentially available in the future. Their properties are comparable to traditional anti ozonant waxes made from petroleum based raw materials. Their performance has been confirmed independently by laboratory tests as well as industrial usage.

### New products are now available for testing:

- **VARAZON 9300** a fully synthetic wax
- **VARAZON 9302** a blend of a synthetic wax and a petro based wax
- **VARAZON 9304** a blend of a synthetic wax and a petro based wax

### Physical properties

	Congealing Point [°C]	Penetration at 25°C [1/10 mm]	Penetration at 40°C [1/10 mm]	Viscosity at 100°C [mm <sup>2</sup> /s]
VARAZON 9300	63	16	60	4.9
VARAZON 9302	65	17	51	6.5
VARAZON 9304	60	58		6.1

All tested materials performed similarly well. With the current results at hand all combinations of synthetic wax intermediates with petro based components proofed to be suitable as anti ozonant waxes in the rubber industry.



**SASOL**

## Sasol Performance Chemicals

### Wax Division

Worthdamm 13–27  
20457 Hamburg, Germany

industrial.waxes@de.sasol.com

### Global Contacts

<b>Europe</b>	+49 40 78115 0	wax@de.sasol.com
<b>North America</b>	+1 510 232 8704	wax@us.sasol.com
<b>Latin America</b>	+55 11 4612 8199	wax@us.sasol.com
	+55 11 2898 9768	
<b>Asia-Pacific</b>	+86 21 22 180581	wax@ap.sasol.com
<b>Middle East</b>	+20 3 420 52 10	wax@alexandria-wax.com
<b>Africa</b>	+27 16 960 2088	sasol.wax@sasol.com

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