ABB Ability™ Advanced Process Control for metals
ABB Ability™ Advanced Process Control for metals (APC) is the ‘autopilot’ that models and predicts process behavior, and replaces manual manipulation of multiple variables with accurate, automatic setpoint adjustments that allow metals manufacturers to consistently control, stabilize and optimize operations around the clock for maximum profitability.

**Customer need**
Metals manufacturers are under constant pressure to maximize productivity, quality and availability while minimizing costs and environmental impact. It’s more critical than ever that operational decisions are accurate, based on process data and expertise, as systems and processes become increasingly complex, integrated and interdependent. At the same time securing 24/7/365 continuous access to personnel equipped with the experience and expertise necessary to drive operations optimally is a growing challenge in many industries including metals.

**ABB solution**
ABB Ability™ Advanced Process Control for metals (APC) is a digital modeling and optimization solution for driving your plant at peak performance around the clock. By coordinating the multiple setpoints of numerous process stages and immediately detecting deviations, it makes accurate, automatic and consistent system decisions, avoiding the performance fluctuations that are inevitable with manual control, and reducing the need to have onsite experts constantly monitor and modify processes manually.

**Benefits**

<table>
<thead>
<tr>
<th>Typical value APC delivers*</th>
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<tbody>
<tr>
<td>Quality variability</td>
<td>−10-20%</td>
</tr>
<tr>
<td>Output</td>
<td>+2-3%</td>
</tr>
<tr>
<td>Fuel consumption</td>
<td>−1-2%</td>
</tr>
<tr>
<td>Electricity consumption</td>
<td>−2-3%</td>
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*Based on over 300 references within process industries

For more than 20 years APC has been delivering tangible benefits to ABB customers across process industries. New digital technologies significantly reduce the time and effort required to develop additional APC applications, impacting positively on ROI and providing clear advantages for a much wider range of processes featuring continuous operations and multiple control loops.

Several key areas in metals are identified as high potential for optimization with APC including raw material grinding, pelletizing and sintering, as well as annealing furnaces and reheating furnaces in cold rolling.

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**Why choose ABB as your partner in digital?**

At ABB, we understand that what really drives success in digitalization is an in-depth understanding of your metals plant. Domain expertise and on-ground process knowledge are essential to the effective and efficient convergence of OT and IT and the true realization of added value. Take the first major step in your digital journey together with a trusted and experienced partner.
What is APC?
APC is the ‘autopilot’ for driving your plant to an optimum state around the clock. It employs Model Predictive Control (MPC), a technology proven to successfully model and predict process behaviour some steps into the future and deliver effective control to handle multivariable processes that feature delays and/or strong interactive loops.

By leveraging ABB’s extensive metals industry know-how together with MPC, machine learning and advanced analytics, key metals processes can be accurately modeled, creating digital twins which can be used to evaluate current conditions, predict behaviour some steps into the future and automatically adjust process variables and setpoints within given constraints. By making frequent, small changes, APC helps avoid large corrections or overcompensation for changes in conditions, creating a stable process, before steadily and smoothly moving to and maintaining an optimal operating state which maximizes both quality, throughput and energy-efficiency.

Integrates with your automation system
Part of the ABB Ability™ digitalization portfolio, Advanced Process Control for metals utilizes real-time data from control systems and can be integrated into ABB Ability™ System 800xA or stand-alone for connection to third-party alternatives using open communications protocols such as OPC (OLE for Process Control).
Available applications

Iron and steelmaking involves complex, resource-heavy processes which are currently highly dependent on operator expertise and manual intervention for optimal performance. ABB Ability™ Advanced Process Control for metals offers three powerful applications that reduce the need for manual monitoring and adjustments to improve stability and repeatability while optimizing productivity and energy consumption while maintaining product quality.

**ABB Ability™ Advanced Process Control for pellet indurating machine burner**
Plant data is used to create a model of the process, predict control performance in the near future, calculate setpoint adjustments and deploy them to the Level-1 controllers to prevent feed rate, induration machine burner speed and bed height variations from interfering with temperature control in the firing zone, maintain a stable burn through pellet temperature, minimize pellet quality variability and reduce energy consumption.

**ABB Ability™ Advanced Process Control for pellet plant dryer**
A model of the dryer outlet temperature is created and used to predict control performance in the near future horizon. Setpoint corrections are then calculated and downloaded to the Level-1 controllers allowing intermittent disturbances in the dryer’s feed rate to be rejected, dryer control to be improved by avoiding long process delays and insufficient drying due to unmet temperature limits to be eliminated.

**ABB Ability™ Advanced Process Control for raw material grinding**
MPC is employed to model, predict and stabilize key process variables such as material feed rate, separator speed and reject rate in order to optimize ball and vertical mill throughput and allow for the highest possible feed rate at a given product quality, minimize grinding quality variability and reduce the number of stops.
ABB Ability™ Advanced Process Control for metals
Use case highlights

How ABB Ability™ Advanced Process Control for metals met the needs of ABB customers

Pellet plant indurating machine burners
APC maintained the individual temperature profile, delivering a 15% reduction in standard deviation for the indurating machine temperature profile along the indurating machine burner zone, improving pellet quality and reducing burner fuel consumption by ensuring burn-out temperature is reached at the right location.

Raw material grinding
APC was installed on a grinding circuit that included a roller-press with static V-separator and single chamber ball mill, improving control performance with a 4% productivity increase, 3% energy savings and 60% reduction of returns standard deviation.

Pellet plant dryer
APC maintained the outlet temperature of the iron ore dryer at the desired setpoint despite intermittent disturbance in feed rate and process delays.