APPLICATIONS
The SUPERCLAUS® process recovers elemental sulfur from H₂S-containing gases originating from gas treating and sour water stripper plants. Yields up to 99.2% overall sulfur recovery, without any further tail gas cleanup, are possible.

DESCRIPTION
The SUPERCLAUS® process consists of a thermal stage followed by minimum three catalytic reaction stages, with sulfur removed between stages by condensers. The first reactors are filled with standard Claus catalyst, while the final reactor is filled with selective oxidation catalyst.

In the thermal stage, the acid gas is burned with a sub-stoichiometric amount of controlled combustion air, such that the tail gas leaving the last Claus reactor contains typically 0.8-1.0 vol.% of H₂S. The selective oxidation catalyst in the final reactor oxidizes the H₂S to sulfur at an efficiency of more than 85%.

If a sulfur recovery rate of more than 99% is required, a third Claus reactor stage can be installed upstream of the selective oxidation reactor.

OPERATING CONDITIONS
Two main principles are applied in operating the SUPERCLAUS® process:

» Operating the Claus plant with excess H₂S to suppress the SO₂ content in the Claus tail gas

» Selective oxidation of the remaining H₂S in the Claus tail gas by means of special catalyst which efficiently converts the remaining H₂S in the presence of water vapor and excess oxygen to elemental sulfur only

Other operating features that apply to Jacobs' Comprimo® Claus process are applicable for the SUPERCLAUS® process as well. These include NH₃ destruction up to 30 vol.%, the capability to process heavy hydrocarbons and aromatics (BTX) up to 2 vol.%, turndown ratios of 100-15% and production of 99.9% pure bright yellow sulfur.

UTILITIES
Basis: 100 t/d, two Claus reactors, one selective oxidation reactor, 71 vol.% H₂S and 11 vol.% NH₃, feed gas, thermal incineration with heat recovery, and sulfur recovery of 99%.

<table>
<thead>
<tr>
<th>Consumption</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 bar(g) steam t/h</td>
<td>2.7</td>
</tr>
<tr>
<td>40 bar(g) steam t/h</td>
<td>12.8</td>
</tr>
<tr>
<td>Pre-/Reheat 40 bar(g) t/h</td>
<td>1.7</td>
</tr>
<tr>
<td>Electricity kW</td>
<td>310</td>
</tr>
<tr>
<td>Fuel gas t/h</td>
<td>0.28</td>
</tr>
<tr>
<td>Boiler feed water t/h</td>
<td>16.4</td>
</tr>
<tr>
<td>Steam for plant heating t/h</td>
<td>0.9</td>
</tr>
</tbody>
</table>

REFERENCES
Since the first commercial demonstration of the SUPERCLAUS® process in 1988, more than 215 units with a total installed capacity of over 48,000 t/d have been licensed. The biggest single unit in operation has a capacity of 1,500 t/d.

FEATURES
» Application in both new and existing plants
» Sulfur recovery up to 99.2%
» Long catalyst lifetime
» Simple continuous operation
» Low additional investment costs
» NH₃ destruction
» High turndown
» High reliability - less than 1% unscheduled shutdown time

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