Spraybox

Working principle

A suitable potential applied to a watery solution is able to provoke both oxidation-reduction reactions affecting the pollutants present and to create micro bubbles of hydrogen/oxygen at the cathode/anode; moreover, where the electrodes are made of metals such as aluminium or iron, their respective ionic forms (Al^{3+}, Fe^{3+}) are formed at the anode and hydrogen and hydroxyl ions are formed at the cathode (H_2, OH^-). The effect of the electric field is such as to provoke the breakdown of the large organic molecules of the ethoxylate compounds (non ionic surfactants) into particles with lower molecular weights, thus destroying the active ingredient and more generally reducing the soluble C.O.D.

The combined effect of the three actions described above (destruction of the macromolecules, formation of coagulating centres such as the metal hydroxides already present in the solution or produced by the solubilisation of the electrodes and the creation of micro-bubbles of gas which, rising to the surface, drag with them emulsions, colloids and the flakes being formed) has a clear synergic effect on the flocculation in progress, thus significantly increasing the efficiency of the system.

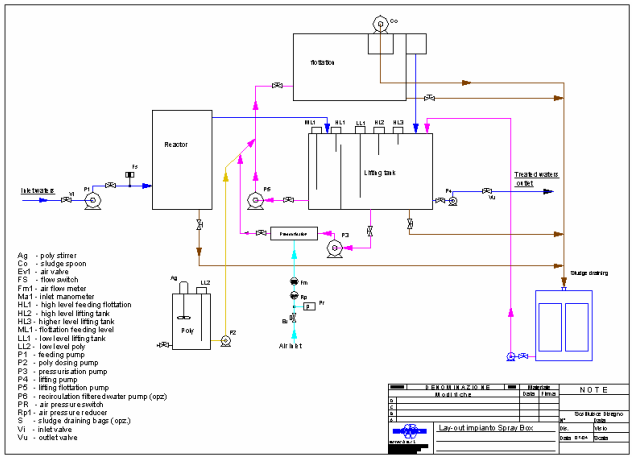
The drag effect is then completed by means of a fully-fledged dissolved air flotation with partial pressurisation for the clarification of the waters and thickening of the sludge.

Performance

- Efficiency of treatment constantly higher than with the traditional chemical-physical treatment
- Use of small amounts of auxiliary products (coagulants, polyelectrolytes etc.) with a consequent considerable reduction (up to 50%) of the final sludge
- Reduced running costs (up to 50%) compared to traditional systems
- Possibility of reutilisation of the treated water

Space required for the system limited to a maximum

Spray box view of internal components



Spray box Lay-out

System Components

- Electrocoagulation reactor with sacrificial electrodes

  Rectangular tank, containing electrodes in Al/Fe arranged vertically all round the section for the oxidation-reduction reactions devised in this treatment, with waste trap/drain and flanged inlet and outlet stub pipes
- Flottation machine
- Pressurisation
- Accessories

  Polyelectrolyte preparation and metering station, metering system for back up flocculant if used, feeding recirculation and lifting pump; general electric command panel to control all the functions.

Technical-functional data	SB5	SB25
Running capacity	18 m^3/h	90 m^3/h
Water treatment capacity	5 m^3/h	25 m^3/h
Recirculation pressurisation at 5.5 bar	4 m^3/h	20 m^3/h
Internal recirculation	3 m^3/h	15 m^3/h
Contents to be removed max 4000 ppm	20 kg/h	100 kg/h
Surface charge per m^2	8 kg/h	36 kg/h
Discharge of flotated sludge at 4-5%	0.6 m^3/h	2.8 m^3/h
Discharge clarified water	4.4 m^3/h	22.2 m^3/h
Consumption of compressed air at 6.5 bar	0.8 Nm^3/h	2.4 Nm^3/h
Power used	10 kW	20 kW
Dimensions	2500 x 2500 x 2200 mm	3000 x 4000 x 3000 mm

Spray box overall view

Spray box detail flotation machine