

## OXYGEN DELIGNIFICATION

Oxygen (O<sub>2</sub>) delignification is one of the most important processes in today's pulp bleaching technology. The process uses oxygen to reduce active chlorine requirements in the bleach plant, and is an important step towards total chlorine free (TCF) and elemental chlorine free (ECF) pulp production. Recently, oxygen delignification has been recognized as one of the strategic technologies which offer yield enhancement in bleached pulp production.

The most important environmental impact of oxygen delignification is the reduction or elimination of adsorbable organic halides (AOX). Other environmental benefits include lower biochemical oxygen demand/chemical oxygen demand (BOD/COD) and less color in effluent.

With chlorine gradually being phased-out of the bleaching process, and oxygen being the most inexpensive bleaching chemical in the mill, oxygen delignification offers significant operating cost advantages over delignification processes which use bleaching agents such as chlorine dioxide and hydrogen peroxide.

There are several types of oxygen delignification, including:

- High Consistency Oxygen Delignification (HCOD)
- Medium Consistency Oxygen Delignification (MCOD)
  - Double Stage
  - Single Stage
  - Mini

Selecting the appropriate type of delignification system involves careful consideration of each mill's

unique operating situation and the balance between installation and operating costs. The table below offers an approximate relationship between these costs. The range in delignification rates is due mainly to the addition of chemicals other than oxygen, either prior to or between stages of delignification.

Type of System	Relative Capital Cost	% Delignification Rates
HCOD	1.0	30–60%
MCOD (Double Stage)	1.5	40–70%
MCOD (Single Stage)	0.8	30–50%
MCOD (Mini)	0.3	20–30%

### APPLICATION

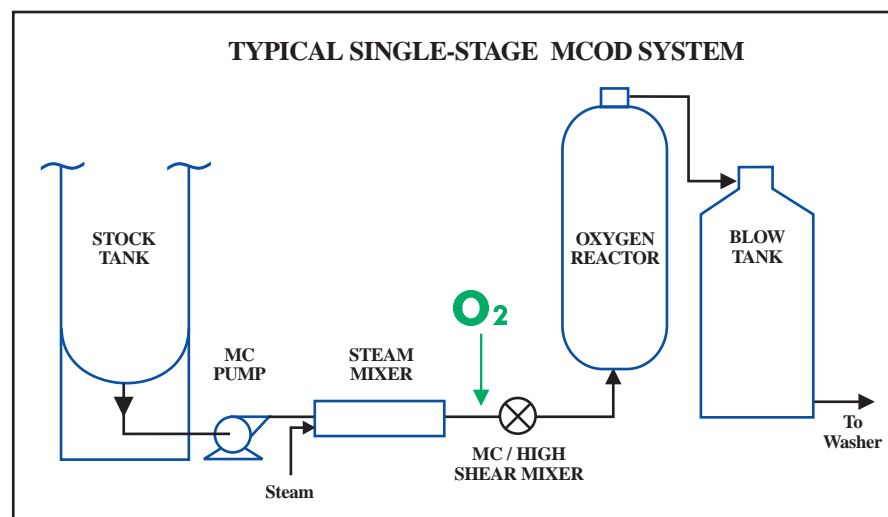
Single stage, medium consistency oxygen delignification (MCOD) is the most common technology being adopted by the industry.

In a typical MCO installation, the

pulp from the stock tank is moved by an MC pump to a steam mixer, where the temperature is raised to the desired level, and oxygen is injected into the pulp mixture. Next, an MC/High Shear mixer ensures intimate gas/liquid mixing of the oxygen-entrained pulp. The pulp is then fed to an upflow reactor, and discharged to a blow tank for further processing. Caustic and other chemicals are usually added before the MC pump.

### BENEFITS

- Lower overall bleaching chemical costs
- Reduced or eliminated AOX production
- Lower BOD/COD production and less color in the effluent
- Reduced wastewater treatment costs
- Better yield than extended cooking
- An important bleaching step towards TCF or ECF pulp production and mill closure





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