sgl carbon

HCl synthesis with steam generation

In our units, H_2 and Cl_2 react at temperatures above 2000 °C to produce HCl gas. In order to produce hydrochloric acid the gas is absorbed in water by a falling film absorber.
The generated heat of combustion (approx. 0.7 kWh per kg of HCl (100 %)) and the heat of absorption in water (approx. 0.5 kWh per kg of HCl (100 %)) can be utilized to produce steam and hot water which can be used in other processes in the plant. Especially steam generation can be quite profitable. The actual payback time of the whole HCl synthesis unit depends on plant size and energy cost but usually is in the range of 1 – 4 years.
SGL Carbon offers individual solutions to customer needs. Based on our proven bottom-burner technology we provide HCl synthesis units with included steam generation. For units > 60 t/d HCl we offer a membrane wall synthesis unit. For units < 60 t/d HCl we propose our patented ECOSYN® option, using the water tube boiler concept. Nearly 40 % of the generated heat can be recovered as steam via a membrane wall unit, up to 60 % with the ECOSYN unit.
Our in-house engineering team ensures tailor-made solutions as per customer requirement.

↑ Membrane wall of a HCl synthesis unit (S-1200e) with steam generation

Your benefits of choosing the steam generation option

- **Efficiency:** SGL Carbon's 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 enable highest energy efficiencies and therefore result in even further reduced payback times.

Our offer

Equipment
- Synthesis unit including burner, combustion chamber, absorber, scrubber and steam generation up to 10 barg
- Buffer tanks and pumps if requested by customer

I&C
- Field instrumentation for automatic & remote start up
- Field instrumentation for control
- Field instrumentation for safety interlocks
- Control panel incl. safety system suitable for DCS- or PLC-based operation
- Automatic ignition system (no blower or ejector required)

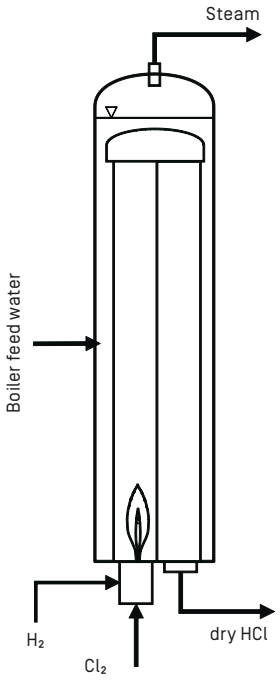
Fittings, piping, steel
- Flame arrestors, manual valves, POLYFLURON® expansion joints
- Piping: Steel, POLYFLURON PTFE, PP, FRP, CS
- Steel structure and skid mounting upon request

Engineering & 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 according to local regulations
- Certifications according to applicable codes and standards as well as customer requirements
- Commissioning including on-site training and final documentation

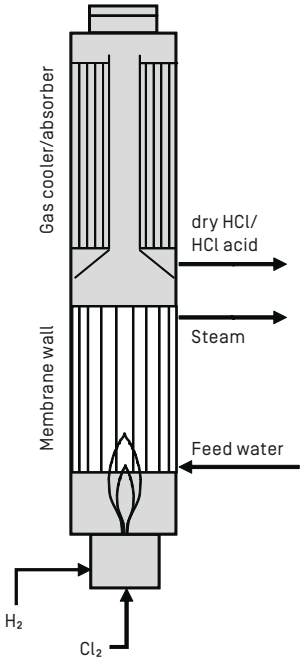
Data of bottom burner technology with steam generation

Typical properties	Units	ECOSYN®	Membrane wall
Capacity range	t/d	5 to 60	60 to 160
Max. steam pressure	barg	10	10
Steam generation efficiency of generated heat	%	approx. 60	approx. 40
Gas temperature after cooling	°C	300	1000
HCl dry gas		yes	yes
HCl acid		with external absorber	with internal absorber
Product acid concentration	% w/w	up to 38	up to 38
Free Cl_2 in product (typical values)	ppm	< 1 (possible)	< 1 (possible)
Turndown ratio (in respect to nameplate capacity)	%	30	25
Clean vent gas		as per local standards	as per local standards
Stoichiometric H_2 excess (depending on feed gas purity)	%	typically 5 – 15	typically 5 – 15

Schematic of HCl generation unit with steam generation



↑ ECOSYN synthesis unit (< 60 t/d)



↑ Membrane wall synthesis unit (> 60 t/d)

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