BUSS ChemTech

FLUORINE TECHNOLOGY

ANHYDROUS HYDROFLUORIC ACID (FROM FSA)

BUSS ChemTech is recognized as the world leading technology supplier for fluorine chemicals.

Our process technology for fluorine chemicals is the result of over fifty years of continuous development linked to direct experience of the design and construction of industrial scale plants.

AHF Plant: Capacity 10,000 mtpy, China

We have developed an innovative and ecologically beneficial route for the production of anhydrous hydrofluoric acid from fluorosilicic acid, a waste by-product of fertilizer production.

Hydrofluoric acid is an important intermediate for inorganic and organic fluorine compounds, such as aluminium fluoride, cryolite, uranium hexafluoride, fluorocarbons and fluoropolymers.

OUR EXPERIENCE ALLOWS US TO OFFER PLANTS WITH FULL OPERATING GUARANTEES.

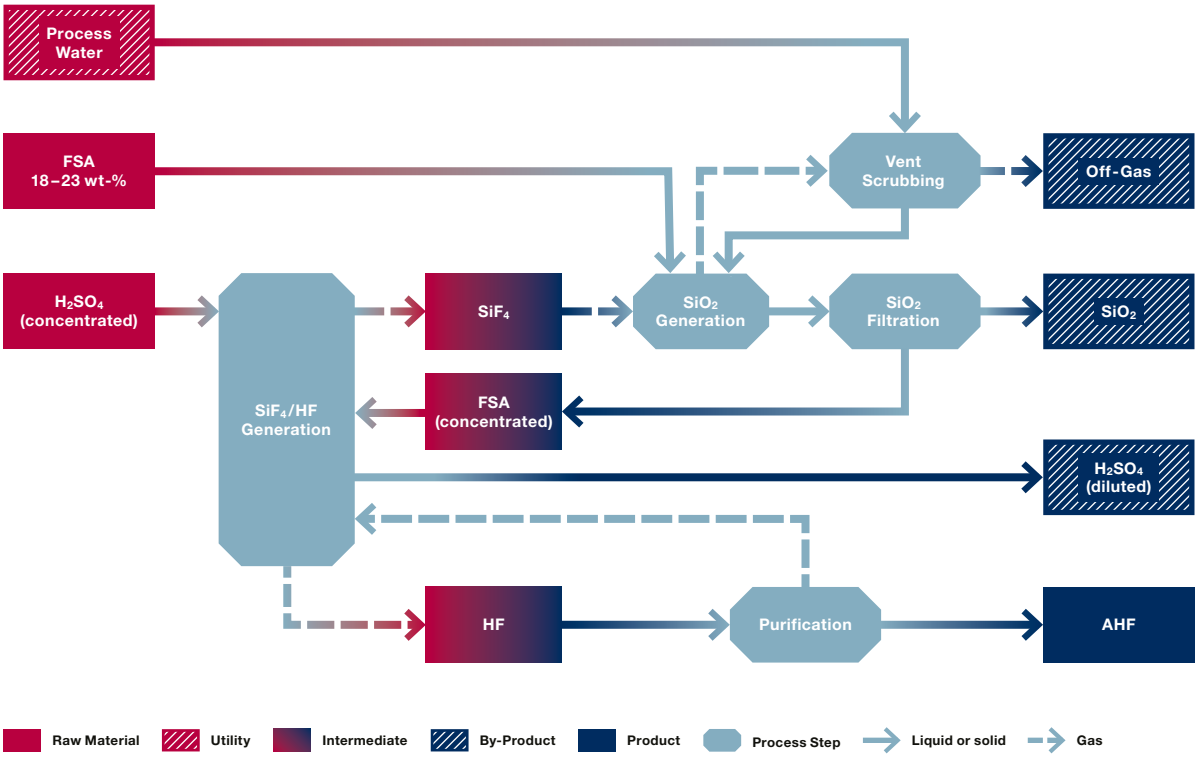
THIS RESULTS IN

- Plant capacities and product specifications tailored to your requirements
- Critical equipment like the Prereactor manufactured to strictly controlled specifications
- Prolonged plant life and high productivity

RANGE OF SERVICES

- Conceptual design
- Feasibility studies and plant assessments
- Basic and detail engineering
- Process automation
- Materials or total plant supply
- Project management
- Commissioning and start-up
- After sales service

AHF loading station



THE AHF PLANT

Concentrated fluosilicic acid is decomposed in the presence of sulphuric acid according to the following reaction:

$H_2SiF_6 + SiF_4(aq) + H_2SO_4 \rightarrow 2SiF_4(g) + 2HF(g) + H_2SO_4(aq)$

The reaction produces silicon tetrafluoride gas and hydrogen fluoride. The latter remaining mainly absorbed in the sulphuric acid.

This acid is distilled to produce anhydrous hydrofluoric acid (AHF).

The by-product sulphuric acid is dilute at a concentration of 70 % to 75 %. This acid is pumped back to the phosphoric acid plant to be fed to the reaction system.

Silicon tetrafluoride gas is cleaned in absorption columns to remove hydrogen fluoride and flows forward to the silicon tetrafluoride concentration system where it is absorbed in fluorosilicic acid.

SiF_4 gas is absorbed and reacts according to the following overall exothermic reaction:

$5SiF_4 + 2H_2O \rightarrow 2H_2SiF_6 + 2SiF_4 + SiO_2$ (Hydrate)

A by-product of this system is silica.

Vent gas from the silicon tetrafluoride concentration system is cleaned of hydrogen fluoride and flows to the Central Absorption System before emission to the atmosphere.

AHF SAFETY STORAGE

AHF is stored at a low temperature in a double containment system with pressure control and safety instrumentation.

The main storage system consists of three AHF Storage Tanks within the AHF Storage Containment Tank. The stored acid can be re-circulated by the AHF Circulating Pump, through the AHF Circulating Cooler, and cooled down to below -5 °C.

The gas inside the outer containment is continuously dried in the AHF Containment Air Dryer. The HF content in the containment is monitored online.

The vent gas flows to the Central Absorption.

AHF Plant: Capacity 20,000 mtpy, China

KEY FEATURES

- High profitability
- Zero cost raw materials
- Minimum hold-up AHF in the plant
- High quality anhydrous hydrofluoric acid
- Reliability in operation
- Environmental and high safety record

AHF Safety Storage, UAE

Learn more about our technologies. Scan the QR code now!

EXPECTED CONSUMPTION FIGURES

RAW MATERIALS[1]	
Fluorosilicic Acid (FSA calculated as 100 % H_2SiF_6)	1,600 kg
Sulphuric Acid (calculated as 100 % H_2SO_4)[2]	30,000 kg
Potassium Hydroxide	14 kg

UTILITIES FOR AHF PLANT[1]	
Steam, Low Pressure	0.001 GJ
Steam, Medium Pressure	0.011 GJ
Process water	5 m^3
Cooling water	24 GJ
Chilled water	6.8 GJ
Electricity	315 kWh

EXPECTED PRODUCT SPECIFICATION	
HF	min. 99.985 wt-%
H_2SO_4	max. 0.004 wt-%
H_2O	max. 0.008 wt-%
H_2SiF_6	max. 0.001 wt-%
SO_2	max. 0.001 wt-%
P_2O_5	max. 0.001 wt-%

[1] Values are per metric ton of hydrofluoric acid produced.
[2] The amount of sulphuric acid that needs to be continuously circulated within the system (not consumed).

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