



Wound Dressings

Vulcanization of Rubber  
Stoppers

## Spotlight Zinc Oxide in Medical Applications

# Spotlight – Zinc Oxide in Medical Applications



With over 100 years of experience, Grillo Zinc Powder GmbH is one of the market leaders in developing and producing zinc oxides in different qualities. As a traditional and family-owned company, Grillo Zinc Powder GmbH offers customer-focused solutions for various uses of zinc oxide. The products are ideally suited for providing end-to-end service for customers focusing on the treatment of skin and wounds.

The pharmaceutically pure zinc oxides from Grillo Zinc Powder GmbH are produced from high-purity SHG zinc by the indirect process (French Process) in compliance with Good Manufacturing Practice (EU-GMP guidelines Part II).

Zinc oxide can be used as active ingredient or as excipient in numerous pharmaceutical and cosmetic applications such as skin creams and pastes, but also in medical applications like wound dressings and the vulcanization of rubber stoppers.

## Zinc Oxide Pharma

Product	Description	Specific area surface range (m <sup>2</sup> /g)	Grade
<b>Zinc Oxide Pharma 4 API</b> <b>Zinc Oxide Pharma 4 Excipient</b>	High purity pharmaceutical zinc oxide 99.995 % ZnO	BET 3.0-5.0	EP/USP/BP CEP, ASMF
<b>Zinc Oxide Pharma 6 API</b> <b>Zinc Oxide Pharma 6 Excipient</b>	High purity pharmaceutical zinc oxide 99.995 % ZnO	BET 5.1-7.0	EP/USP/BP CEP, ASMF
<b>Zinc Oxide Pharma 8 API</b> <b>Zinc Oxide Pharma 8 Excipients</b>	High purity pharmaceutical zinc oxide 99.995 % ZnO	BET 7.1-9.0	EP/USP/BP CEP, ASMF

- Pharmaceutical API
- Wound healing, antiseptic effect, antimicrobial effect
- Complies with EU GMP guidelines

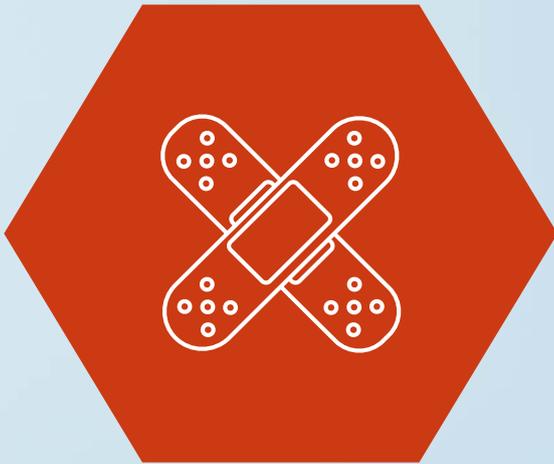


# Zinc Oxide in Wound Dressings

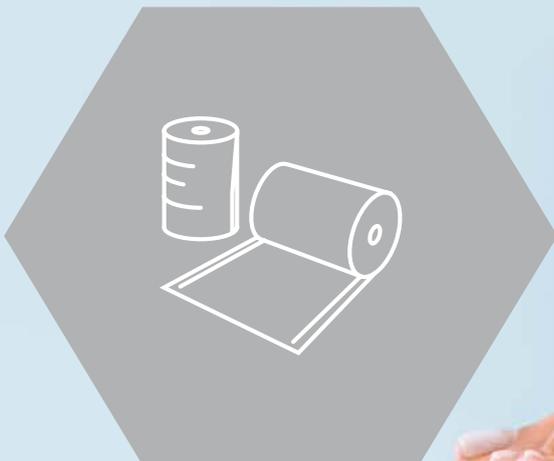
Due to its beneficial characteristics zinc oxide is commonly used in wound dressings or bandages.

It has an anti-inflammatory/ anti-bacterial effect, binds moisture and odors and soothes the skin. In addition, zinc oxide even stimulates cell renewal and can also effectively absorb UV radiation. This is why zinc oxide plays an important role in the field of wound healing.

Examples of application areas where zinc oxide can support are e.g. post-inflammatory skin following surgery, draining wounds, venous/arterial ulcers (with compression) and eczema.



- Antiseptic
- Antimicrobial
- Anti-inflammatory
- Wound healing
- Allergy-friendly
- Moisture-absorbing



# Zinc Oxide for Vulcanization of Rubber Stoppers

In the pharma and medical field rubber stoppers are used as sterile closures for containers for different liquids such as antibiotics, infusion liquids, insulin or blood.

Zinc oxide is one of the most important compounding ingredient in rubber technology and therefore key for the production of rubber stoppers.

During vulcanization, rubber is transformed from a plastic to an elastic state through temperature and time. Classically, the addition of heat causes the macromolecules of the rubber to crosslink. As a result, they can no longer move freely and the resulting rubber behaves elastic.

In order for the vulcanizate to achieve the application-relevant properties, an accelerator must be mixed in alongside sulfur. Almost all accelerators only develop their full effectiveness in the presence of metal oxides, of which zinc oxide has been proven to be the best additive. It enhances the vulcanization efficiency and vulcanizate properties and reduces the vulcanization time.

## Advantages:

Reduced  
vulcanization  
time ✓

Enhanced  
vulcanizate  
properties ✓

Improved  
heat sink  
effect ✓



# Complementary Products for Vulcanization of Rubber Stoppers



Hydrophobic lubricants for glass, metals, plastics & rubbers. They come with high water repellency/ hydrophobicity and excellent lubricating characteristics.

Type	Product Description	Regulatory Status				Physical Properties			
		INCI	USP NF	Ph. Eur.	DMF	Viscosity [cSt., 25°C]	Specific Gravity [at 25°C]	Refractive Index [at 25°C]	Flash Point, closed cup [°C]

## Liveo™ 360 Medical Fluid

Type	Product Description	INCI	USP NF	Ph. Eur.	DMF	Viscosity [cSt., 25°C]	Specific Gravity [at 25°C]	Refractive Index [at 25°C]	Flash Point, closed cup [°C]
20 cSt.	Clear, colourless, PDMS liquid (Polydimethylsiloxan)	✓	✓	✓	✓	20	0,951	1,4018	>100
100 cSt.		✓	✓	✓	✓	100	0,967	1,4032	>100
350 cSt.		✓	✓	✓	✓	350	0,971	1,4042	>100
1000 cSt.		✓	✓	✓	✓	1000	0,972	1,4046	>100
12500 cSt.		✓	✓	✓	✓	12500	-	1,4047	>100



Butyl rubber is the #1 choice worldwide for pharmaceutical stopper applications. Exxpro™ specialty elastomers from ExxonMobil provide additional benefits. They combine all butyl elastomer properties while adding the benefit of having an outstanding cleanliness.

	Description	Properties	Benefits
<b>Exxpro™ Speciality Elastomers</b>	Brominated isobutylene paramethyl-styrene terpolymers (BIMSM)	Isobutylene backbone Pendant pMS ring Fully saturate backbone (no double bond) Highly reactive benzylic bromine	Maintains all Butyl elastomer properties, impermeability, dampening Excellent cleanliness Gamma Sterilization stability Excellent ageing resistance without antioxidant Versatile curing system



VESTENAMER® 8012 is a rubber based on transpolyoctenamer which has proved itself as a valuable processing aid. Due to its properties, it is a versatile polymer that can be used to solve a wide variety of problems dealing with runner compounding and processing.

VESTENAMER® 8012 is supplied as cylindrical pellets in polyethylene packaging.

	Description	Properties	Benefits
<b>VESTENAMER® 8012</b>	trans-Polyoctenamer	Low melting point < 60 °C Low viscosity in the melt Mooney < 10 High crystallinity ~35% High percentage of macrocycles ~25%	Does not migrate Improves Compatibility of rubber components Reduces viscosity, mixing time, and energy intake

– Compatibility: Excellent synergy with our butyl rubber!

# Contact

For more information feel free to reach to the Healthcare experts at Biesterfeld at [healthcare@biesterfeld.com](mailto:healthcare@biesterfeld.com)

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## Imprint

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