

Systems for Gas and Liquid Processes

Frings



Features:

- ✓ Sophisticated gas/liquid reactors with high performance rotor/stator turbine
- ✓ Intensive mixing and highly efficient mass transfer
- ✓ Self-aspiration does not require pressurized gas infeed
- ✓ Internal gas circuit allows for 100% gas consumption

Products for Chemical Industry





Systems for Gas and Liquid Processes

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Working principle of gas/liquid contactor FRIBORATOR

The rotor stator turbine FRIBORATOR is equipped with a star-shaped turbine (figure 1) designed to axially aspirate the liquid from the bottom of the reactor unit and to accelerate it centrifugally and tangentially at the work space. The rotation creates a vacuum at the backside of the work space, which is connected to the gas pipe. Due to the pressure differential between the gas pipe and the work space, gas escapes into the work space of the turbine and intensive gas/liquid mixing takes place. The gas/liquid mix is transferred by the turbine into the stator channels. The length and geometry of the channels depend on the tank diameter.

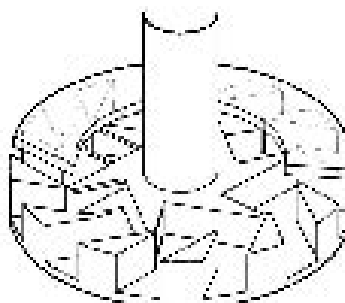


Figure 1: FRIBORATOR hydraulic parts

Process Description/Application of FRIBORATOR

Example 1:

Precipitation of CaCO_3



The FRIBORATOR aspirates the gas containing carbon dioxide (from lime kiln flue gas or other sources) into the reactor without the support of a blower (self aspirating) and mixes it intensively with the aqueous caustic lime suspension.

In the following neutralization reaction the precipitated product is formed. The specifications of the product can be adjusted by means of educt concentration levels, batch cycle times and filling levels. Utilization of carbon dioxide exceeds 70 % at a gas dispersion rate of > 3 vvm (volume gas/volume liquid per minute). The formed fine crystal structures fulfill the requirements of paper, cosmetic and health care industries

Operating data:

temperature:	50	°C
pressure:	1.0	bar
density:	1200	kg/m ³
gas/aeration rate:	> 3	vvm
aerator operation:	self-aspirating	
CO ₂ utilization:	≥ 70	% (at 20% feed content)

Example 2:

Two stage saturation / carbonization of phenolate



The phenolate feed is an intermediate product from a coal distillation process and is saturated with pure CO₂ gas in a two stage process to neutralize the phenolate to phenol and soda.

The FRIBORATOR aspirates the pressurized CO₂ from the head space of each reactor and mixes it into the aqueous caustic phenolate solution. After reaction, the products are led to a phase separation tank and the aqueous phase containing the soda is settled and removed.

Residence time in the reactors has to be held constant, therefore feed variation leads to filling level variation, but a feasible and secure operation of the plant is guaranteed.