

SCA Higene Products UK Ltd

Oakenholt Site – PM2 Dust Extraction System

Background

The demand for softer tissue has resulted in more dust being generated during the paper-making process. The dust is present both as air-borne dust and accumulation on the structures around the tissue machine building. The volume of air borne dust is a health issue for the machine operatives and also presents an increased fire risk. During machine shut-downs the tissue machine and structures are washed down, but this leads to extended outage time and potential issues with water ingress into electrical equipment.

PM2 was originally installed with a dust extraction system, but this was removed several years ago due to its ineffectiveness.

The proposal is to install a new modern wet scrubber dust removal system.

Process Description

The dust extraction system will consist primarily of :

- 3 nozzles strategically placed on the sheet run between the yankee cylinder and the reel section.
- Extraction points over the UTM pulper.
- A canopy over the reels section and strategic closure of all of the area to minimise the volume of air required to transport the dust.
- 4 small on machine separators with water injection nozzles.
- Fan suction manifolds, ducting and sheet break damper.
- 1 large off machine separator with water injection and water circulation pump.
- 1 large dust extraction fan with discharge silencer, access platform for cleaning of the silencer baffles.
- Fan acoustic enclosure.
- Exhaust ductwork.
- Water supply pump, piping and variable speed drive.
- Water collection / seal tank and return water pump with variable speed drive and piping
- New PLC and drives dedicated to power control the dust system.

The fan will have a volume capacity of 27 m³/s to create sufficient velocity to extract and carry dust from its collection on the machine and hence through the system. The air / dust mixture is then sprayed with atomised water prior to the on machine separators which will separate a proportion of the fibre and water, the remaining air / water / fibre mix is collected in a manifold of ductwork and continues to a much larger off machine separator where further water is sprayed into the stream to collect and separate the remainder of dust and water, the air then continues through the fan and in line silencer through ductwork and is discharged directly to atmosphere outside the building on the north elevation of the machine house. The fan drive is variable speed @ 200Kw and will be set through commissioning at an optimum speed to create sufficient velocity to carry the dust, ultimately there may be different fan speeds for varying grades or PM speeds.

To prevent blocking of the water spray nozzles, water will be taken from the existing LP CW pump which will be uprated to provide the 700 lpm increase in flow required to supply the spray nozzles on the dust system, the new drive will be variable speed and will be controlled by a new pressure control loop which will again be set to provide the correct pressure at the nozzles.

Water from the on machine separators will be collected in a new seal tank located in the basement of the PM and returned to the flotation clarifier via a new variable speed pump controlled by level in the tank. Water from the off machine separator will be circulated locally for its own spray water and the remainder pumped also to the flotation clarifier.

The additional recirculated water use for the dust system will be offset by the recent removal of a vacuum pump which had a similar water requirement for its operation.

The estimated increased load on the clarifier from both sources will be will be approximately 5 kg/hr or 43 tonne per year that will ultimately manifest itself in increased sludge to land spread from the site.

The effluent treatment plant should not be affected by this plant as the sludge will be removed and water recycled within PM2 systems.

Increased energy consumption will be approximately 30kw/hr per tonne of tissue produced from PM2.

Dust levels within the machine house will be guaranteed to 2 mg/m³ measured :

- 1.5 m from the machine baseplate track on front side between centrelines of yankee dryer and wound jumbo reel in braked position on PM reel.
- 1.5 m above floor level

Refer to attached PDF from Novimpianti providing more details for the system.

Environmental Considerations

The original site permit imposed a limit of 50mg/m³ for particulates for the dust removal systems. All air emission limits were removed on the latest permit (issued 29/11/12). The guarantee for the new dust system is less than 10mg/m³. It is proposed that particulates are measured following commissioning and then annually.

Noise from the site is managed by a noise management plan. This was required following noise complaints from PM1 machine. The plan includes regular monitoring around the site and the new dust extraction system exhaust will be added to the monitoring plan. The exhaust ducting will be located at a height of approximately 6m on the north side wall of the machine building, with the opening directed downwards. The system guarantee will be a maximum noise level of 80dbA @ 1.5 meters from the exhaust point. This is a lower level of noise than the recently modified fan on PM1 which was the cause of the complaints.