

HCL GAS GENERATION PLANT

Introduction

Commercial Hydrochloric acid is available in the market as 30% aqueous solution and is widely used in industry in large quantities. However for certain applications, such as hydrogenation reactions, and in bulk drug/ pharmaceutical industry, HCl is required in gaseous form.

HCl gas is required in anhydrous state for critical reactions where moisture cannot be tolerated. In such cases HCl Gas can be generated from commercial grade HCl acid, through several different methods.

HCl Gas Generation by Ablaze

Ablaze has a long and successful record of design and supply of several Engineered systems for HCl gas generation. Being manufacturer of Borosilicate glass equipment, PTFE components and PTFE lined components, Ablaze is well qualified to handle such systems, as these are the major Material of Construction used in such systems. Ablaze also has in-house capabilities for Instrumentation and Automation, which is necessary for reliable and safe operation.

Different processes for HCl gas generation are offered based on customer requirement:

- Using Calcium Chloride
- Using Concentrated Sulfuric Acid
- Distillation or Boiling process

Ablaze can successfully design and supply HCl Gas Generation plants from 5 Kg/Hr up to 250 Kg/Hr capacity.

Larger capacity plants can also be provided on request

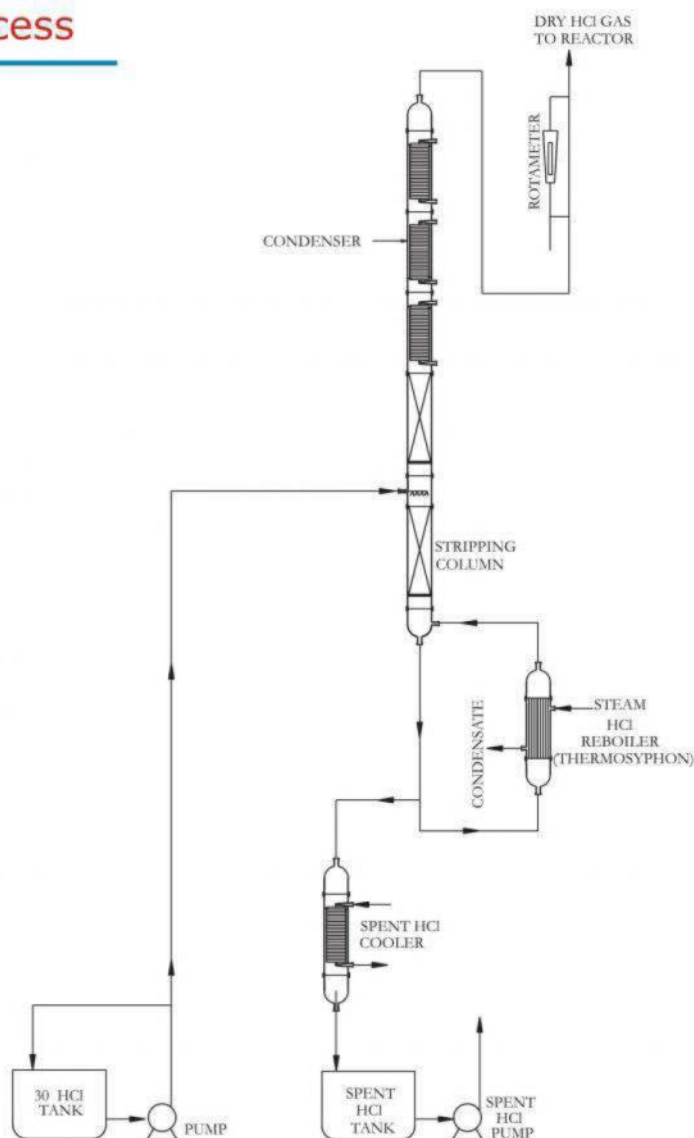
30% HCl feed: 65 Kg/hr
Cooling Water at 30°C 4m3/hr
Chilled Brine at -10°C 3m3/hr

HCl Gas Generation by Boiling Process

In this process, HCl gas is generated by the process of distillation of 30% Hydrochloric acid solution. Metered quantity of commercial hydrochloric acid is preheated in a preheater by steam and fed to a fractionating column with steam as heating media in the reboiler.

The vapours leaving the column are condensed with coolant as cooling water and chilled brine in stages. The relatively dry gas passes through a mist eliminator and then through a rotameter. The spent acid containing 22% HCL is cooled through a cooler and then discharged.

The system turn-down ratio is high and all the wetted parts of the system are made of highly corrosion resistant materials (Borosilicate 3.3 glass and PTFE).



Typical flow scheme for HCl Gas Generation by Boiling Process

Salient Features

- Low Capital Cost
- Low operating cost
- Compact and simple process
- No requirement of other feed chemicals
- Effluent is pure Hcl
- High efficiency (~99%)

Raw Material and Utility Requirements

The indicative requirements for 20 Kg/hr HCl Gas Generation System are given below:

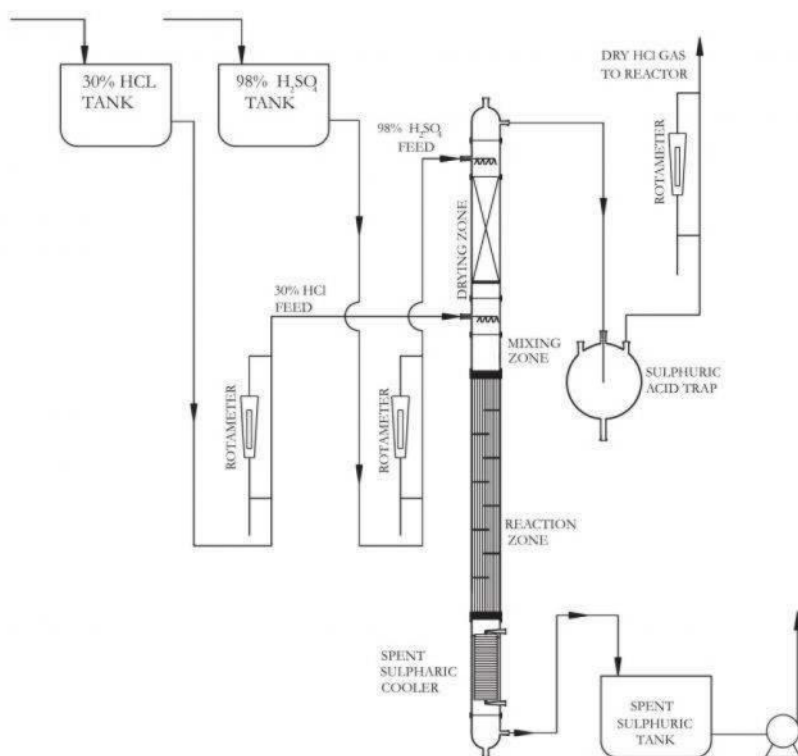
30% HCl feed: 200 Kg/hr
Cooling Water 3.5m³/hr
Chilled Brine at -10°C 4m³/hr

HCl Gas Generation by Sulphuric Acid Process

The process of HCl gas generation using Sulfuric Acid is quite similar to the Calcium Chloride method. Sulfuric Acid has a huge affinity towards water and hence acts as a dehydrating agent, thus removing water from the HCl solution.

The plant operates on continuous basis and 30% Hydrochloric acid solution (feed) is fed co-currently with concentrated (98%) Sulfuric Acid from the top of a packed column, in the Mixing Zone. Sulfuric acid comes in contact with water and produces heat which strips out the HCL gas. HCl gas is cooled in the heat exchanger to decrease the moisture content. It is then passed through Drying Zone to further remove the water through contact with Sulfuric acid and is finally passed through Sulfuric acid trap to make it anhydrous.

The dry product gas is measured through a rotameter and taken to a process or storage. The bottom product (spent acid) contains dilute sulfuric acid with some dissolved HCl. It is cooled in the spent acid cooler and taken to the spent acid storage tank.



Typical flow scheme for HCl Gas Generation by Sulphuric Acid Process

Raw Material and Utility Requirements

The indicative requirements for 20 Kg/hr HCl Gas Generation System are given below:

30% HCl feed: 70 Kg/hr
 98% H₂SO₄ 170Kg/hr
 Cooling Water at 30°C 2m³/hr

Salient Features

- Low Capital Cost
- No need of separate mist eliminator
- Compact and simple process
- High efficiency (~99%)

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