Integrated Production Solutions for Aluminum Smelter Operations

Securing an alumina source, fluctuating market prices, increasing energy costs, higher grade and specialized aluminum product demands require aluminum smelter operations to be more effective and agile. Traditionally, the range of different processes from pot reduction to cast house, and auxiliary processes such as carbon anode baking and power generation, have made smelter data analysis difficult. Honeywell’s integrated production solution links the process control systems to the Enterprise Resource Planning (ERP) system and combines data from these varied processes, enabling staff to increase value and reduce operating costs throughout the aluminum smelting production chain.

Honeywell’s Experion® Process Knowledge System (PKS) and Enterprise Building Integrator can seamlessly integrate pot-line control systems, fire and gas, emergency shutdown, security and information systems.

Honeywell’s aluminum smelter Manufacturing Execution System (MES) applications can help:

- Improve customer order acceptance flexibility, optimize furnaces and ladles production schedule, minimize cast house cycle time and reduce furnace flushing thereby maximizing pot metal superheat and production.
- Minimize metal losses, optimize metal inventory and minimize quality giveaways through frequent and accurate metallurgical balance.
- Reduce statistical quality variability, eliminate waste and recycling efforts, and optimize asset effectiveness by closely monitoring the operation, improving laboratory data management and tracking downtime with better root cause reasons.

Honeywell’s proven advanced control enables efficient transformation of fuel to electricity, achieving world-class current efficiency performance and maximizing pot metal superheat. Advanced control technology helps to better control the anode baking furnace temperature profile, and early event detection and state estimation technologies enable the smelter to improve pot control and kiln reliability.

Case Study

A large aluminum company planned to build a 400,000-tonne aluminum smelter in North America. This was a fast track project with critical completion dates which required integration of control, fire, security and building automation. In addition, the company needed to ensure the smelter operation team was ready to master the latest smelter process technology and required process simulation and training.

Honeywell was chosen as the preferred vendor because of its unique capability to deliver all project requirements. The total solution included the following:

- Experion system incorporating over 240 controllers and 350,000 acquisition and control points
- Enterprise Buildings Integrator connecting the:
  - HVAC system that covered 30 zones and over 800 controllers
  - Surveillance security system incorporating nearly 100 cameras
  - Fire detection and alarming system for the entire facility
- 120 Human Machine Interfaces allowing access to process, HVAC, security and fire, and surveillance video through a single interface
- Dynamic training simulation systems for raw material handling, smelter gas treatment and the anode facility
The choice of a single integrated solution covering all areas resulted in significant benefits throughout the project and into operations. There was considerable return on investment realized through the single platform approach, which minimizes lifecycle costs and ensures the systems work seamlessly together.

A strong technical team locally supported by Honeywell and its global partners was built to validate and evolve all the technologies required, including laboratories in Europe and third-party vendors in North America. The project was approved by the aluminum company and plant startup was on time and on budget.

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More Information
For more information on Honeywell’s aluminum solutions, visit www.honeywell.com/ps or contact your Honeywell account manager.

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