

# The conversion of the electrostatic precipitator on the pulse jet bag filter especially in the aspect of heavy metals removal

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## 1. Introduction

The Electrostatic Precipitators (ESP) may require major upgrade or replacement due to present and future emissions consideration such as the ESP is not meeting outlet emissions requirements due to chemical composition of dust and especially in relation to mercury emissions control by sorbent injection upstream of the ESP, addition of a semidry or dry FGD system and compliance with upcoming fine particulate control regulations.

A lower cost option to consider for compliance strategy is the conversion of existing ESP to pulse jet fabric filter (fabric filter).

## 2. ArcelorMittal Romania case

This lecture introduces idea of conversion of the ESP to pulse jet bag filter executed at ArcelorMittal plant in Galati in Romania. Also is discussed the criteria that makes the conversion possible.

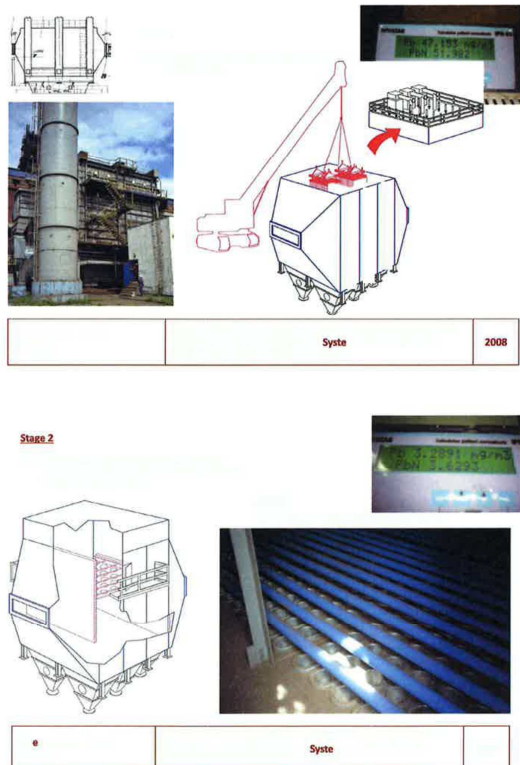


Figure 1. Different stages of ESP conversion

The key reason that fabric filters can now guarantee extremely low emission  $< 1 \text{ mg/Nm}^3$  as Bipromet SA has got a lot of references in copper industry incl. reduction of heavy metals emissions.

Coming back to AM Galati case the decision was taken when Romania joined EU to use more efficient flue gas cleaning ability, which could increase the production capacity of Stock House of BF. The cost of conversion was reduced due to reusing of existing ESP casing, supporting structure and dust conveying system. Bipromet SA provided whole design even lack of the drawings of existing ESP.

The dimensions of existing ESP allowed the usage of 6 m long bags. In addition to reduce the investment cost we used also the space ESP dedicated for clean compartment as walk in plenum design. However in case the customer would prefer another design – another refurbishment of ESP is possible – the top covers located on the roof incl. top whether enclosure.

The continuous monitoring system shows outlet dust concentration after ESP (top picture) and after refurbishing into fabric filter (bottom picture). The customer was very satisfied due to very abrasive dust causing erosion of the blades of impeller of the fan.

For Bipromet SA is quite simply a significant goal to achieve better air = more dust like a product to catch to improve the production efficiency.

First of all checking of important issues was taken into account:

- the casing condition depending of the ESP life and operation conditions;
- static re-calculations due to a higher under-pressure.

The advantages of converting an ESP to pulse jet filter was taken into account:

1. lower cost than replacing with a new bag filter,
2. minimal works of ducts modification,
3. reuse of existing dust hoppers and dust conveying system,
4. shortage of project time schedule,
5. chemicals' emission reduction in case the sorbents injection,
6. reduction of dust emission,
7. ready for future emission standards.

## 3. Lead process case

The refurbishment also possible within old fashioned, low ratio fabric filters. Within lead process in Glogow

Copper Smelter it was an safe and safety aspect of maintenance and staff enaged for replacment of filter bags. Instead of wide description of conversion of low ratio fabric filter to high ratio filter the cross section below shows a specific design. The main goal achieved dust emission reduced from 120 mg/Nm<sup>3</sup> to below 3,0 mg/Nm<sup>3</sup>.

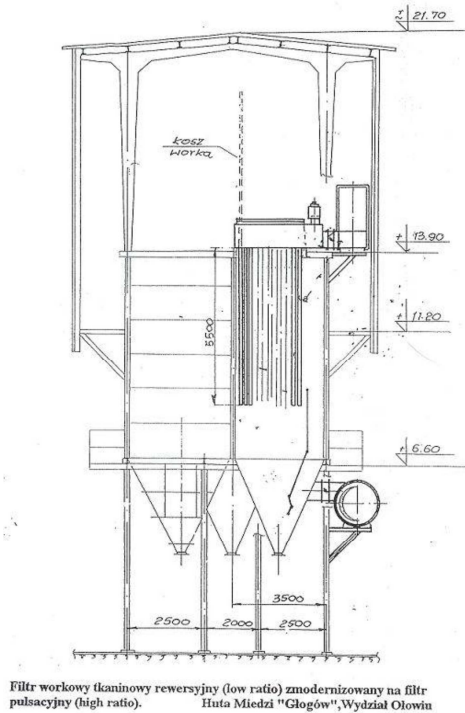


Figure 2.

#### 4. Better air is our business

Bipromet SA has been a leader of fabric filters design since over 50 years. Our core products of bag filters were through many years experience tested in copper industry and due to the heavy metals impurities there were always preferences for fabric filters than ESPs.

The conversion of an existing ESP to a pulse jet bag filter is a process that is becoming common as more plants seek an air pollution control to minimize the emission. A key to successfully applying this retrofit technology is using long filter bags and ability to clean effectively the full length of these long bags.

An increasing number of ESP could be converted to fabric filters as a response to demand of industry in relation to environmental authorities pressing in relation to the BAT conclusions and new emissions legislation.

Nowadays reality around the world in heavy industry incl. copper and power industry needs to eliminate/minimize the heavy metals emissions as an impact on our environment.

#### 5. Conclusions

The investment cost can be reduced significantly by converting many ESPs to much more efficient dust collector, which is bag filter instead of installing of a new bag filters in all.

The cost of conversion is an essential aspect indicated in yellow on the picture below.

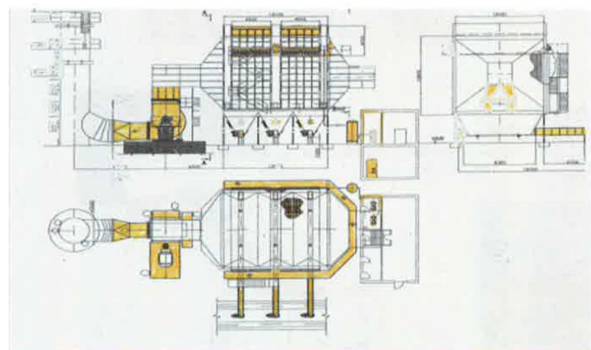


Figure 3. Refurbishment of dedusting system incl. ESP conversion