

## Vestenamer: A polymeric crosslinking additive for performance improvement

Vestenamer is a speciality additive manufactured by Evonik Industries that offers unique processing performance improvement. Many rubber process stages can benefit from the inclusion of Vestenamer, which must be considered as a polymeric crosslinkable additive. The properties may be characterised by four structural features:

### Crystallinity

Vestenamer 8012 has high crystallinity of approx. 30%. The crystallinity is thermally reversible, and the crystallisation rate is exceptionally high. This effect is used to reduce the cold flow of soft compounds, to improve wall collapse resistance in profile and hose extrusion, increase the hardness of vulcanisates, and reduce the shrinkage and its anisotropy during calendaring (see Table 1).

### Low viscosity above the melting point

Vestenamer 8012 has an exceptionally low molecular weight, above the melting temperature of ca. 54°C the low molecular weight accounts for the exceptionally low viscosity (ML 1+4 100°C <10). As a result, Vestenamer functions as a plasticiser in many applications.

### High proportion of macrocycles

Vestenamer 8012 contains ca. 25 weight percent of macrocycles. This accounts for the high collapse resistance of Vestenamer containing rubber compounds at temperatures well above its melting point. This is certainly the result of entanglements between the linear molecules of the basic rubber and the macrocycles. These cyclic macromolecules have a further influence on the physical properties of the vulcanisates, e.g., by increasing the rebound resilience.

### Double bond content

Vestenamer 8012 contains a double bond at every eighth carbon atom. Vestenamer vulcanises with all cross-linking agents commonly used in rubber

curing, e.g., sulphur, peroxides or curing resins.

### Compounding guidelines

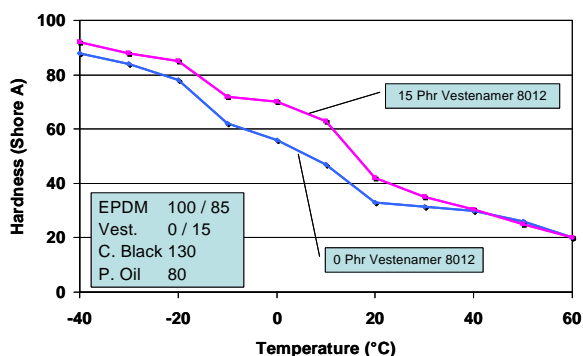
Vestenamer 8012 is compatible with almost all rubbers, irrespective of their chemical structure or polarity, and can even compatibilise polymers that are otherwise incompatible, such as EPDM and NBR or emulsion and solution polymerised rubbers. In general, Vestenamer is applied in a blend by substituting 5 to 15 parts of the base polymer. Vestenamer is suitable for use in mill mixing or internal mixer applications. Addition of Vestenamer is made during the first stage of mixing together with other polymers.

### Typical Applications

- Polymer blending + Improved mixing efficiency
- Extrusion process improvement
- Tire components
- Roller compounds

If you are interested in Vestenamer 8012 or in case of any questions, please get in touch with your Technical Sales contact or send a mail ([info@struktol.de](mailto:info@struktol.de)).

Table 1: Hardness of uncured hose compounds



## Calendar of Events 2008

October 14-15th 2008: **3rd Russia / CEE Rubber & Tire Markets** / Krakow, Poland [www.cmtevents.com](http://www.cmtevents.com)  
**Dr. Volker Börger:** "Raw material supplier perspective: Implementation of the REACH legislation"

October 15-17th 2008: **3rd rubber symposium of the countries on the Danube** / Szeged, Hungary  
**Mario Kuschnerus:** "Process Additives for a cost efficient production" [www.rubber2008.mke.org.hu](http://www.rubber2008.mke.org.hu)

October 20-23th 2008: **International Rubber Conference & Expo 2008** / Kuala Lumpur, Malaysia  
**Colin Clarke:** "Improved Natural Rubber Processing and Properties by use of selected Process Additives" [www.irc2008malaysia.com.my](http://www.irc2008malaysia.com.my)

November 26-28th 2008: **8th Rubber Fall Colloquium** / Hannover, Germany [www.dikautschuk.de/khk2008](http://www.dikautschuk.de/khk2008)  
**Colin Clarke:** "How to improve silica compounds containing different silane types by certain processing additives"

December 3rd-5th 2008: **RubberChem Conference** / Prague, Czech Republic [www.rapra.net](http://www.rapra.net)  
**Mario Kuschnerus:** Presentation title to be announced

December 4-6th 2008: **Tires and Rubberchem China** / Shanghai, China [www.rubbertech.com.cn](http://www.rubbertech.com.cn)  
**Joint booth with our distributor SS China**

# Technical terms in the rubber industry: The „Frosting effect“ - a brief explanation

This phenomenon is caused by ozone attack on relaxed vulcanisates containing white fillers (as silica, calcium carbonate etc.). The term *Frosting* describes a whitening or greying of the vulcanisate surface layers.

Unprotected vulcanisates absorb ozone, especially in warm and humid conditions. Ozonides are formed by reaction with double bonds of the polymer main chain exposed on the vulcanisate surface. The ozonides protect the rubber from further ozone attack and without stretching no ozone cracks will appear. Under tension ozone absorption would become continuous through exposure of more polymer chains and would result in crack growth. *Frosting* is occasionally mixed up with *Bloom* caused by unreacted sulphur or accelerators etc., but unlike Bloom the surface defects caused by

FROSTING cannot be removed by solvent washing or heating. (remark: if surface is "cleaned" with solvents the whitish layer might seem to disappear but the solvent only activates a "surface swelling" of the rubber. This Swelling might cover the Surface "FROSTING defect" shortly but not long term wise).

**Frosting appears due to exposure of white filler particles on the vulcanisate surface. It can be described as a kind of surface rubber degradation.**

To avoid frosting an optimum filler dispersion is desirable by using e.g. homogenising resins as Struktol 60 NS flakes or Struktol TH 110.

In order to protect the vulcanisate from oxygen and ozone attack additional antioxidant and protective wax are recommended to be included in the normal mixing cycle.

## REACH: Pre-registration has started on June 1st 2008

On June 1st 2008 the second step of the implementation of the new European Chemicals Policy REACH started. Until December 1st the 6 months pre-registration phase is running. Schill+Seilacher "Struktol" AG is very well prepared for this step and intends to pre-register all necessary substances in order ensure the availability of our products in the future after the registration process has started in 2009.

We have been in steady contact with our suppliers and customers searching for answers to our set of REACH questions. Of the over 700 different raw materials we have been delivered, we have secured availability to 95% of them directly through our suppliers. Additionally, as we can pre-register as an importer of a substance, we feel we can safely say that for the next 6 to 10 years we foresee no problem in material availability.

As a producer of more than 1000 different compounds, the enormity of our task in identifying our exact obligations with respect to the new law is not simple. Within REACH's framework, compounds can take on multiple identities. The goal is to correctly identify all our substances in manner that minimizes our testing expenses and gains us access to the SIEFs with the maximum positive influence.

We are positioning ourselves to be in a winning situation. Within our industry we have been seeking out contact among our colleagues in the hopes of joining together before the Phase-in period begins, and are working hard to minimize the cost of our own registration. We do not want to see a negative impact upon the portfolio we offer you as a customer in availability, and are pressing to meet that goal. For more infos please visit our website ([www.struktol.de](http://www.struktol.de)).

Being in the initial class of students who were offered a joint degree in Chemistry and Business, I was in a unique position of being able to understand the rubber industry from both the scientific and the economic perspectives from the get-go. This helped me develop into a competent and capable international technical sales manager quickly. Since joining the Schill+Seilacher „Struktol“ team in October of 2007, I have had the pleasure of discovering our diverse product line in our various laboratories, and have begun to be introduced to our business partners in Southern and Eastern Germany, Switzerland, Austria and Central Europe from Mr. Uwe Rossow. In addition to working with rubber additives in this region, I will also seek to expand my role by investing my time into the growing market for TPEs, in addition to providing an excellent technical service to our customers.

INSIDE -



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Call us. We have the solution.