APPLICATIONS
The EUROCLAUS® process recovers elemental sulfur from H₂S-containing gases originating from gas treating and sour water stripper plants. The EUROCLAUS® process is an improvement of the SUPERCLAUS® process. Yields from 99.3 up to 99.5% overall sulfur recovery, without any further tail gas cleanup, are possible.

DESCRIPTION
The EUROCLAUS® process consists of a thermal stage followed by three or four catalytic reaction stages, with sulfur removed between stages by condensers. The final Claus reactor is filled with a layer of hydrogenation catalyst, followed by a reactor filled with selective oxidation catalyst.

In the thermal stage, the acid gas is burned with a sub-stoichiometric amount of controlled combustion air; the tail gas leaving the last Claus reaction typically contains 0.8-1.0 vol.% of H₂S and 100-200 ppmv SO₂. This low SO₂ content is obtained with a hydrogenation catalyst that converts SO₂ to H₂S in the bottom of the last Claus reactor. The selective oxidation catalyst in the final reactor oxidizes the H₂S to sulfur at an efficiency of more than 85%. Total sulfur recovery efficiency up to 99.3% can be obtained with three reactor stages, and up to 99.5% can be achieved with four stages.

OPERATING CONDITIONS
Three main principles are applied in operating the EUROCLAUS® process:

» Operating the Claus plant with excess H₂S to suppress the SO₂ content in the Claus tail gas
» Selective reduction of SO₂ to H₂S in the Claus process gas by means of a catalyst with hydrogenating properties
» 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.

Other operating features that apply to Jacobs’ Comprimo® Claus process, also apply to the EUROCLAUS® process. These include NH₃ destruction up to 30 vol.%, turndown ratios of 100-15%. Producing 99.9% pure bright yellow sulfur.

UTILITIES
Basis: 100 t/d, one Claus reactor, one Claus/reduction reactor, one selective oxidation reactor, 71 vol.% H₂S and 11 vol.% NH₃ feed gas, thermal incineration with heat recovery, and sulfur recovery of 99.3%.

<table>
<thead>
<tr>
<th>Consumption</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 bar(g) steam t/h</td>
<td>2.8</td>
</tr>
<tr>
<td>40 bar(g) steam t/h</td>
<td>13.0</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>0.29</td>
</tr>
<tr>
<td>Boiler feed water t/h</td>
<td>16.5</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 EUROCLAUS® process in 2000, more than 85 units have started up or are under construction. Units with a production capacity of more than 4800 t/d have been licensed.

FEATURES
» Application in both new and existing plants
» Selective oxidation catalyst as applied in the SUPERCLAUS® process
» A final Claus reactor also containing hydrogenation catalyst
» Sulfur recovery up to 99.5%
» Long catalyst lifetime
» Simple continuous operation
» Low additional investment costs
» NH₃ destruction
» High turndown
» High reliability - less than 1% unscheduled shutdown time