

SPHERILEX® Precipitated Silicas for Enhanced Oral Care Applications

SPHERILEX® 



Customers are looking for toothpaste that leaves them with healthy, clean feeling teeth and an enjoyable brushing experience. They are looking for products that can provide a wide array of benefits to meet their specific needs, such as enhanced whitening, reductions in tooth sensitivity, gingivitis and plaque, along with general protection from cavities. Evonik has a broad portfolio of precipitated silica products designed to be used in a wide variety of toothpaste categories, including the new SPHERILEX® products with enhanced performance benefits.

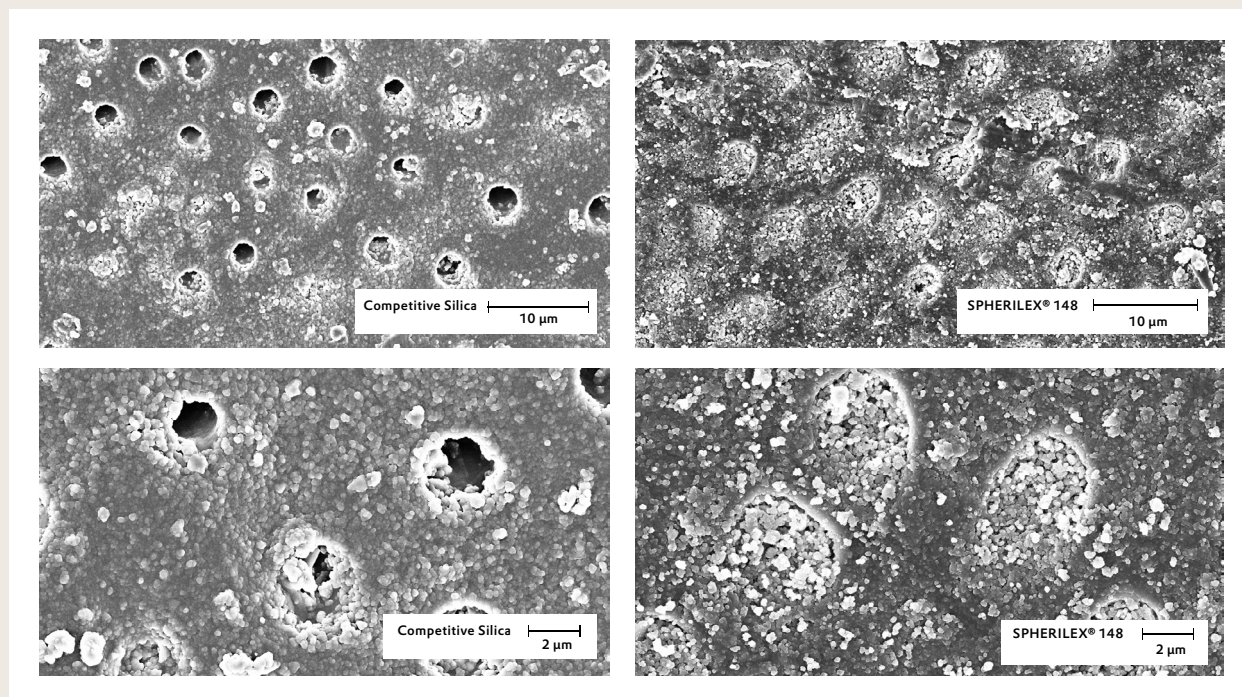
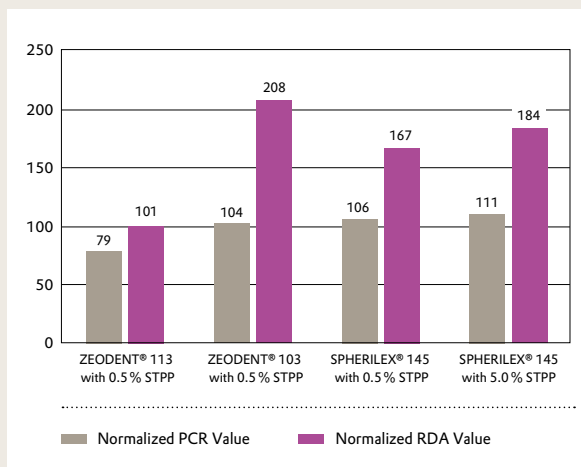
The SPHERILEX® production technology, located in Hamina, Finland, is a patented process that results in materials with a high level of consistency. SPHERILEX® synthetic amorphous silicon dioxide grades have a unique spherical particle shape and very narrow particle size distributions.

Properties and Methods	Units	SPHERILEX® 145	SPHERILEX® 148
Particle size d_{50} , Coulter LS	μm	11	4
Particle size d_{95} , Coulter LS	μm	–	8
Dynamic void volume (DVV) at 10 MPa	cc/100g	55	70
Na ₂ SO ₄ content, soluble in water	%	<2.0	<2.0
pH value, 5% in water	5%	7.5	7.5
Loss on drying, 2 h at 105 °C	%	<7	<7
Fluoride compatibility	%	>90	>90

The data in this table are typical values. Specifications are available on request.

SPHERILEX® 145 has been designed to deliver high cleaning performance with moderate abrasion at loading levels in the 15–20% range. SPHERILEX® 145 works particularly well in whitening toothpaste formulations, especially those that contain phosphate chelants. The narrow particle size distribution and low oil absorption results in rapid dispersion and incorporation during the toothpaste making process.

SPHERILEX® 148 has been designed to have a spherical particle shape, a small particle size and a narrow particle size distribution. The spherical particle shape is very well suited to reside in spherical dentin tubules. Approximately 40% of the spherical particles are smaller than dentin tubules, and laboratory studies have shown the product has a higher affinity for occluding bovine dentin tubules compared to traditional, non-spherical precipitated silicas. SPHERILEX® 148 also provides high levels of cleaning at low loading levels, and has been shown to have a reduced wear on enamel surfaces (REA). It is recommended the product should be used at 2–5% loading in conjunction with standard ZEODENT® products.



Tubule occlusion performance of competitive silica product (left) compared to SPHERILEX® 148 (right)

References

Brännström, Martin. "Sensitivity of dentine". *Oral Surgery, Oral Medicine, Oral Pathology*. 21 (4): 517–526. doi:10.1016/0030-4220(66)90411-7.

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