Hydrogen Peroxide

Chematur
Engineering Group

Use

- bleaching in the pulp & paper and textile industry hydrogen peroxide has largely replaced chlorine as a bleaching agent
- intermediate in chemical industry
- water treatment
- disinfection
- mining & metallurgic industries

Raw materials

- hydrogen (produced from NG/LPG/naphtha, or a by product from other chemical industry)
- oxygen (from compressed air)
- demineralised water
- cooling water, steam, nitrogen

Environment

Air emissions

The off gas from the oxidation, consisting of nitrogen and unreacted oxygen, is saturated with hydrocarbons. To recover the hydrocarbons the gas is cooled and the condensed solvent is collected and returned to the process. Before release to the atmosphere the off gas is passed through adsorption beds. The collected organics are returned to the process.

The emitted off gas contains less than 50 mg/m^3 hydrocarbons.

Water effluents

A small stream of condensate and separated water will leave the plant. This water can be biologically treated in industrial or municipal waste treatment plants. If local circumstances require, the wastewater can be passed through activated carbon, which reduces the content of organic pollutants to virtually zero.

Waste water

If the wastewater is treated with activated carbon, the spent carbon should be incinerated.

Process description

Hydrogen peroxide is manufactured by the circulation of an organic working solution (consisting of different solvents and 2-ethyl anthraquinone, which is the active chemical). The working solution is hydrogenated and oxidised, after which the product is extracted using a very pure water.

Hydrogenation

Hydrogen gas is added to the working solution in the presence of a noble metal catalyst. The hydrogen is chemically bonded to the 2-ethyl anthraquinone. The catalyst is filtered off and returned to the hydrogenation reactor.

Oxidation

When the working solution is contacted with compressed air the oxygen of the air reacts with the hydrogen that has been bonded to the 2-ethyl anthraquinone. This reaction forms the hydrogen peroxide, which is dissolved in the working solution.

Extraction

To get the hydrogen peroxide in a useable form it is extracted from the working solution using a very pure water. The product is a hydrogen peroxide solution with a concentration of up to 40 weight percent. This can be further concentrated by distillation, for example if the hydrogen peroxide is to be trasported to an end user. The peroxide free working solution is returned to the hydrogenator to start a new cycle.

References

Year	*Capacity (tpy)*	*Client*	*Location*	*Country*
1995	10 000	Zaklady Azotowe Pulawy (ZAP)	Pulawy	Poland
2002	13 000	Pt. Asean Aceh Fertilizer	Lhokseumawe	Indonesia
2006	12 500	Gujarat Alkalies and Chemicals	Dahej	India
2007	14 000	Descon Oxychem Ltd.	Lahore	Pakistan

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CHEMATUR ENGINEERING AB
Box 430, SE-691 27 KARLSKOGA, Sweden, Telephone +46 586 641 00, Telefax +46 586 791 700, info@chematur.se www.chematur.se