SPECIAL: Energy, Resources, Environment & Sustainability in the aluminium industry

Energy considerations – an industry route map

Aluminium cycle: machining, briquetting, melting

Otto Fuchs orders melting furnace from Hertwich

New sustainability reports from EGA and Constellium

New life cycle assessment of aluminium beverage cans

Innovative, water-heated log preheating saves energy and costs

Reports in the run-up to Euroguss 2020
Nemak installs modern KMA air extraction and filtration system in its new Slovakian foundry

In modern production plants, clean air in the working area is an absolute must. Product and workplace quality as well as certification requirements make measures for air pollution control absolutely necessary. The exhaust air generated by foundry machines is composed of oily smoke and aerosol substances. The continuous use of these machines results in a high smoke pollution, which has to be separated. Therefore, exhaust air technology in modern foundries offers high potentials for energy savings and CO₂ avoidance. When expanding its production site in Žiar nad Hronom, Slovakia, automotive supplier Nemak relied on a modern exhaust air filtration system of a specialist.

As a global developer and manufacturer of aluminium vehicle components, Nemak supplies components for over 650 vehicle types to more than fifty customers worldwide. The diversified portfolio ranges from complex high-tech cast components for conventional and hybrid engines to structural components and solutions for e-mobility. Nemak’s business unit in Europe comprises eleven production sites in nine countries. From its Slovakian location in the city of Žiar, the company supplies automotive components to customers both in the Eastern European country and beyond. In the course of an expansion, investments were made in modern exhaust air technology to increase the efficiency of energy consumption at the new die casting plant and to avoid any possible environmental impact from the start.

Energy-efficient operation required

In production plants air pollution control measures have not only to meet the requirements of occupational safety and environmental protection, but have also to ensure energy-efficient operation. In foundries, exhaust air technology is the second major energy consumer after melting and holding furnaces. High energy consumption results in high production costs and high CO₂ emissions. By using energy-efficient exhaust air filter systems, however, savings of up to 80% percent can be achieved, while at the same time improving the CO₂ balance of the production site and thus contributing to climate protection.

With conventional exhaust air purification, the exhaust air is extracted from below the hall roof and transported outside. To create a clean air environment for occupa-
proves by 30 to 40 tonnes per year.

An automatic filter cleaning system integrated in the filter minimizes maintenance effort and service downtime.

**Connecting casting machine and exhaust air filtration system**

In a modern casting cell, various peripheral technologies are integrated into one coherent system. The basis for an intelligent connection between the exhaust air filtration system and the casting machine is the advanced communication between the respective control systems.

In Nemak's foundry in Slovakia, the filter technology can adapt to the current exhaust air requirements of the respective casting cell. By synchronizing the technical interfaces, the ventilation power of the filter system adapts to the spraying cycle of the die casting machine. During the spraying pause, a frequency converter can be used to throttle the fan output to 75 percent in order to reduce electricity consumption. Such an efficiency measure allows for energy savings to be realized at each individual casting cell.

Furthermore, in the age of Industry 4.0, enhanced communication (ProfiNet) between the casting machine and the filter system forms the basis for many safety-relevant measures in the area of fire protection and occupational safety, such as auto start/stop, emergency control, etc.

Nemak places the highest demands on its production sites in terms of energy efficiency, occupational safety and environmental protection. The four Ultravent exhaust air filter systems at the die casting plant in Žiar have been in operation for over a year and deliver convincing results.