TEGO® Sulpho

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Sandvik Rotoform® process
- TEGO® Sulpho applied by a roller coater

Aqueous bath containing ~3 % TEGO® SULPHO 1 which is applied by a roller coater
Sandvik Rotoform® process
- TEGO Sulpho applied by spray nozzles

Aqueous bath containing ~14 % TEGO® SULPHO 2 which is applied by a spray nozzle

Source: courtesy of SANDVIK
Application

Shaping and release agent for the production of sulphur pastilles after

- Natural gas purification
- Oil purification (hydro treatment/ H₂S)

Typical operating conditions

(depending on belt type, speed and sulphur production rate)

- Sulphur temperature: 125°C
- Sulphur pastilles temperature at the end of belt: 40-50°C
- Sulphur production rate: 2 – 12.5 mt/h (depending on operating unit)
TEGO® Sulpho - Release Agent for Sulphur Pastillizing

Mechanism

- Below the cloud point TEGO® Sulpho is soluble in water. Upon reaching the cloud point TEGO® Sulpho precipitates as a second phase, giving the aqueous dilution a cloudy appearance. By doing this, TEGO® Sulpho forms a thin layer onto the sulphur surface as well as on the steel belt.

- The silicone backbone provides the release effect between:
  - sulphur pastille/conveyor belt – significantly prolongs life cycle of knives scraping pastilles off the belt
  - sulphur pastille/sulphur pastille – no agglomeration, free flow behavior

- The organic groups of the molecule adsorb on sulphur surface.
  - reduces dust
  - positively influences pastille shape and size
## Comparison of TEGO® Sulpho 1 and TEGO® Sulpho 2

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<th>TEGO® Sulpho 1 (former TEGOPREN® 5863)</th>
<th>TEGO® Sulpho 2</th>
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<td>Preferred process</td>
<td>Bath</td>
<td>Spraying</td>
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<tr>
<td>Dosage (dilution in water)</td>
<td>~ 3 %</td>
<td>~ 15 %</td>
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<tr>
<td>Cloud Point (based on recommended dilution)</td>
<td>~ 40 °C</td>
<td>~ 63 °C</td>
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<td>Quantity required (per mt sulphur)</td>
<td>50 g</td>
<td>20 g</td>
</tr>
<tr>
<td>Dynamic Viscosity</td>
<td>2.000-3.400 mPas</td>
<td>580-920 mPas</td>
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<tr>
<td>Flash point (undiluted product)</td>
<td>&gt; 65 °C</td>
<td>&gt; 90 °C</td>
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</table>
Characteristics of TEGO® Sulpho

Features

• Provides a homogeneous and stable aqueous solution at recommended concentration
• Cloud point fits to pastillizing operating conditions
• Low foaming
• Offers excellent release properties
• Sprayability of the solution with the new TEGO® Sulpho 2
• Shear stability

Advantages

• Better solubility in water than silicone oil based emulsions
• No flocculation at recommended concentration
• Better handling of the pastilles (no dust)
• Continuous operation
• Uniform sulphur pastille shape

Benefits for the belt operator

• Reduced fixed costs due to less maintenance and easier handling
• Variable cost savings up to 10%
• Improved stability, especially for hot conditions with the new TEGO® Sulpho 2
• Special design for Sandvik systems to ensure long term efficiency
• Non sticking sulphur – increased productivity
Why simple silicone oil emulsions are inferior to TEGO® Sulpho

- Silicone oil emulsions tend to separate:
  - at low concentration levels (ready-to-use = 5 %) and /or
  - if they are used in hot and cold regions, < 5°C and > 30°C

- Dilutions of silicone oil emulsions show diminished long term efficiency

- Separated Si-oil emulsions are not re-dispersible in water

- Separation tendency of Si-oil emulsions leads to:
  - bad release effect between sulphur and the belt
  - increased cleaning efforts of machinery and conveyor belt

- Stable Si-oil emulsions leave sticky residues to minor extent

- Contaminated surfaces (conveyor belt) are more difficult to clean, solvents have to be used due to the insolubility of silicone oil in water

- Poor quality Si-oil emulsion may even cause corrosion on the conveyor belts
Consumption examples of TEGO® Sulpho 1 und Sulpho 2

**Consumption**
(depending on belt speed and sulphur production rate)

TEGO® Sulpho 1  
ca. 0.05 kg/mt sulphur  
Water + TEGO® Sulpho 1  
ca. ~1.67 litres/mt sulphur

(preferably applied via bath, recommended dilution with water ~ 3%)

TEGO® Sulpho 2  
ca. 0.02 kg/mt sulphur  
Water + TEGO® Sulpho 2  
ca. ~0.13 litres/mt sulphur

(preferably applied via spray nozzle, recommended dilution with water ~ 15%)