

Installation of Oxygen De-lignification Bleaching Process

I. Background Information :

In a Paper industry, the blown pulp from digester is washed and bleached, before being sent to the stock preparation plant for further processing. The bleaching is carried out in counter-current fashion in the washer drums.

One of the large integrated paper plants had the following bleaching sequence - Chlorine-Caustic-Hydrogen Peroxide-Chlorine-di-oxide.

The typical operating parameters were as follows:

- ❖ Kappa number = 21-22
- ❖ Yield = 45.3%
- ❖ Washing loss = 16 kg/ ton of pulp (as sodium sulphate)
- ❖ Black liquor conc. = 14.2%
- ❖ Chemical consumption
 - Chlorine = 8.5% of unbleached pulp
 - Caustic = 3.0% of unbleached pulp
 - Hydrogen peroxide = 0.5% of unbleached pulp
 - Sodium chlorate = 1.63% of unbleached pulp
 - Sodium chloride = 1.14% of unbleached pulp
 - Sulphuric acid = 4.77% of unbleached pulp
 - Sulphur dioxide = 0.125% of unbleached pulp

II. Best Practices :

The plant adopted the oxygen delignification process for their bleaching sequence.

Oxygen delignification involves the use of Oxygen and alkali to remove substantial fraction of lignin remaining after cooking. It is conducted at elevated temperature and pressure, at high or medium consistencies and in single or multiple stages. The process can be applied to all type of pulp. The most efficient oxygen delignification process for chemical pulping uses 2- stages and medium consistency



A conventional single stage oxygen delignification system consists of a pump, a mixer, an up flow pressurized reactor and a blow tank.

Two important factors required for efficient delignification are that the pulp should be washed well before bleaching and pulp should be medium to high consistency. The higher the consistency, lower will be the Kappa number.

III. Benefits :

The oxygen delignification process has the following advantages:

- ❖ Lower Kappa Number
- ❖ Significant reduction in effluent load
- ❖ Improved bleach ability, i.e., higher brightness
- ❖ Savings in bleaching chemicals
- ❖ Improved yield
- ❖ Improved pulp strength

The installation of oxygen delignification bleaching can offset the need for the advanced RDH pulping process. The reduction in chemical consumption was about 50%.