

## Ozone for Pulp Bleaching ITC Limited, Bhadrachalam, India

### Background

Situated 300 km east from Hyderabad, ITC Bhadrachalam is India's largest integrated pulping and paperboard manufacturing unit. The annual pulp production of 240,000 t is made from eucalyptus, bamboo and subabul provided by ITC's plantations. Always moving forward, ITC implemented the first ozone plant for pulp bleaching in India, recently ordered a new paper machine and plans a new pulp production increase.



Figure 1: View of the Mill

With ozone as part of the bleaching sequences ITC has chosen for their pulp mill one of the most efficient bleaching processes. "With the ozone plant in the pulp mill of ITC we will convince the P&P industry in India that ozone is more than just an alternative to chlorine dioxide" says Mr. Robert Serfass, formerly Director of the ITT WEDECO Pulp & Paper group.

### Project Details

ITT WEDECO was contracted in 2006 by ITC to supply the first ozone system for pulp bleaching in Andhra Pradesh while ITC targeted an increased production of 240,000 t/y. The ozone system was supplied in September 2007 and successfully started-up in November 2007. Today it is used in both fibre lines with the following bleaching sequences: (Ze)D(EOP)D in the reengineered existing fibre line and (Ze)(DP) in the new one.

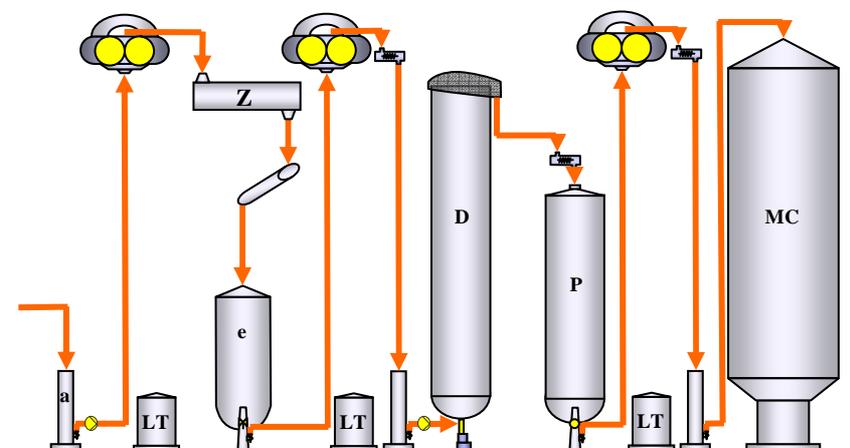


Figure 2: New Fiberline in ITC Bhadrachalam

The very short and simple bleaching line (Ze)(DP) sets impressive results. The production capacity is 400 bdt/d and the specific power consumption is around 75 kWh/bdt.

# WEDECO

## Project Case Study



With a Kappa index of 4.5 after Z, the new pulp reaches easily 89% ISO brightness while the total effluent volume is around 8 m<sup>3</sup>/bdt in the (Ze)(DP) line. The replacement ratio is 1 kg of ozone for at least 1.9 kg of pure ClO<sub>2</sub> whereas costs per kg are very close to each other: ozone definitely induces significant savings. The average chemical consumption is shown in the following table:

Bleaching Sequence		(Ze)(DP)	(Ze)D(EOP)D
Ozone, O <sub>3</sub>	kg/bdt	6	5
Chlorine dioxide, ClO <sub>2</sub> (as active chlorine)	kg/bdt	25	30
Hydrogen peroxide, H <sub>2</sub> O <sub>2</sub>	kg/bdt	8	4

Table 1: Chemical Consumptions

ITC conducted its own physical tests and it appears, even with a slight drop in viscosity, that all mechanical properties were improved by the use of ozone! As an example, bamboo which is known to increase physical properties is today less implemented than before.

“Ozone generation is now the bottleneck in our process: we need more ozone to decrease our costs” says ITC. It will certainly be done within the next 2 years as a 200,000 tons pulp production increase is planned.

### ITT Wedeco Scope

The ozone plant for the ITC pulp mill is designed for a maximum ozone production capacity of 200 kgO<sub>3</sub>/h at a concentration of 12 wt% (or 230 kgO<sub>3</sub>/h @ 10wt%) from a VSPA-oxygen. This represents the worldwide largest single ozone generator. The total scope of ITT WEDECO for the project of ITC included:

- One Z-Compact System (Type PDO 9500),
- One ozone gas distribution system (to provide ozone to the existing and to the new fibre line),
- Two ozone destruction systems, skid mounted, each including three ozone destructors, water separator and gas/steam heat exchanger (one system is for the existing fibre line and one system is for the new fibre line),
- One set of measurement and safety equipment,
- PLC-system and central control and monitoring system (CCMS),
- Supervision of installation, commissioning, start-up and training,
- Operation & maintenance contract.



Figure 3: Worldwide largest Z-Compact System, ITC Bhadrachalam

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