



STEEL MAKING REHEAT FURNACE PRESSURE



Steel companies around the world continuously introduce and enhance processes that emphasize sustainable development. Key sustainable targets include minimizing the environmental footprint and increasing energy efficiency. These companies proactively develop actions to decrease fossil fuel consumption, thus reducing greenhouse gas emissions. Through all these initiatives, companies prove it is possible to be socially responsible while reducing operational cost to produce quality steel.

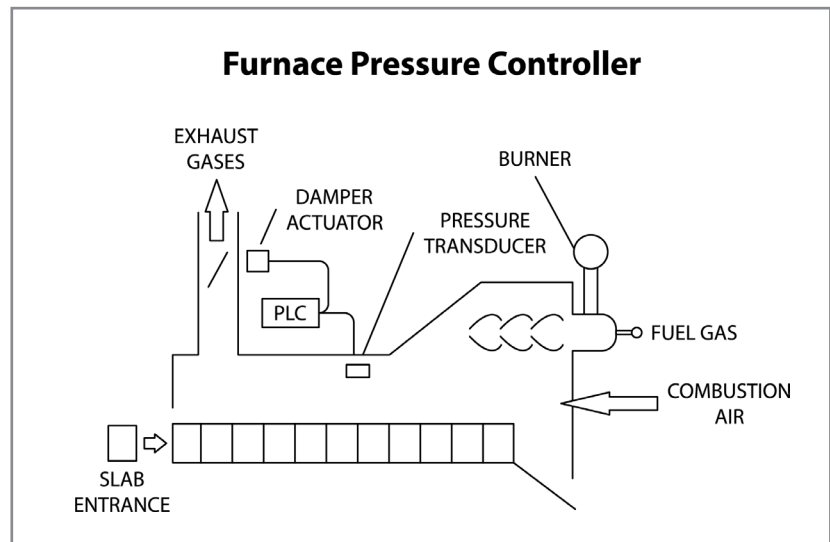
Modern continuous rolling mills produce large quantities of thin sheet metal but consume significant amounts of energy—particularly with reheat furnaces. These furnaces are gas fuel energy intensive, second only to blast furnaces.

The reheat furnace is located at the hot strip mill and is the process step before hot rolling. In this step, steel billets, plates, or blocks are usually heated from room temperature to $\sim 1,200\text{ C}^\circ$. At this temperature, the billet can be hot rolled and achieve the desired metallurgical, mechanical and dimensional properties of hot rolled products. Optimal operations require the minimization of fuel consumption, while maintaining a controlled steel billet thermal soak.

From economic, production, and environmental standpoints, the operation of reheating furnaces is of great importance to the steel making process. Economically, the consumption of fuel needed for reheating can represent up to 15% of the operational cost of a rolling process. With respect to productivity, a reheat furnace capacity often dictates the production rate for the rollers, which means that reheating is usually the bottleneck in achieving the maximum production volume. The furnace operation must be reliable, as any downtime will cost the average sized mini mill nearly \$45,000 per hour in lost product revenue.

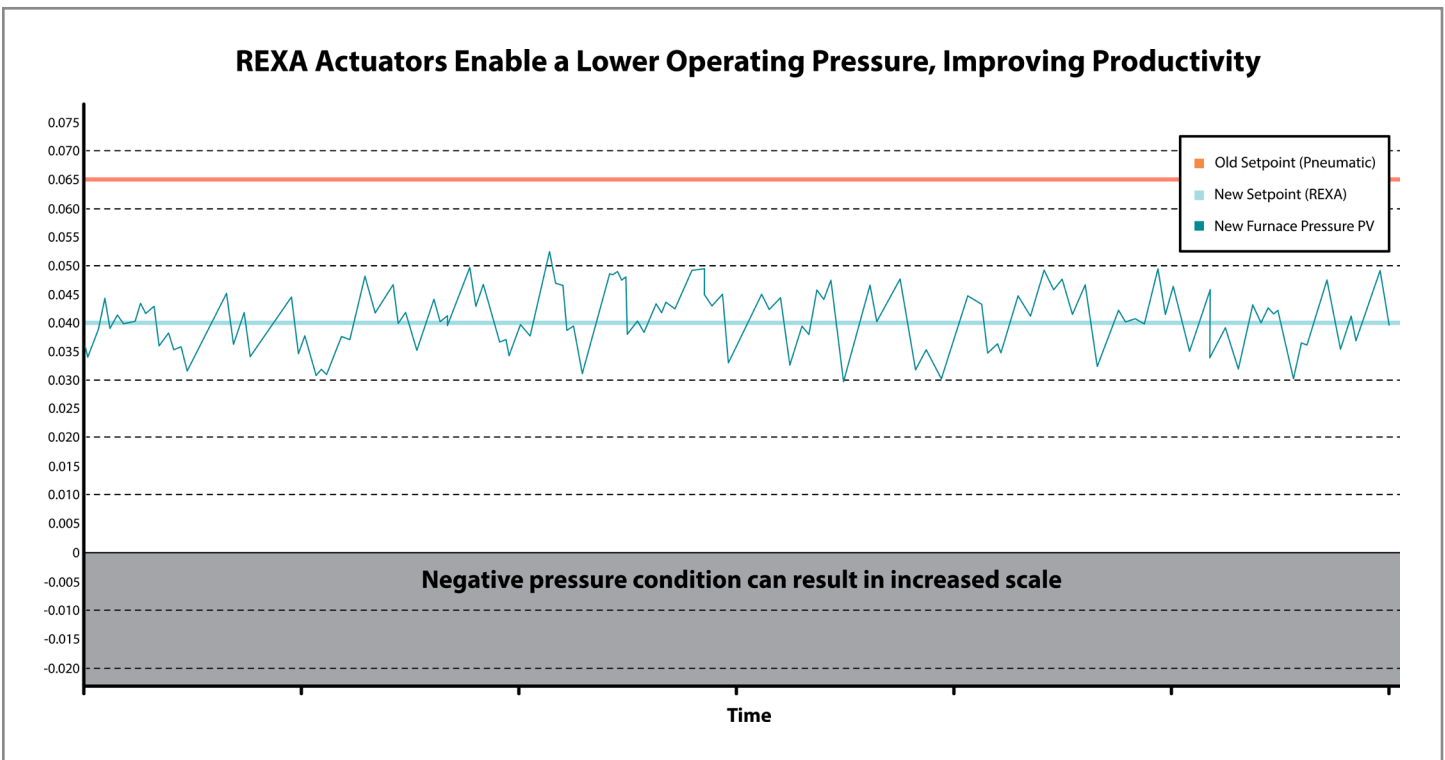
Maintaining a controlled ramp up and holding soak temperature is not a straightforward task. Heat transfer to the steel billets is influenced by internal temperature setpoint of the furnace, flow rate of fuels and flow rate of air. Maintaining furnace pressure is very important. If the furnace pressure is too low, air will ingress in the furnace with oxygen, potentially causing scale formation, impacting quality and productivity. If the furnace operates too high, then the fuel consumption will increase operational cost.

At a steel mill in northeast Pennsylvania, the rolling mill team was frustrated by the furnace pressure control. The stack damper position used a pneumatic actuator and was responsible for the amount of flue gas exiting the stack. Control was poor, and the actuator was not reliable. The unit required maintenance to recalibrate the position switches. In winter, water in the air lines would freeze, making the actuator inoperable.





“Upgrading from pneumatic actuators to REXA actuators provided a reliable solution with higher furnace availability and reduce fuel consumption.” – Instrumentation Supervisor





Headquarters & Factory

REXA, Inc.
4 Manley St.
West Bridgewater, MA 02379
Tel: 508-584-1199

Sales, Service, & Training

REXA, Inc.
20338 Telge Road, Building E
Tomball, TX 77377
Tel: 281-944-4490

Sales & Service

REXA, Inc.
7110 Oak Ridge PKWY. Suite 170
Austell, GA 30168
Tel: 770-857-0003



www.rexa.com

SS-7_8.24