



# Struktol® TACKIFIERS AND ANTIMISTING ADDITIVES FOR LUBRICANTS

THE Struktol® TACKIFIERS AND ANTIMISTING ADDITIVES FOR LUBRICANTS ARE BASED ON HIGH MOLECULAR WEIGHT POLYISOBUTYLENE (PIB) CHAINS DISSOLVED IN DIFFERENT BASE OILS. THEY ALL CONFER TACK AND STRINGINESS TO LUBRICANTS AND ARE RECOMMENDED TO PROVIDE ADHERENCE IN SLIDWAY OILS AND CHAIN LUBRICANTS, STRINGINESS IN GREASES AND AEROSOL MIST REDUCTION RESISTANCE IN HIGH SPEED AND PNEUMATIC SYSTEM LUBRICANTS.

## AVAILABLE PRODUCTS

Product Name	Appearance	Density at 15°C	Dynamic Viscosity	Flash point	Packaging	Recommended dosage	Minimum storage stability	
Struktol® AM	viscous, pale yellow liquid	870 kg/m <sup>3</sup>	1500 mPa*s at 70°C	> 180°C	170 kg drums	1.0 – 2.0%	24 months	
Struktol® BA	highly viscous, brownish liquid	915 kg/m <sup>3</sup>	23000 mPa*s at 40°C	> 240°C	180 kg drums	≈ 5.0%	24 months	Biodegradable (OECD301B)
Struktol® C	viscous, brownish liquid	910 kg/m <sup>3</sup>	5500 mPa*s at 70°C	> 200°C	180 kg drums	0.1 – 1.0%	24 months	
Struktol® H	viscous, colourless to pale yellowish liquid	860 kg/m <sup>3</sup>	4000 mPa*s at 70°C	> 200°C	170 kg drums 800 kg container	0.2 – 3.0%	12 months	Food grade application
Struktol® M	viscous, brownish liquid	900 kg/m <sup>3</sup>	750 mPa*s at 70°C	> 190°C	180 kg drums	0.5 – 5.0%	12 months	
Struktol® S	viscous, brownish liquid	900 kg/m <sup>3</sup>	750 mPa*s at 70°C	> 190°C	180 kg drums	0.5 – 5.0%	24 months	

## TACKIFIERS

Tackifiers, or tackiness agents, are added to lubricant oils which are subject to fly-off loss during usage. The tacky effect results from a dissolved high molecular weight polymer, giving the oil modified rheological behaviour already at low concentration, leading to smaller oil losses. Apart from a higher viscosity the effect of a tackifier on oil can be recognized by the so-called stringiness.

A limited stringiness may occur as a result of a very high viscosity. A tackifier enhances the stringiness by changing the rheological properties. Due to the high molecular mass and long chain length, the molecules interact with each other even at small concentrations. At high shear rates the rheological properties of the given oil tend to a viscoelastic solid state, which can be demonstrated best with the tackifier itself.

If a glass rod touches the oil surface and is moved upwards, an oil thread is formed, which causes a slight bulging of the surrounding surface through force transmission. If the rod moves very rapidly, the thread may break like a rubber thread. The thread can be wound up by turning the rod; a thin thread may become thicker with more material following.

When stirring oil containing a tackifier no funnel is formed, but the oil moves up the stirrer shaft (Weissenberg effect).

The effect of a tackifier is based on these properties. On the one hand the increased viscosity of the oil decreases the oil spilling from moving parts, however the viscoelastic rheological behaviour reduces the formation of oil drops even more, and already disintegrating oil parts rejoin the oil film again. If some oil flies away it does not do so as small and far reaching oil drops, but as thin oil threads having a much shorter range of travel, which leads to a much lower contamination of the surrounding working area.

**The movement of the lubricated parts in tangential direction and the shear forces cause viscoelastic behaviour of the lubricant, which resists the centrifugal force.**

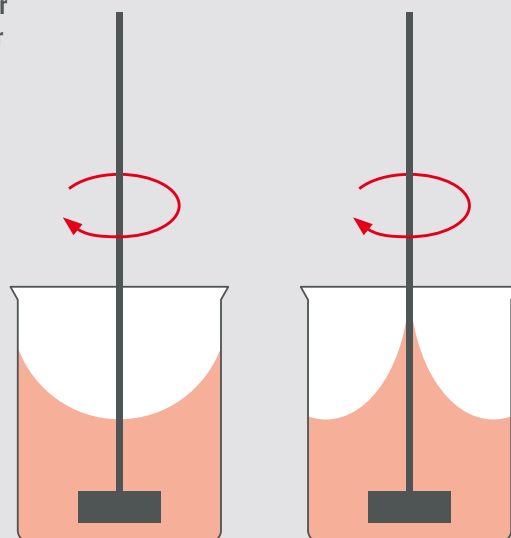


Figure 1

## INCORPORATION

Prior to blending tackifiers into oil the drums should be placed in a heating chamber for several hours for a better product flow. The optimum temperature is between 50 – 70°C. Extended exposure at higher temperatures should be avoided due to the possible oxidative degradation.

The incorporation of tackifiers into the base oil should be done within the 50 – 70°C range. The stirrer speed should be not too high, since the additive is very sensitive to shearing due to its long molecule chains. When the molecular chains are broken down mechanically, the molecular mass reduction will cause a considerable loss in tackiness.

For the same reason any recirculation should be avoided or reduced to a technological minimum.

## FILTERABILITY

Problems may occur during filtration due to the high filter resistance caused by increased viscosity, but the filtration process also produces high shear rates inside the filter and leads to a mechanical breakdown and loss of tackiness. Figure 2 shows the rapid loss of stringiness after repeated filtration of oil through a pressure filter.

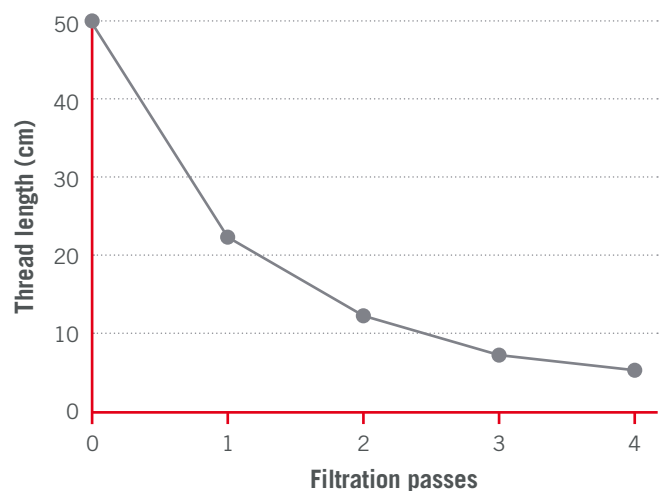


Figure 2

A separation of the polymer from the oil caused by the filter is very unlikely at normal pore sizes.



## STRINGINESS MEASUREMENT

This is a short description of the Schill+Seilacher in-house measuring device for stringiness:

A metallic cylinder (6) is put on the oil surface and then moved upwards at a speed of 6 cm/s. The forming oil thread (7) has to be observed visually and at the moment of rupture the position of the cylinder is fixed by means of a scale of length in the background.

A standard stirrer drive (1) can be used as a motor. The lifting speed is regulated by changing the stirring speed of the stirrer drive. The cord runs through a bent pipe (2). The scale of length (3) should be as close to the oil thread as possible in order to ensure a proper reading. A black colour for better visibility of the oil thread is preferred. The sample (4) should be placed onto an adjustable table (5).

Threads from 5 to 30 cm can be easily measured; outside this range the reproducibility is inadequate.

The stringiness depends on the chemical nature and the molecular mass of the additive, its concentration, the base oil viscosity and the temperature. It is also a function of the chemical nature of the base oil. Moving air in the vicinity of the test apparatus may influence the measurement and should be avoided.

Three different paraffin based oils were used to demonstrate the influence of additive concentration on the viscosity and the stringiness. The higher the viscosity of base oil the less tackiness agent is needed to reach a certain level of stringiness [Figure 4]. The graphs also give a rough idea about the activity of our standard grades Struktol® M and Struktol® C.

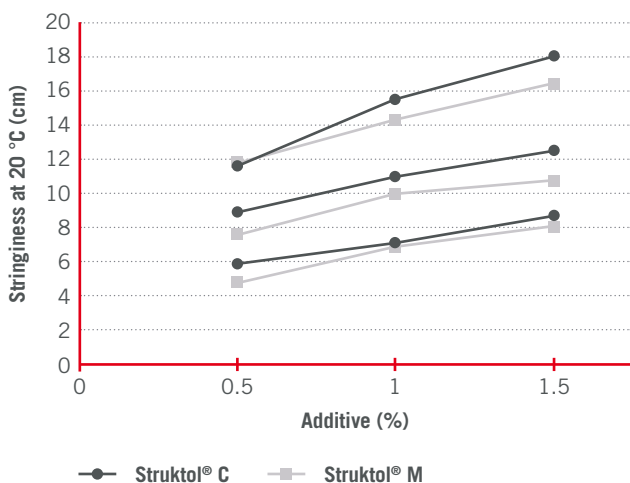


Figure 4

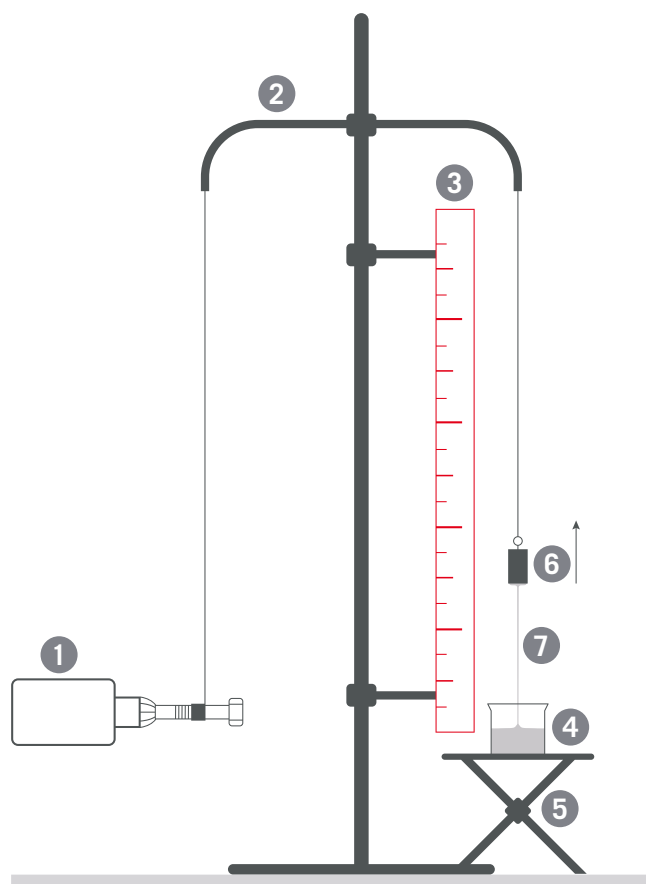


Figure 3

The addition of tackiness agents increases the viscosity of base fluids [Figure 5]. In this case the kinematic viscosity at 40 °C (DIN 51562 – Ubbelohde viscosimeter) was measured.

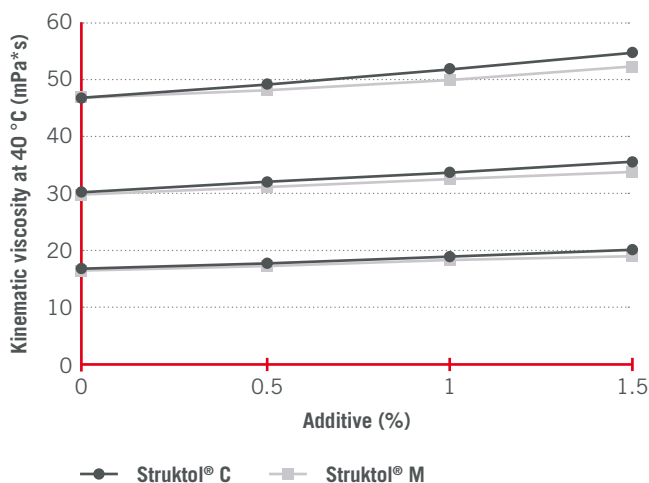


Figure 5

## CHAIN SAW OILS

Chain saw oils are traditionally produced mainly with mineral oils, but due to the increasing environmental concerns rape seed oil becomes a more preferred alternative.

Struktol® C and Struktol® M can be used for mineral oil based chain saw oils. Both products are based on polyisobutene. Struktol® C is a concentrated version of Struktol® M and requires a longer incorporation time.

The dosages vary between 0.5 to 5 % depending on the base oil viscosity, the mixing conditions and the intended effect.

Rape seed oil and other vegetable oils require additives having other solubility characteristics. Here we offer Struktol® BA based on a natural rubber polymer dissolved in rape seed oil. It is biodegradable and can be used for environmentally friendly chain saw oils.

Due to the unsaturated polymer Struktol® BA is more sensitive to high temperatures and should not be heated above 70 °C.

The preferred dosage is approx. 5%.

Struktol® BA does not improve the low temperature behaviour of vegetable oils, thus an additional additive is necessary. An antioxidant should also be added to avoid rapid resinification of oil residues on the chain saw and operator clothing.

## OTHER APPLICATIONS

1. Mould oils
2. Slideway oils
3. Spinning preparations
4. Greases

The base oil of Struktol® H meets the requirements of the European Pharmacopoeia III, 2001, and the US FDA CFR §172.878, §178.3620(a). Due to its colourless appearance, the product is well suited for application in spinning finishes in the textile industry and in lubricants for food processing machines.

## ANTI-MISTING ADDITIVES

During metal working, oil mists may form due to high tool speeds. This can lead to poor working conditions. In order to minimize the formation of oil mists, special additives can be added to the oil. These additives should not be toxic and must have a certain shear stability to withstand the long service time of metal working fluids.

Anti-mist additives also contain polymers, but with a much lower molecular weight, offering a considerably better shear stability compared to tackifiers. The mechanism of the oil mist prevention is close to that of the reduction of oil droplets provided by a tackifier, but takes place at much higher shear speed requiring polymers with shorter chain length.

The anti-mist additive Struktol® AM should be added at a concentration of 1 – 2 %. It has a good solubility in metal working fluids based on mineral oils. However, it is not recommended for usage in water or synthetic ester based metal working fluids.

### DISCLAIMER

This publication is not a specification and does not contain any instruction manual or operating guidelines. It is provided for information purposes only and without any responsibility. Schill+Seilacher makes no representations about the accuracy, reliability or completeness of the information in this publication. We reserve the right to revise our not specified products and the information at any time without notice. The information in this publication is based on the present state of our knowledge and experience and serves the general description of our products and their possible applications. Our technical advice and recommendations, whether verbal, in writing or by way of trials, do not absolve the recipient, on account of the many outside influences which may affect the product use and application, from their own testing and trials. A legally binding assurance based on the information contained herein regarding particular properties or the suitability for definite customer applications cannot be derived from our information.

In accordance with the provisions of our General Terms and Conditions of Sale and Delivery, which can be accessed under <https://struktol.de> Schill+Seilacher excludes liability for slightly negligent breaches of obligations arising from the use of the information contained in this publication, provided that they do not relate to damage from injury to life, limb or health or guarantees or claims under the Product Liability Act are affected. Furthermore, the liability for the breach of obligations, the fulfilment of which is essential for the proper execution of the contract and on the observance of which the customer may regularly rely, remains unaffected. The same applies to breaches of duty by our agents.

Please contact our  
TAD-Team at  
[info@struktol.de](mailto:info@struktol.de)



[www.struktol.de](http://www.struktol.de)



# Struktol® TACKIFIERS AND ANTIMISTING ADDITIVES FOR LUBRICANTS

THE Struktol® TACKIFIERS AND ANTIMISTING ADDITIVES FOR LUBRICANTS ARE BASED ON HIGH MOLECULAR WEIGHT POLYISOBUTYLENE (PIB) CHAINS DISSOLVED IN DIFFERENT BASE OILS. THEY ALL CONFER TACK AND STRINGINESS TO LUBRICANTS AND ARE RECOMMENDED TO PROVIDE ADHERENCE IN SLIDWAY OILS AND CHAIN LUBRICANTS, STRINGINESS IN GREASES AND AEROSOL RESISTANCE IN MIST AND PNEUMATIC SYSTEM LUBRICANTS.

## AVAILABLE PRODUCTS

Product Name	Appearance	Density at 15°C	Dynamic Viscosity	Flash point	Packaging	Recommended dosage	Minimum storage stability	
Struktol® AM	viscous, pale yellow liquid	870 kg/m <sup>3</sup>	1500 mPa*s at 70°C	> 180 °C	170 kg drums	1.0 – 2.0%	24 months	
Struktol® BA	highly viscous, brownish liquid	915 kg/m <sup>3</sup>	23000 mPa*s at 40°C	> 240 °C	180 kg drums	≈ 5.0%	24 months	Biodegradable (OECD301B)
Struktol® C	viscous, brownish liquid	910 kg/m <sup>3</sup>	5500 mPa*s at 70°C	> 200 °C	180 kg drums	0.1 – 1.0%	24 months	
Struktol® H	viscous, colourless to pale yellowish liquid	860 kg/m <sup>3</sup>	4000 mPa*s at 70°C	> 200 °C	170 kg drums 800 kg container	0.2 – 3.0%	12 months	Food grade application
Struktol® M	viscous, brownish liquid	900 kg/m <sup>3</sup>	750 mPa*s at 70°C	> 190 °C	180 kg drums	0.5 – 5.0%	12 months	
Struktol® S	viscous, brownish liquid	900 kg/m <sup>3</sup>	750 mPa*s at 70°C	> 190 °C	180 kg drums	0.5 – 5.0%	24 months	



# DISCLAIMER

This publication is not a specification and does not contain any instruction manual or operating guidelines. It is provided for information purposes only and without any responsibility. Schill+Seilacher makes no representations about the accuracy, reliability or completeness of the information in this publication. We reserve the right to revise our not specified products and the information at any time without notice. The information in this publication is based on the present state of our knowledge and experience and serves the general description of our products and their possible applications. Our technical advice and recommendations, whether verbal, in writing or by way of trials, do not absolve the recipient, on account of the many outside influences which may affect the product use and application, from their own testing and trials. A legally binding assurance based on

the information contained herein regarding particular properties or the suitability for definite customer applications cannot be derived from our information. In accordance with the provisions of our General Terms and Conditions of Sale and Delivery, which can be accessed under <https://struktol.de> Schill+Seilacher excludes liability for slightly negligent breaches of obligations arising from the use of the information contained in this publication, provided that they do not relate to damage from injury to life, limb or health or guarantees or claims under the Product Liability Act are affected. Furthermore, the liability for the breach of obligations, the fulfilment of which is essential for the proper execution of the contract and on the observance of which the customer may regularly rely, remains unaffected. The same applies to breaches of duty by our agents.

