VESTENAMER®
for the tire industry
Evonik Resource Efficiency GmbH
VESTENAMER as process additive…

...reduces the viscosity of rubber compounds → facilitates processing and mixing, better incorporation of fillers!

...gives higher Green-strength and dimensional stability → important feature when it comes to precise molding of rubber parts as well as extrusion!

...acts as compatibilizer → Enhances compatibility of otherwise incompatible rubbers, e.g. polar and nonpolar rubbers (i.e. EPDM and NBR)!

...improves the processability of natural rubbers → significantly higher reversion stability especially at high vulcanization temperatures!

...is a reactive additive → participates in the vulcanization process and incorporates in the rubber matrix. No blooming or release over time as often observed with other additives!
EVONIK’s C8-Technology Platform as basis for VESTENAMER®

- Fully backwards integration to butadiene
- Long time process know-how for making C8-rings

- Polymerization via ROMP technology gives a unique material
- VESTENAMER® contains a high proportion of macrocyclic polymer
- VESTENAMER® has a high concentration of trans-configured double bonds
VESTENAMER®
An outstanding processing aid

Processing advantages
- Reduced Mooney Viscosity (higher flowability)
- Better filler dispersion
- Improved compound homogeneity
- Improved extrudability and surface finish

Compatibility
- Enhances compatibility of otherwise incompatible rubbers, e.g. polar and nonpolar rubbers

![Image of EPDM/NBR w/o VESA](image1)
![Image of EPDM/NBR 20phr VESA](image2)

**Extrusion**
- (cable jacket compound)
  - 5mm Tube: 160, 190
  - 10mm Tube: 146, 234

**Mixing**
- (apex compound)
  - 1st Stage Mixing: 104, 85
  - 2nd Stage Mixing: 90, 72

Mooney ML (1+4) @100°C*
VESTENAMER®
Significant improvements for filler incorporation

Processing advantages
- Prevents agglomeration of carbon-black aggregates
- Dispersing agent: Better dispersion of active and non-active fillers
- Improved compound homogeneity
- Flow improver: reduction of Mooney viscosity in compound
VESTENAMER®
Green strength is the key

dimensional stability of unvulcanized compounds

- High crystallinity below melting point
- Fast recrystallization
- Entanglement of rubber-polymer chains with macrocycles of VESTENAMER®
VESTENAMER®
Versatile use in tire production

**Tread/Base**
✓ with higher silica loading
✓ excellent continuous extrusion
✓ improvement of abrasion resistance
✓ reduced shrinkage

**Sidewall/Carcass**
✓ higher green strength
✓ reduced green tackness

**Rim strip**
✓ higher green strength
✓ better unvulcanized dimensional stability
✓ better penetration of wire bundle

**Bead/Apex**
✓ higher hardness
✓ excellent processability

Most leading tire manufacturers already use VESTENAMER® in some of their compounds!
EVONIK...provides comprehensive solutions for the tire industry


