

## Epoxydised Natural Rubber (ENR): a strong polymer needs processing support

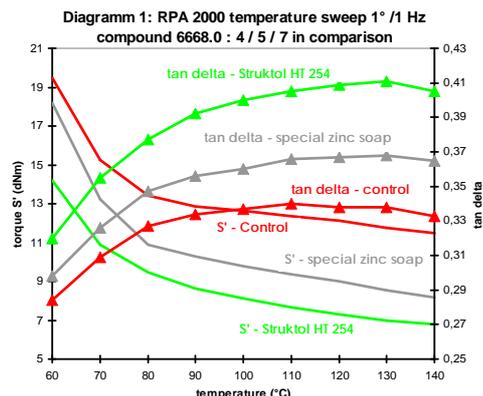
Epoxydised Natural Rubber (ENR) is commercially available as either the ENR 50 grade (50% epoxydised) which is mainly consumed for general purpose rubber goods, or the ENR 25 grade (25% epoxydised) typically designed as a purpose polymer within the tyre industry. Focusing on tyre industry targets and talking about the "green tyre" technology (low rolling resistance, top wet grip etc.) typically S-SBR is used for passenger tyre treads in combination with high silica loading reinforced by the use of silane coupling agents. The idea for usage of ENR is exactly dedicated to this application field. Contrary to S-SBR, ENR does not need silane coupling agents as its inherent affinity to silica surface results in strong silica-rubber interactions.

The following study demonstrates that like S-SBR compounds ENR compounds need a tailored mix of additives in order to optimize the both flow and extrusion performance, which means the shift away from traditional zinc soap combinations.

TABLE 1- 6668.0	4	5	7
ENR 25	100	100	100
Ultrasil 7000 GR	60	60	60
rapeseed oil	4	4	4
ZnO	5	5	5
stearic acid	2	2	2
Santoflex 6PPD	1,5	1,5	1,5
Protektor G 35	1,5	1,5	1,5
spezial zinc soap		3	
Struktol HT 254			3
Santocure TBBS	2,5	2,5	2,5
Perkacit DPG-grs	0,7	0,7	0,7
sulfur	1,5	1,5	1,5
total:	178,7	181,7	181,7

Struktol HT 254 is such a new "non-zinc-soap" material. While using Struktol HT 254 the visco-elastic behaviour of ENR is greatly improved and a strong de-

crease in Mooney viscosity is observed (control: 92 / zinc soap: 78 / Struktol HT 254: 73) along with the notably better tan delta and S' behaviour shown in Diagram 1.



Improvement is also notable in the smoother extrusion process. Comparatively, Struktol® HT 254 showed the best speed related extrusion performance [m/min] - means higher extrusion output and best extrudate surface finish (Garvey die extrusion results see photos below).

6668.0	4	5	7
extrusion:	(control)	(special zinc soap)	(Struktol HT 254)
speed [m/min]	1,85	2,25	2,51
swelling [g/m]	101,9	136,7	111,5
rate [g/min]	188,9	308	278

extrudate control    special zinc soap    Struktol HT 254



(Literature: Rubber Asia, 11-12 / 2007, Dr. Jay Namiar  
ACS Meeting, October 2007, TARCC—ISSN 1547-1977)

### Calendar of Events 2010

- October 12-14, 2010: **Rubber Expo 2010** in Milwaukee, Wisconsin / USA  
[www.rubber.org/rubberexpo2010](http://www.rubber.org/rubberexpo2010)  
**Struktol Company of America — Booth No.: 301**
- October 27 till November 3, 2010: **K Fair** in Düsseldorf, Germany  
[www.k-online.de](http://www.k-online.de)  
**Schill+Seilacher — Booth No.: Hall 08a/G10**
- November 3-5, 2010: **9th Fall Rubber Colloquium KHK**, Novotel in Hanover, Germany  
[www.dikautschuk.de/khk/](http://www.dikautschuk.de/khk/)  
**Schill+Seilacher - Conference Presentation:** „Parallel improvement of processing and physical properties in peroxide cured elastomers by the use of reactive silicone based additives“ (Dr. Volker Börger)
- November 17-19, 2010 **International Rubber Conference—IRC 2010**  
[www.irc2010.com](http://www.irc2010.com)  
 Renaissance Hotel Mumbai Hotel & Convention Center, India  
**Schill+Seilacher—Conference Presentation:** „The role of process additive towards process ability of latest generation tire compounds- necessary in order to meet changing legislation“ (Colin Clarke)
- November 25-27, 2010: **Rubber Tech China 2010** in Shanghai  
[www.rubbertech.com.cn](http://www.rubbertech.com.cn)  
**S+S/SS China — Booth No.: 2A354**
- November 30 till December 1, 2010: **RubberChem 2010** in Vienna, Austria  
[www.polymerconferences.com](http://www.polymerconferences.com)  
**Schill+Seilacher Conference Presentation:** „Reactive rubber processing additives based on organosilicones for peroxide crosslinkable polymer types“ (Dr. Volker Börger)

The suggestions for application and usage of our products as well as possible proposed formulations are meant to advise only to the best of our knowledge. This information is without obligation and does not release customers from their own testings to ensure suitability for intended processes and use. Liability is only accepted in case of intention or gross negligence. Liability for any defects caused by minor negligence are not accepted. Each producer is responsible and liable to observe legislation and patent rights of third parties.

**Call us. We have the solution.**

## New Struktol® MR 603: the mandrel release solution for shaped chlorinated polyethylene (CM) automotive hoses

The newest Struktol Mandrel Release agents named Struktol® MR 603 provides outstanding performance in the manufacturing of chlorinated polyethylene hoses. Chlorinated polyethylene called CM or CPE (*CM for elastomeric type, CPE stands for thermoplastic chlorinated polyethylene type*) exhibits excellent physical and mechanical properties including chemical, oils, heat and weather resistance. CM also provides good low temperature performance; excellent compression set resistance; and, retains excellent tensile strength and abrasion resistance even with high filler loading levels. These characteristics make CM a perfect component in automotive hoses - be it for hydraulic, coolant or automatic transmission hoses.

But, the manufacturing of CM hosing is tricky. CM has a tendency to stubbornly attach itself to a mandrel's surface. Here Struktol® MR 603, when compared to other commercially available mandrel release agents, provides a much easier release. Similar to other Struktol MR products, Struktol® MR 603 is a liquid material that is easy to handle and its water-solubility offers easy wash-out properties without the use of detergents.

For further information or samples feel free to contact at any time:

Mr. René Mille / Product Manager Release Agents (fon: +49 (0) 40-73362-351, fax: +49 (0) 40-73362-194, email: [rmille@struktol.de](mailto:rmille@struktol.de)) or your familiar Struktol contact person.

(Literature: Rubber World, June 1990 - Milton Farber)

## Acrylic rubber hoses - new manufacturing problems due to necessary DOTG respectively DPG replacement in EAM

Struktol® MR 161 has again proved its worth when used in production as mandrel release agent for EAM hoses, especially when new state-of-the-art DOTG resp. DPG free compounds are concerned. (*Remark: The European Union under REACH will ban the use of guanidine accelerators such as DOTG and DPG due to carcinogenic concerns*). Mandrel

fouling is dramatically reduced when Struktol® MR 161 is used as mandrel release agent, in comparison to similar mandrel release agents for EAM or other acrylic rubber compounds. Consequently the mandrel endurance times for the manufacture of state-of-the-art EAM hoses are longer when Struktol® MR 161 is used, indirectly increasing production output.

## REACH at Schill+Seilacher "Struktol" GmbH : update + news

Schill+Seilacher is well prepared for the December 2010 REACH deadline. We are currently the Lead Registrant for two substances and will be submitting the lead dossier for joint submissions on behalf of the Fatty Esters Umbrella Consorti-

um and the Zinc Salts of Fatty Acids REACH Consortium. We are also now deep in our preparations for the 2013 deadline and anticipate again taking on the role of Lead Registrant for a number of substances.

I joined Schill+Seilacher "Struktol" GmbH in January 2008 following many successful years working directly in the tire industry. Being a leader in the rubber and latex R+D department, I am responsible not only for the development of new rubber additives, lubricants and plasticizers and other speciality chemicals, but also for the approval of new raw materials. As a large number of our new developments are tailor-made to a customer's specific request, the required project work - both internally and externally - to implement a new product is significant. In other words, I guide our development process from the initial raw materials through the production process and customer application.

INSIDE -



**Dr. Herbert Schulze**

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