

APPLICATIONS

The Claus process has been developed to recover elemental sulfur from H₂S containing gases originating from gas treating plants such as alkanolamine units or physical solvent plants. Modern Claus plants should be able to process H₂S/NH₃ containing gases as well, originating from Sour Water Strippers.

DESCRIPTION

The Claus process is based on the combustion of part of the H₂S to SO₂ and the subsequent reaction between the remaining H₂S and the SO₂ produced, forming sulfur. There are two main varieties of the Claus process: straight through and split flow. The straight through process is used for feed gas containing more than 50% H₂S while split flow is applied for gases containing 50 to 15% H₂S. The sulfur recovery process consists of a thermal stage (combustion chamber, waste heat boiler) and two or three catalytic reaction stages (reheater, reactor and condenser). In the thermal stage, the Claus reaction takes place at a high temperature level (950-1350°C). The sulfur produced in this stage is condensed either in the waste heat boiler or in the condenser. Subsequently, the gas is reheated to a temperature of 200-300°C before introduction into each reactor stage. The heat generated from the reactions is used for steam production. In the thermal stage, a choice can be made between the production of LP, MP or HP steam. In the sulfur condensers LP steam is generated. The tail gas is sent to an incinerator or tail gas treater.

OPERATING CONDITIONS

NH₃ in the total Claus feed gas can be processed up to 30 vol.%. Some feed gases may contain small amounts of heavy hydrocarbons and aromatics, operating experience up to 2 vol.%. Claus plants can be designed for turndown ratios of 100-15%. Product sulfur has a purity of more than 99.9% -bright yellow-; and contains less than 10 ppmwt H₂S after degassing. H₂S (stack) emission: 5-10 ppm vol. exit thermal incinerator depending on the incinerator temperature and 10 ppm vol. exit a catalytic incinerator.

UTILITIES

Basis: 100 t/d 2 Claus reactors, 71 vol.% H₂S and 11 vol.% NH₃ feed gas and thermal incineration with heat recovery, sulfur recovery 96%.

		Consumption	Production
4 bar(g) steam	t/h	-	3.0
40 bar(g) steam	t/h	-	12.7
Pre-/Reheat 40 bar(g)	t/h	1.0	-
Electricity	kW	265	-
Fuel gas	t/h	0.23	-
Boiler feed water	t/h	16.5	-
Steam for plant heating	t/h	0.9	-



REFERENCES

Since 1957 more than 445 Claus plants have been built around the world, ranging in capacity from 3 t/d up to 1,200 t/d. Sulfur recovery and gas sweetening projects are handled by a specialized project group with many years of experience. Feed back of operating experience and results of plant tests are utilized for continuous optimization of Jacobs' sulfur recovery process.

FEATURES

- » Sulfur recovery with:
 - two reactors : up to 96%
 - three reactors : up to 98%
- » NH₃ destruction
- » Integrated sulfur degassing process
- » Energy saving through heat integration and waste heat recovery
- » High turndown
- » High reliability - less than 1% unscheduled shutdown time
- » Explosion proof equipment
- » Good accessibility to all equipment
- » Jacobs has facilities to manufacture, construct and assemble packaged units. Skid mounted and module mounted units have been supplied ranging from 3 to 440 t/d

LICENSOR

Jacobs Comprimo® Sulfur Solutions, a member of Jacobs Engineering Group Inc.

For any information:

Mr. Frank Scheel

Tel: +31 71 582 7366

E-mail: frank.scheel@jacobs.com

Mr. Dennis Koscielnuk

Tel: +1 403 692 2950

E-mail: dennis.koscielnuk@jacobs.com

www.jacobs.com/comprimo

