AKTIFIT VM

Field of application: Elastomers

1. Description

AKTIFIT VM is an activated SILFIT Z 91, produced by modifying the surface with a special vinyl functional group. The by-products split off during the treatment reaction are largely removed during the production process which firmly attaches the functional group to the filler surface. This helps minimize undesirable side effects, as they are potentially encountered with in-situ mixing (direct addition of additivs to the compound).
A special process technology during production of AKTIFIT VM provides high hydrophobicity as well as outstanding low moisture absorption even under very humid conditions. During the vulcanization the vinyl groups of the AKTIFIT VM react in the presence of radicals with the polymer.

Characteristics

Appearance		free-flowing powder
Color CIELAB scale:	L* a* b*	96.2 - 0.1 1.0
Sieve residue > 40 µm		10 mg/kg
Volatile matter at 105 °C		0.1 %
Densitiy		2.6 g/cm³
Particle size distribution	D_{50} D_{97}	2.3 µm 11.0 µm
Surface area BET		10 m²/g
Oil absorption		65 g/100 g
Equilibrium moisture content at 23 °C: 50 % relative humidity 80 % relative humidity 90 % relative humidity		 0.05 % 0.07 % 0.08 %

Packaging

Paper bags	á 25 kg
EVA bags	on demand
Big Bags	550 - 900 kg

Shelf life

2 years if stored properly under dry conditions.

2. Applications

In elastomer applications AKTIFIT VM can be used as a functional filler either on its own or in combination with other non-reinforcing or reinforcing fillers. The best effect is achieved in radical cured systems (peroxide, high-energy radiation).

It can be used whenever high tensile strength and high modulus, combined with low tensile and compression set, are as important as excellent processing and extrusion properties.

In addition AKTIFIT VM provides outstanding low dielectric losses in high voltage cable insulations.

It is also suitable for very bright and white compounds.

These properties are an ideal combination, in particular for pressure-less cured extruded products and sponge rubber.

Information on compliance with certain regulations/recommendations and other safety-related aspects: Product safety information

Fields of Applikation

- pressure-less cured extruded products (profiles, hoses)
- cable sheaths and cable insulation, also for high voltage
- sponge rubber products
- molded products and seals
- condenser gaskets
- prevention of filler caused mold fouling during the injection process or deposits in the orifice die (plating) during extrusion

Methods of processing:
Any process commonly used in the rubber industry.

Elastomers:
radical cured elastomers such as CM, CSM, EPM, EPDM, EVM, Q, HNBR

Dosage:
generally in the range from 50 to 400 phr, depending on application, formulation and requirements

3. Benefits

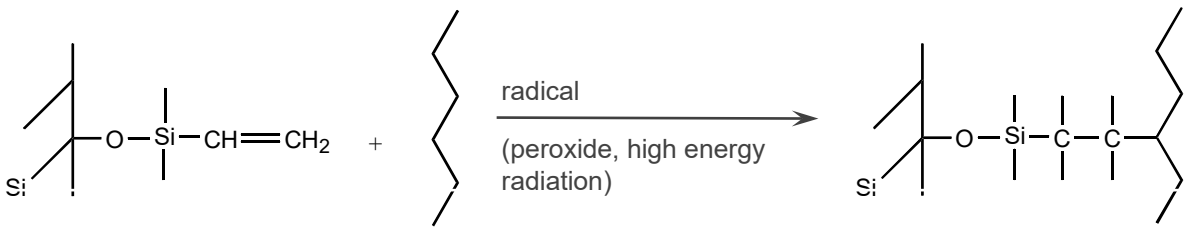
The excellent properties of the base material SILFIT Z 91 are retained:

- low sieve residues
- low moisture, low moisture absorption
- very high brightness
- very high color-neutrality
- good, fast incorporation
- excellent dispersion behavior, even in critical compounds
- good rheological properties
- excellent surfaces
- excellent extrusion properties
- no negative influence on curing rate
- low tensile and compression set
- high electrical resistance
- good aging properties
- high chemical resistance
- matting effect

AKTIFIT VM also provides the following benefits compared with the base SILFIT Z 91:

- highly hydrophobic filler
- outstandingly low moisture absorption under very humid conditions
- increased tensile strength
- maximum tensile strength at a higher filler loading
- increase of modulus
- reduced tension and compression set
- improved abrasion resistance
- improved resistance to liquids
- electrical resistance remains high and constant during immersion in water
- outstandingly low dielectric losses in high voltage cable insulations, even during immersion in water

4. Possible reaction during vulcanization at user‘s plant (model)



AKTIFIT VM rubber polymer

5. Application examples

Plating

Prevention of filler caused mold fouling during the injection process or deposits in the orifice die (plating) during extrusion (Aktifit VM represented by Silfit Z 91)
Technical report: “Die plating”

White building profiles (window and facade seals)

- markedly higher tensile strength
- markedly lower compression set
- and more neutral white color (less yellow tint) versus calcined clay
- loadings up to 400 phr Aktifit VM with adapted plasticizer oil level and even lower peroxide loading:
  - outstanding extrusion properties, even using amorphous EPDM grade
  - sufficiently high tensile strength, even using amorphous EPDM grade
  - thus enabling the use of amorphous EPDM resulting in markedly better low temperature performance
  - outstandingly low compression set
  - more neutral white color approaching targets of RAL 9002

Technical report: “Calcined Neuburg Siliceous Earth in white building profiles”

Medium to high voltage cable insulation

- very low sieve residue
- outstandingly low dielectric loss factor tan δ, even without additional in situ vinyl silane and even after water immersion
- higher tensile strength
- potential for elimination of additional in situ vinyl silane
- potential for increasing filler loading

Technical report: “Calcined Neuburg Siliceous Earth in medium and high voltage cable insulations”

Generelly profiles and seals, gaskets and o-rings

based on peroxide cured polymers with lowest compression set

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