DELTALAB · SMT
ÉQUIPEMENTS PÉDAGOGIQUES & TECHNIQUES

ABSORPTION / DESORPTION

Non contractual photo

SERVICE : 230 V / 50 HZ / SINGLE PHASE: 0.5 KW. COLD WATER 20 ° C / 3 BAR: 600 L / H. COMPRESSED AIR 6 BAR: 20 NM3 / H REAGENT GAS WITH PRESSURE REGULATOR 1 BAR: 1 NM3 / H EVACUATION OF TOXIC GASES. SEWER. DIMENSIONS : 1, 35 M X 0, 60 M X 3, 00 M

WEIGHT : 120KG

REFERENCE : MP1040

Principle of operation

Absorption is a process of material transfer from a compound present in a gas phase to a liquid phase by dissolution. The reverse operation of transfer of a gas dissolved by an inert gas is called desorption. These processes are carried out in a packed column between an ascending gas effluent and a descending solution or solvent (countercurrent operation). The presence of packing increases the liquid-gas exchange surface, thus the material transfers. A heat exchanger at the bottom of the column makes it possible to cool the outgoing solution (the absorption is an exothermic reaction); in discontinuous operation this exchanger makes it possible to check the influence of the temperature on the efficiency of the absorption. A static mixer, located upstream of the introduction of gas into the column, serves to dilute the gas to be treated with an inert gas (air or nitrogen).

Educational Objectives :

- Study of the hydrodynamics of the column.
- Study of the absorption without chemical reaction.
- Absorption study with chemical reaction.
- Influence of the pressure drop on the efficiency of the column.
- Continuous or discontinuous operation.
- Study of the desorption by an inert gas.
- Thermal balances.
- Material balance.
- Determination of the number of theoretical plates (McCABE and THIELE, KREMSER and BROWN).
- Determination of the number of transfer units
- Material transfer coefficient.

Technical specifications :

Equipment

- Canister for the solution or polyethylene feed solvent.
- Feeder dosing pump.
- Trap for differential pressure tap.
- Column made of borosilicate glass, in two parts with glass lining.
- A recentering plate in 316L stainless steel,
- Borosilicate glass column head, with introduction of the solution or solvent and evacuation of the gas phase.
- Column of borosilicate glass column, with introduction of the gas phase.
- 316L stainless steel vertical refrigerant.
- Hydraulic guard adjustable in height.
- Recipe of borosilicate glass solution.
- 316L stainless steel connection pipes.
- Support frame in 304L stainless steel tubes and aluminum nuts.

Instrumentation

- Condenser cooling water supply equipped with a float flowmeter with its control valve.
- Column pressure drop measurement using a "U" differential pressure gauge.
- Control and control cabinet, IP55, equipped with emergency stop, operating buttons and the following interfaces:
- Two digital temperature indicators of nine probes type Pt100 ?.

OPTIONS :

Option 1: 1L graduated borosilicate glass recipe for bubbling gas collected at the head of column 'equipped with a drain valve in stainless steel 316L Option 2: CO2 sensor with a range of 0-5000ppm (addition of a digital indicator on the case) Option 3: 1 additional 500mm borosilicate glass section with guide plate and Pt100 temperature probe Option 4: Vertical refrigerant in stainless steel 316L, single-acting borosilicate glass ferrule. Option 5: Data acquisition system including: . A 9.7' touch screen with machine synoptic and real-time values . USB port to export data in CSV format