Case story

Flue Gas Cleaning system, based upon dry absorption from Heavy Fuel Oil

BWSC – Project Enemalta - Malta

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ENEMALTA – HEAVY FUEL OIL
INSTALLATION OF FLUE GAS CLEANING SYSTEM – DRY ABSORPTION AND FILCON BAG FILTER

Introduction:

Enemalta is the main provider of electricity generation and distribution services in the Maltese Islands and was established in 1977.
In 2007 Enemalta sign a contract with Burmeister Wain Scandinavian Contractor (BWSC) for the delivery of 8 complete Heavy Fuel Oil Engines, as Enemalta had to increase the supply of power. Each Engine should deliver 17 MW electrical power and the Fuel to be Heavy Fuel Oil with a Sulphur content of 2%.
In 2008 Filcon was awarded the contract for delivery of 4 complete de-SOx and dust Cleaning systems, based upon dry absorption. Each Line handling 2 Engines.

Pilot Plant – Azores Islands

Purpose / Requirement:

As the dust particles from Heavy Fuel Oil Incineration are extremely sticky and this would be the first Plant (World-wide) to use a Bag Filter for removal, It was decided to Build a Pilot Plant for testing, which was carried out at the Azores Islands in 2009.
The test result showed no damage on the Filter Material and the De-SOx emission, using Sodium Bicarbonate (SBC) was fulfilled.

The Test was carried out in a period of 2 month by the Team of Filcon Denmark.

Emission demands:

The new installation should fulfil all emissions according to the EU-Directive: EU 2000/76/EC

Raw gas emissions - Azores Islands

Solution:

As Malta in an Island and Enemalta have good Hapor Facilities, it was decided to deliver the Main Equipment in complete units and transport them by ship from Denmark to Malta.

Each line consists of 1 Reactor and 1 Bag Filter. There in a common SBC silo for each 2 lines

Complete Bag Filter

Loading of Reactor in Denmark

The Bag Filter Casing has a diameter of 6 meter and total transport dimensions was:

(L x W x H) = 22 x 8,5 x 7,5 m) – Weight 70 ton

All components / Equipment was delivered with one ship.

3 Reactors below deck

All Equipment loaded for Enemalta

Carrying out:

Due to some political issues at Malta Islands and late delivery of the Engines, the project was postponed and Filcon delivered the Equipment to Malta in January 2011

Installation of FILCON Bag Filter No. 1

INSTALLATION AT MALTA:

Filcon supplied necessary Mechanical and Electrical Supervision at the site at Malta, and the complete Erection was handled by the Main Contractor BWSC.

The complete installation and commissioning took approx. 9 month and the first line was started 01.09.2011

Each line is handling approx. 300.000 m3/h at 170-180 dgrC.

All 4 Filcon filters installed

All 4 Filcon filters installed

PLANT DETAILS:

Reactor: The Reactor is dimensioned and designed to have a load variation between 25 and 100% and as it's essential to have sufficient velocity inside the reactor, for the absorption with SBC, the Plant is equipped with a recirculation system of Clean Gas to the Reactor inlet.

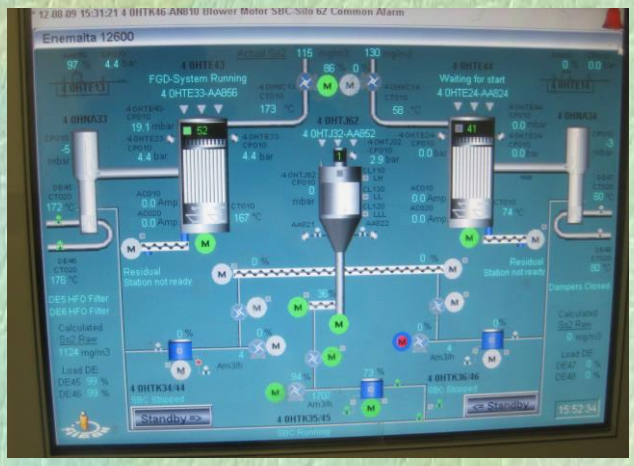
PLANT DETAILS:

Bag Filter:

Due to diameter of the Bag Filter (6 meter) and the design of the Supporting structure as a cylinder, it was decided to Install the Control systems for the Plant, below two of the Bag Filters, each handling two Lines.

The PLC system is designed as a complete Redundant system (Siemens S7-414), as a Request from the End User and is delivered by Filcon, with Ethernet connection for the communication to the central control room

MCC and Control Cabinet – below the Filter module



Operational Panel for 2 lines

SBC silo:

Each SBC silo delivers absorbent to 2 lines and is equipped with 3 x 37 kW Grinders, fabr. Alpine (2 for normal operation and 1 standby Grinder for maintenance ; the standby Grinder is connected to both lines.

As the Equipment are Quite big and there needs to be sufficient space for Maintenance, two of the High pressure Fans (15 kW) are placed below the nearby Bag filter module.

CONCLUSION:

After start-up of all 4 Flue Gas Cleaning lines, Enemalta carried out a Emission test, which showed that all emission was fulfilled according to the demands / contract.

The guarantee consumption of SBC, differential pressure, Pressure air consumption, etc. was fulfilled according to the contract