

# GOOD MANUFACTURING AND APPLICATION PRACTISES IN OZONE

The word GMP is well known to all. Good manufacturing practices govern most sensitive manufacturing processes that follow strict quality output. Regular inspections, validation of processes, calibration of equipments, CIP process are all part of GMP.

The same related to an ozone application. We shall term it GMAP, good manufacturing and application processes. Companies that follow these GMAP norms would provide value for money, reliability of both equipments and services.

The GMAP in Ozone covers two main areas:

- ▶▶ Reliability of Equipments and accessories chosen
- ▶▶ Reliability of application process and guarantee of results

## Reliability of Equipments and Accessories Chosen

Ozone equipments and accessories do not come cheap. The client expects that the equipment and accessories chosen by him (on recommendation of the manufacturer) have high standards of reliability.

The following details provided could indicate reliability of equipments and accessories:

- ▶▶ Standard specification sheets that OEM provides
- ▶▶ P & ID of equipment
- ▶▶ Wiring drawing of equipment
- ▶▶ QC certificate including a QAP for large machines
- ▶▶ Ozone test certificate during Factory

inspection (FAT)

- ▶▶ Warranty certificate and guarantees provided
- ▶▶ On line ozone production indicator for the client to know how much ozone is produced by the machine (mandatory)
- ▶▶ References list and certificated including contact numbers of existing clients
- ▶▶ Reference list of equipments working beyond 5 years and contact details of client
- ▶▶ Packing standards

The following details provided could indicate reliability of application:

- ▶▶ Ozone design and details provided to customer
- ▶▶ Calculation of ozone requirement for process
- ▶▶ Selection criteria for oxygen requirement and details of oxygen system
- ▶▶ Selection criteria for ozone pumps and details of pumps selected including performance sheets
- ▶▶ Selection criteria of ozone mass transfer, specifications of venturi and performance curves of venturi selected
- ▶▶ Design of contact tanks for large applications and drawings
- ▶▶ Ozone destructor selection and specification sheets
- ▶▶ Material of composition lists of ozone

generator parts, pipes, tubes and hoses

- ▶▶ Pressure and flow ratings of gases/cooling water flows and checks wherever required
- ▶▶ P & ID of process

The details provided could indicate reliability of process:

- ▶▶ P & ID of process equipment and verified at site
- ▶▶ Safety interlocks provided for equipment protection
- ▶▶ Safety equipments proposed including plant room requirement
- ▶▶ Ozone and oxygen leakage testing
- ▶▶ On line ozone production testing
- ▶▶ Guarantees for residual ozone/or process
- ▶▶ Validation documents if required
- ▶▶ Operation manuals including Dos and Don'ts
- ▶▶ Comprehensive training for operations and safety
- ▶▶ 24x7 technical and operation assistance

A GMAP program is required for the ozone Industry. This alone would increase the confidence of the prospective users and provide a stimulus for growth of this Industry. Users must keep in mind these checks to enforce compliance by OEMs. This would drive away fly by night and inexperienced operators in the market and make the Industry healthy.

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