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Privé : Les Sables Olimag: Productivity and the environment both win with natural gas

Increased production, reduced energy intensity, lower production costs, a smaller environmental footprint, stabilized combustion, fewer unplanned stoppages and lower maintenance costs are statements that the owners and managers of Olimag in Thetford Mines can now make since the conversion of their rotary kiln from used oil to natural gas.

Founded in 1986, this Québec company has become an important manufacturer of abrasives for sandblasting. Olimag, whose name is derived from olivine and magnesium, also produces the refractory sand used by steel mills in several countries. And it produces specialized sands used, among other things, as grout for sealing deep water wells.

Constantly seeking to improve the quality of its sands to meet the specific needs of different activity sectors, OLIMAG invested in the conversion of a rotary kiln to natural gas – a key factor in producing high quality sands.

Extending the distribution network to Thetford Mines: For access to natural gas

The used oil employed led to serious operating, maintenance and management problems. Since the properties of this fuel were not constant, combustion stability was impossible to maintain, resulting in a lack of control and, consequently, a reduction in product quality plus frequent stoppages.

This led to discussions about changing the fuel – heavy oil, anthracite (coal), petroleum coke (pet coke) – which to choose? Their operational and environmental disadvantages discouraged the company's owners. Major investments would have been required for handling, storing and conditioning these fuels. Heating the heavy oil reservoirs, pumping and atomizing it, made that option onerous. The acquisition of a ball mill and its high operating and maintenance costs eliminated the choice of coal or pet coke. The environmental impact of solid fuels on greenhouse gases (GHGs) and the atmospheric pollution due to sulphur, fine particulates and nitrogen oxide emissions went against Olimag's principles and convictions.

Olimag's managers, along with business people in the Thetford Mines area, therefore got together to persuade Gaz Métro to extend its distribution network into the region. Natural gas represented the best energy source to meet the economic and environmental needs of regional companies, from small SMEs to multinationals.

Natural gas: A guarantee of efficiency

Natural gas offers several advantages when it comes to satisfying heating needs for industrial processes. Computational fluid dynamics supports the designer and facilitates optimizing the heat transfer between the flow of hot gases and the products to be treated. It is feasible to get a flame temperature, a configuration, length, and sufficient volume in order to optimize radiation in the desired range. The design of the equipment and controls thus becomes easy. As concerns the Olimag rotary kiln, the burner chosen and its components maximize flow speeds, air and gas pressures, as well as the temperature range throughout the kiln. Controlling the emissivity of the flame adjusts the temperate based on the sand's granulometry.

The transfers of heat to the products to be treated are thus maximized, while ensuring the longevity of the refractory lining of the rotary kiln. However, if the design is poor, then the high temperature required for calcination becomes a challenge for operators of rotary kilns like those used in making cement and lime. Rings can form inside the rotary kiln, as a result of products in fusion that solidify and accumulate at particular points on the wall's perimeter. The rings plug the kiln since they prevent the material to be treated from circulating inside the rotary kiln. Unplanned stoppages are required to unclog the kiln by breaking up the rings with a pick hammer. The choice of natural gas, along with the reconfiguration of air circulation and turbulence inside the rotary kiln, prevent such rings from forming.

High quality products: Thanks to natural gas

The sandblasting sand is produced by a natural gas heat treatment with temperatures approaching 2300°F. The raw material is continuously fed into the rotary kiln. The high temperature heat treatment fuses and ceramicizes the particles. The sandblasting sand thus produced has the mechanical qualities sought, including high impact resistance, plus a geometric configuration suitable for its use as an abrasive. In the case of refractory sand, the heat treatment applied to the raw material and the additives gives it the mechanical and chemical qualities foundries need.

Concrete results: Increased production, decreased GHGs

Since the conversion of the rotary kiln in 2013, the results obtained confirm that natural gas was a wise choice. First of all, the new natural gas burner and its improved controls have resulted in an increase in production of more than 23%, measured in tonnes produced per day. Also, the new burner has permitted lowering the energy intensity by 5.7% in terms of gigajoules per tonne produced, and the decrease in GHGs is around 24%, thanks to natural gas.

Given the price stability and strong competitiveness of natural gas, coupled with the many operational and environmental benefits of this source of energy, Olimag finds itself in a very advantageous position.

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