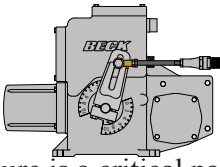
BECK®

Electric Actuators for Industrial Process Control

Beck Actuator Helps Improve Crude Heater O_2 Control and Combustion Efficiency



New Jersey U.S.A.

Controlling furnace draft pressure is a critical part of overall crude heater combustion control and operation. Furnace draft has a profound effect on combustion efficiency, stack emissions, heater life and operating safety. Pressure excursions - positive or negative - cause inefficient combustion and can lead to heater damage and unsafe operating conditions. Since the furnace draft pressure is controlled by the heater's stack damper, it follows that the stack damper actuator plays an important role in overall heater efficiency and safety.

Personnel at the Nustar Paulsboro (NJ) Asphalt Refinery, now owned by Axeon Specialty Products, recognized this and identified it as an opportunity to improve heater stability and efficiency by installing a Beck electric actuator on the Unit #1 Stack Damper. The plant's heater stack damper had been equipped with a manual operator that did not provide reliable, precise control of the damper. The damper had to be set to maintain safe operation at the expense of efficiency. In this configuration, stack O2 (excess air) was typically in the range of 4%, which is much less than ideal for efficient operation. By automating the stack damper with a Beck electric actuator, the plant hoped to improve efficiency by reducing stack O2 by at least 0.5%.

The Beck actuator was selected for this project because of its excellent positioning capability and its reputation for reliability, and it proved itself a perfect choice. Almost immediately after installation, the operators confirmed that the original O2 improvement goals had been exceeded. In fact, the Beck had improved the desired 0.5% stack O2 reduction by a factor of 3 to 4 times since the operators were now able to consistently control O2 in a 2 to 2.5% range.

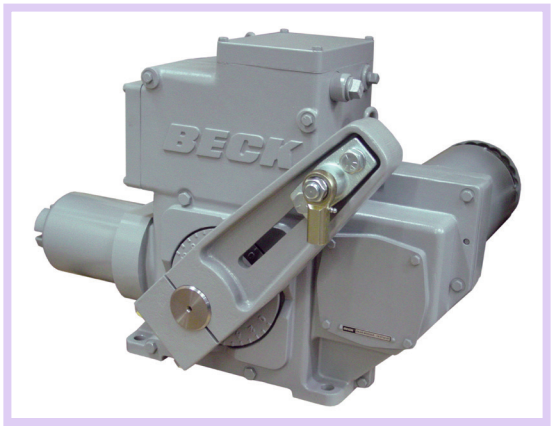


Figure 1

Beck 11E-400 Hazardous Rated Rotary Actuator

The Unit #1 Crude Heater is fueled with 60-80% waste gas, with the balance being natural gas. Reducing excess air up the stack (stack O2) reduces the heat loss. Therefore, the closer excess air (O2) can be controlled to 0%, the less fuel energy wasted. Given natural gas prices at the time of this project, a 1% reduction in stack O2 equates to $36,000 per year savings. The plant's estimated savings given the reduction from 4% to 2-2.5% O2 equates to $54k to $72k per year in fuel efficiency gains alone.

Customer Quote: ***"The consensus is that the Beck actuator has definitely helped us to lower the O2 reading. The board operators are making moves as small as ½ of 1%, O2's are running closer to our desired minimum of 2%."*** **Frank Rizzi**

BECK VIDEO Scan W/ Smartphone

Harold Beck & Sons Inc.
11 Terry Drive
Newtown, PA 18940
(215) 968-4600

Actuator Solutions since 1936

www.haroldbeck.com