sgl carbon

DIABON® bottom-fired HCl synthesis unit

SGL Carbon's DIABON bottom-fired HCl synthesis units are tailor-made turn-key solutions for hydrochloric acid production and anhydrous HCl gas generation at highest levels of product purity. In our units, H_2 and Cl_2 react at temperatures above 2000 °C (3630 °F) to produce HCl gas. In order to produce hydrochloric acid the gas is absorbed in water by a falling film absorber. Residual gas is cleaned in a vent gas scrubber.

The sophisticated design of our units results in highest product quality, highest efficiency, lowest maintenance requirements and highest up-times in the industry. By placing the burner at the bottom of the unit and positioning the absorption process in the upper section we can reduce the free chlorine content in the product. Condensates are drained separately, thus preventing product contamination.

Using bottom-burner technology also enables us to offer the most compact and efficient synthesis in the market by integrating the scrubber section in the unit and implementing counter-current absorption. Furthermore, we can eliminate the need for pumps and buffer-tanks due to the elevated position of the product outlet nozzle. Maintenance tasks like burner flushing can be performed during operation. Additionally, material degeneration and consequently the need for capital investment in spare parts is minimized.

SGL Carbon's in-house engineering team ensures tailor-made solutions as per customer requirement.

↑ Bottom-burner combustion chamber and ignition system

Your benefits

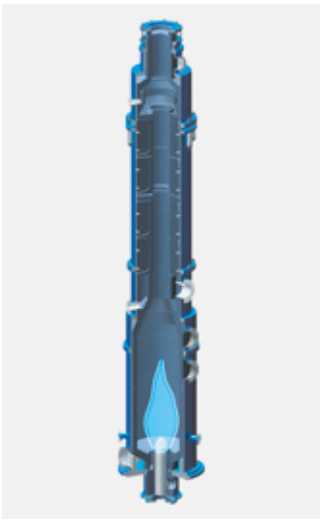
- **Product quality:** Hydrochloric acid or gas produced in our bottom-burner units fulfils any specification ranging from technical or chemically pure quality to food and electronic grade quality. Lowest levels in free Cl_2 in the product are achieved by means like a dry combustion chamber, a long residence time of the feed gases in the combustion chamber, separation of condensate drain from product, and an optimized burner design.
- **Safety:** Our bottom-burner safety concept is outstanding. It includes a safety system for automatic startup and shutdown in case of any failure. Both startup and shutdown are always accompanied by an automatic purging of the system with nitrogen. Instrumentation and sight glasses are placed at ground level to facilitate access for operators. A high response DIABON® rupture disk is placed at the top of the unit, far away from the crew. Combined with the state-of-the-art design of the synthesis units and their integration in the process, a maximum of operational safety is achieved.
- **Efficiency:** Our synthesis systems are characterized by low payback times due to their attractive total cost of ownership, low operating cost, low service and maintenance cost, long service intervals, high uptimes (> 99.9 %) and an extended equipment lifetime. Heat recovery options like steam generation (ECOSYN®) enable highest energy efficiencies and therefore result in even further reduced payback times.

- **Reliability:** In-house project execution results in shortest lead times. Experienced experts with specialized know-how provide fast, flexible and professional global support, remote and on-site. Our experience is based on more than 500 references worldwide.

- **Scalability:** The units are designed to support a large operating range from typically 25 % to 100 % of nameplate capacity. Tailor-made systems allow even operation at 20 % turn-down rate.

- **Flexibility:** Our product portfolio is the most comprehensive in the industry, enabling tailor-made solutions for highest customer benefit. Besides standard synthesis units, process solutions for your special requirements are available which can include: operation at low-pressures, with low purity feed gases, and other options like steam or hot water generation.

↑ Bottom-fired synthesis unit mounted in skid



↑ Bottom-burner HCl synthesis unit (3D design)

Our standard offer

Equipment
- Synthesis unit including burner, combustion chamber, absorber and scrubber

I&C
- Field instrumentation for automatic and remote start up
- Field instrumentation for control
- Field instrumentation for safety interlocks
- Safety system including a status panel, suitable for DCS- or PLC-based operation
- Automatic ignition system (no blower or ejector required)

Fittings, Piping, Steel
- Flame arrestors, manual valves, POLYFLURON® expansion joints
- Piping: Steel, POLYFLURON PTFE, PP, FRP, CS

Engineering and Project-Execution
- Feasibility study, basic and detail engineering
- Set-up and design according to customer requirements in terms of desired product quality and off-gas properties
- Certifications according to applicable codes and standards
- Commissioning including on-site training and final documentation

Additional options

Equipment
- Hot water generation and steam recovery
- Steam generation up to 10 barg
- Buffer tanks and pumps if requested by customer

Fittings, Piping, Steel
- Steel structure and skid mounting

Product information
- Capacity range: 5 to 175 t/d on 100 % HCl basis
- Turndown ratio: 25 % (of nameplate capacity), 20 % for tailor made design
- Product acid concentration: up to 38 % w/w
- Free Cl_2 in product: < 1 ppm (references with < 0.5 ppm available)
- Pure acid and clean vent gas as per local norms
- H_2 excess in combustion: typically 5 % (depending on feed gas purity)

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