SMOGHOG®

Case Study

Extraction of Oil Smoke from Various Multiple Die Presses in the Screw Industry

Problem:

Using multiple die presses in production sites all over the world, an SME manufactures several billion (!) screws for the automobile industry.

Machine types such as Nedschroef 520 EL and National Machinery PAK18 insert a lot of energy into the relatively small “screw” unit at the moment of metal formation, which leads to high surface temperatures in the short term.

Screw Manufacturing

Screws are indispensible as removable connections in the world of technology and are needed in immense quantities. The most conventional manufacturing type is non-machining cold processing, during which defined distortions, such as the head and thread, are molded using high forces. The advantages are that the procedure takes place without any loss of material, the fiber structure is not disturbed and cold working is a positive side effect.

The high quantities needed are manufactured using multiple die presses in a technically modern manner. These multiple die presses can perform several work steps and/or produce several pieces per cycle and are supplemented by delivery and removal systems.

As a result, the oil evaporates abruptly from the workpiece, which is on the surface of the screw blank as an anti-corrosive or to support the formation process.

This leads to a high concentration of oil mist in the exhaust air within the multiple die press or its casing, which is damaging to health and the environment.

In addition, it is frequently forgotten that the oil on screws, which are manufactured in short cycles, evaporates subsequently in the collection container, which also leads to high concentrations of oil mist.

Solution:

For this task, UAS, now Parker Hannifin developed a solution, which takes several aspects into consideration.

In order to achieve a high filtration efficiency for oil mist particles (<0.5µm), innovative electrostatic filter technology is used, which extracts the exhaust air from both the primary workspace and the collection area for the finished components.

In terms of energy, it is particularly interesting that the engine performance of the ventilator is just 5.5kW, i.e. half of the output needed for mechanical filtration systems!

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Container extraction

In this way, the higher investment cost of an electrostatic system are amortised within 2 to 4 years. Thus run times of 10+ years lead to an enormous money saving, particularly with increasing energy cost. At this point, reference is made of VDI 3678 Sheet 2.

In addition, some of the systems have been realized with summer/ winter set-up in order to use the waste heat to heat the hall in the winter, which also saves primary energy.

It is valued as a further advantage, especially regarding eco-auditing aspects, that electrostatic filter elements can be cleaned and reused after having served a long time. “Hazardous waste disposal” is not necessary, which saves environmental and company resources.

Key Technical Data:

- Product SH 60/T TR (two electrostatic stages with integrated wire meshing as a pre-filter)
- Air volume under operating conditions: 12,000m³/h
- Power consumption of ventilator: 5.5kW
- Power supply: 400V/3/50Hz
- Filter weight: approx. 650kg
- Filter surface: 156m² electrostatic filter surface
- Pressure loss of filter: 1.5mbar (150Pa)
- Paint RAL 7035
- Max. process temperature: 65°C

We thank the company for approving this article and the pictures.

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