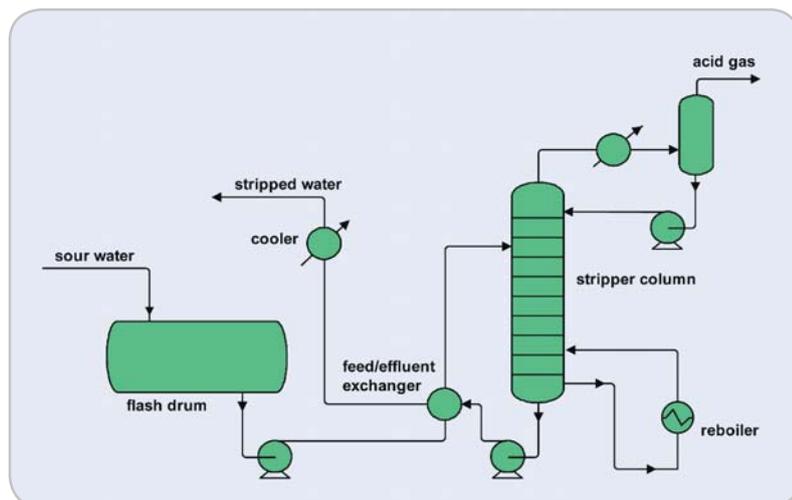


### APPLICATIONS

Many process units throughout a refinery generate significant quantities of sour water. Sour water collected within a refinery contains both H<sub>2</sub>S and NH<sub>3</sub>. These components are present as ammonium hydrosulfide (NH<sub>4</sub>HS) within the sour water. NH<sub>4</sub>HS is the salt of a weak base and a weak acid. In a solution this salt will be hydrolyzed substantially to form H<sub>2</sub>S and NH<sub>3</sub>. In the aqueous phase the free H<sub>2</sub>S and the NH<sub>3</sub> are volatile. The hydrolysis increases with higher temperatures, therefore the gaseous H<sub>2</sub>S and NH<sub>3</sub> can be removed by the application of heat in a Sour Water Stripper.

Depending on client requirements, a single stage or a two stage stripper can be applied.



Single stage sour water stripper

### DESCRIPTION

The sour water feed is collected in a sour water flash drum to facilitate flashing and hydrocarbon separation. The sour water is then introduced to the top section of the sour water stripper column after heating in the feed effluent exchanger. In the stripping section of the sour water stripper column, the sour water is contacted counter currently with steam (from the reboiler) to free the H<sub>2</sub>S and NH<sub>3</sub>.

The sour gases from the stripper column are cooled with air or water, so that the majority of the water vapor is condensed. The separated sour condensate is reintroduced into the stripper column as reflux.

The sour gas is routed to the sulfur recovery unit (Claus plant) in order to recover elemental sulfur from the H<sub>2</sub>S, the stripped water is cooled further and typically routed to the waste water system.

### OPERATING CONDITIONS

Sour water is flashed at close to ambient conditions, to remove as much hydrocarbons as possible. The stripper column is operated at a bottom pressure of approximately 1.3 barg, therewith minimizing reboiler steam consumption and enabling an overhead gas pressure sufficiently high to process gas to the downstream sulfur recovery unit.

It is essential that the overhead gas temperature is in the 85-90°C range, in order to prevent ammonium salt formation and to minimize water content (this is beneficial for the downstream sulfur recovery unit).

### UTILITIES

The main utility user is the steam reboiler. LP steam consumption is generally in the range of 150-170 kg steam per m<sup>3</sup> sour water.

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#### REFERENCES

Jacobs Comprimo® Sulfur Solutions has designed over 35 (single and two stage) sour water stripper units, ranging in capacity from 40 t/d to 3800 t/d sour water, throughout the world.

