SACHTOLITH – White pigment for a wide range of coating applications
SACHTOLITH — the white pigment based on pure Zinksulfide. Designed to offer solutions for a wide range of applications. Because of its special properties like Moh's hardness, UV-absorption edge and low specific surface area. These particles provide benefits to many applications.
The product

SACHTOLITH (CAS Registration No. 1314-98-3) is a white pigment consisting of extremely pure zinc sulfide. Highly purified zinc salt and sodium sulfide solutions, from which all discolorant and toxic heavy metals have been removed down to ppm trace levels, are used for its production. The extremely finely precipitated zinc sulfide is adjusted to the narrow particle-size distribution of approx. 0.3 μm which is optimum for scattering of light by means of calcining at around 700° C. Three SACHTOLITH grades are produced: L, HD and HD-S.

The SACHTOLITH grades

SACHTOLITH L is the standard grade, with no organic treatment. SACHTOLITH HD and HD-S contain small amounts of organic wetting agents to improve wettability and dispersibility in aqueous and organic media. Thanks to its high-energy grinding process (micronization) and a special screening process, SACHTOLITH HD-S is free of coarse particles and is easily dispersed. Its optical performance is some 10 to 15 % superior to that of the L and HD grades.
**Properties of SACHTOLITH**

**Chemical**

In the >4 pH range, SACHTOLITH is resistant to practically all chemicals. Its solubility in 0.1 m hydrochloric acid is approx. 0.3 %.

SACHTOLITH can be oxidized to ZnSO₄ by powerful oxidizing agents or by UV radiation in the presence of water and oxygen. ZnS is capable of reacting superficially with additives which contain heavy metals, particularly at high processing temperatures and under exposure to UV radiation. The property of fixing undesirable heavy-metal ions can, on the other hand, prevent catalytic cracking of polymers. Unlike TiO₂, ZnS does not generate any colored complexes with phenolic anti-oxidants, and reduces the catalytic oxidation of polymers. SACHTOLITH also remains stable up to at least 350° C under exposure to air oxygen.

**Physical**

SACHTOLITH consists primarily of polycrystalline wurtzite and is an n-type photo semiconductor, like the TiO₂ pigments. Under normal conditions, SACHTOLITH is a good isolator (εₑₑₑₑ approx. 8). At approx. Z / W m⁻¹ K⁻¹, its thermal conductivity is unusually high for a mineral product, its specific heat, on the other hand, extremely low, at some 500 J kg⁻¹ K⁻¹.

Specific surface area and binder requirement are low and permit good rheological properties even at high pigmentation levels. In combination with the pigment’s low UV absorption, its good light reflectance in the visible range produces a neutral white tone and results in optimum effectiveness of optical brighteners, Day-Glow paints and photoinitiators.

Due to the product’s lower refractive index (2.37) compared to TiO₂, its scattering power is lower than that of rutile by 35 % and than that of anatase by 25 %. Its spherical particle geometry and low Mohs hardness of 3 mean that SACHTOLITH causes no abrasion or wear on metallic materials.

**Toxicological**

SACHTOLITH is a practically insoluble inorganic substance containing no harmful or notifiable constituents. Under correct use, it is non-toxic and is suitable, inter alia, for the pigmentation of toys and foodstuffs packaging materials.

**SACHTOLITH is registered and approved for use in a large range of countries; the following are intended only as examples:**

- **Germany:**
  - BfR: Meets limits
  - VwVwS:
    - Not a water pollutant
- **EU:**
  - AP 89 (1) and AP 96 (5) Ref. No. 96320
  - EN 71/3
  - Hazardous Substances Ordinance:
    - Not a hazardous in EEC 67/548 ff.
- **Japan:**
  - MITI 1-572
- **USA:**
  - FDA § 178.3297
  - TSCA 1314-98-3
  - Clean Air Act Amendments: Not listed
  - Hazardous Air Pollutants: Not an air pollutant
# Technical Data of SACHTOLITH

<table>
<thead>
<tr>
<th>SACHTOLITH</th>
<th>L</th>
<th>HD</th>
<th>HD-S</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZnS [%]</td>
<td>approx.</td>
<td>98</td>
<td>98</td>
</tr>
<tr>
<td>Volatile constituents (105° C) [%]</td>
<td>DIN EN ISO 787-2</td>
<td>approx.</td>
<td>0.2</td>
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<tr>
<td>pH</td>
<td>DIN EN ISO 787-9</td>
<td>approx.</td>
<td>6</td>
</tr>
<tr>
<td>Sieve residue [%]¹</td>
<td>DIN 53 195</td>
<td>&lt; 0.02</td>
<td>&lt; 0.02</td>
</tr>
<tr>
<td>Hardness (Mohs)</td>
<td>approx.</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Relative scattering power³</td>
<td>DIN 53 165</td>
<td>&gt; 50</td>
<td>&gt; 50</td>
</tr>
<tr>
<td>Lightness L*</td>
<td>ISO 7724</td>
<td>approx.</td>
<td>98</td>
</tr>
<tr>
<td>Refractive index</td>
<td></td>
<td>2.37</td>
<td>2.37</td>
</tr>
<tr>
<td>Dispersibility</td>
<td></td>
<td>satisfactory</td>
<td>good</td>
</tr>
<tr>
<td>Light fastness</td>
<td></td>
<td>good</td>
<td>good</td>
</tr>
<tr>
<td>Weathering resistance</td>
<td></td>
<td>satisfactory*</td>
<td>satisfactory*</td>
</tr>
</tbody>
</table>

¹) Mesh gauge 45 μm  ²) Measured by means of sedimentation ³) Reference pigment: Standard TiO₂ = 100

* in combination with TiO₂ good weathering resistance possible

## Notes for processing

SACHTOLITH HD-S can be dispersed in the Cowles dissolver to grindometer finenesses of less than 20 μm at high speeds within 15 to 20 minutes; additional dispersion on the roll mill or in a pearl mill is recommendable in the case of SACHTOLITH L and SACHTOLITH HD.

## Health and Safety

SACHTOLITH is practically free of toxic heavy metals and therefore fulfills the recommendations of the German BfR Recommendation IX for pigments, as well as a large range of other national purity specifications.
Applications of SACHTOLITH

General

Its low binder requirement combined with its good rheological and white-pigment properties enable SACHTOLITH to be used cost-effectively and with technical benefits wherever organic and inorganic binders need to be highly pigmented for specific applications, such as in undercoat lacquers, jointing and sealing compounds, primers, etc. and also in putties, mastics and marking paints.

Emulsion paints and dispersion plasters

Combined with titanium dioxide-pigmented emulsion paints and dispersion plasters, SACHTOLITH can improve rheological performance and thus provide better conditions for application. Combination with UV-absorbing pigments, such as TiO₂ or iron oxide pigments is the precondition for the use of SACHTOLITH in weathering-resistant paint and coating systems.

In many cases SACHTOLITH used in emulsion paints and dispersion plasters shows a positive contribution to keep surfaces white over a long period of time.

SACHTOLITH has proven to be stable against flocculation and to offer favorable flow performance in a large number of paint and coating systems. SACHTOLITH also exhibits a remarkably stabilizing effect when combined with colored pigments, producing positive effects in the form of only slight flotation and flooding.
Printing inks

The color neutrality achievable with SACHTOLITH is highly esteemed in printing inks. The pigment’s low abrasiveness reduces wear on the dies and matrices used for printing and increases lifetime of the doctor blade.

UV cured paint systems

The photoinitiators used for the curing of pigmented UV paint systems generally absorb light in the wavelength range in which covering white pigments, and titanium dioxide in particular, also absorb light to such an extent that adequate cross-linking cannot occur. SACHTOLITH, a zinc sulfide pigment, the absorption edge of which is significantly shifted into the short-wave range, is an exception. Sufficient UV radiation for the achievement of photoinitiator action and for complete curing thus remains available.

The curing of white UV-coatings pigmented with SACHTOLITH is easier, faster and complete – even at higher film thickness. This leads to lower energy consumption during UV-Curing and better results concerning mechanics and adhesion of the film. On the other hand economics increase as SACHTOLITH replaces a certain resin share without increased resin demand and the content of photo initiator can be reduced by up to 20%.

Powder coating systems

SACHTOLITH can also be used to advantage in powder-coating systems, since complete UV-curing is especially a problem when applying high film thicknesses. Additionally SACHTOLITH can improve rheological properties in powder coatings and enhances flow and throughput. The pigment’s color neutrality permits its use in all tints.

System:
- Laromer PE 44 F
- Laromer PO 83 F (PE Acrylates)