

## Chapter 18

# Waste Gas End-of-Pipe Treatment Techniques in Italian IPPC Chemical Plants

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### ABSTRACT

*Due to more stringent emission regulations, very efficient emission control technologies are required adopting national IPPC permits based on BAT conclusions. Some abatement techniques are operating inside IPPC plants based in Italy. This chapter includes the results of a screening of Italian IPPC plants, trying to highlight operating conditions of abatement devices and possible already existing improvements for several compounds removal. The abatement techniques analyzed operate mainly on VOC content reduction or on inorganic compounds abatement. ISPRA experience has allowed to analyze different operative conditions, related with abatement techniques and their application in IPPC permitted plants. The results of this analysis suggest a possible reconsideration and new assessment for some end-of-pipe devices in order to find other, better-defined operational contexts, different from Italian provisions and an evaluation of current operational performances of the devices, in order to improve their environmental conditions consistently with BAT application.*

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## **INTRODUCTION**

Due to more stringent emission regulations, very efficient new advanced emission control technologies are required adopting National IPPC (Integrated Pollution Prevent and Control) Permits (below AIA) based on Best Available Technologies (below BAT) Conclusions.

Some of these techniques are operating inside Chemical Plants and Refineries based in Italy, such as Oxidation, Adsorption and Absorption devices. Other techniques (i.e. the ones that are new advanced technologies still in research or in demonstration state), are not subject of this Paper, based on describing running situation inside operating IPPC Chemical Plants and Refineries licensed in Italy at National Level.

This paper includes, but are not limited to, the results of a screening of Italian Chemical IPPC Industries and Refineries up to day, trying to highlight operating conditions and possible already existing improvements for removal of:

- VOC and other cancer causing and toxic substances;
- Dust, Mercury and heavy metals;
- NO<sub>x</sub> and Nitrogen compounds;
- SO<sub>x</sub> and Sulphur compounds;
- Chlorides and Fluoride compounds.

The abatement techniques analyzed in this work operate mainly on VOC content reduction, through the use of Oxidizing devices or on inorganic compounds abatement (in addition to VOC), through the use of Absorption or Adsorption devices.

Superior Environmental Protection and Research Institute (below ISPRA) experience, mainly developed as Technical Support to Italian Minister of Environment, Land and Sea (below IMELS), has allowed to analyze different operative conditions, related with abatement techniques and their application in IPPC permitted plants.

Many pollutants emitted from IPPC plants (according to Environmental Permits limit values) have been identified and charted a profile of possible application for abatement techniques in these plants in their different IPPC categories.

The results of this analysis allow to suggest a possible reconsideration and, also, new assessment for some end-of-pipe devices, in order to find other better defined operational contexts, different from actually Italian provisions and, also, an evaluation of current operational performances of the devices, in order to improve their environmental conditions, consistently with BAT application.

## **BACKGROUND**

In Italy, IPPC Permit is an authorization released for environmental protection purposes, in order to prevent and control pollution ‘at the source’ by means of an integrated authorization, allowing operation of IPPC industrial activities with specified production’s characteristics and dimensions, at both national and regional levels (Battistella, 2013).

The list of the categories of these specific industrial activities is regulated by the Italian Legislative Decree n. 59/2005 and s.m.i. (Italian Legislative Decree n. 152/2006 and s.m.i.) that adopts and endorses

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