TCF
TWIN CITY FAN

Replacement Kiln Fan: Increasing Longevity for Chemical Production

Quick Facts

Industry
Chromium-based chemical products

Application
Fans provide heated recirculation air for chemical drying kiln

Customer
Speciality Chemical Manufacturer

Twin City Fan Representative
RL Kunz
Raleigh, NC

Challenge
Ensure bearing longevity, design fan to meet current and future production requirements, provide resilience against corrosion and particulate matter

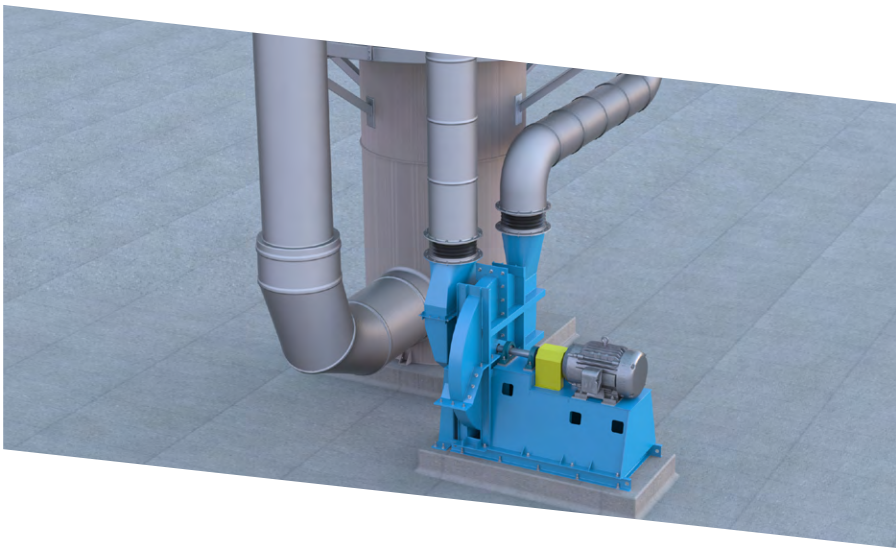
Solution
Customized, MBR heavy-duty pressure blower discharge stack

Overview

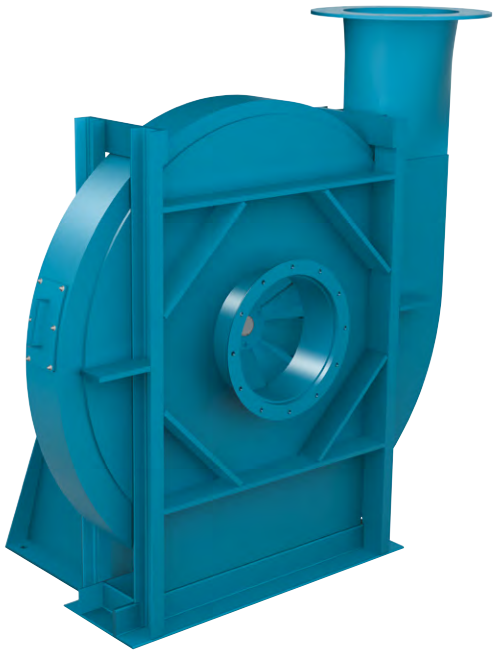
Chromium is a hard, brittle, corrosion-resistant metal. It is often used to plate other metals to form a protective coating, and to manufacture stainless steel. Chromium ore is processed – usually by smelting – to develop many chromium-based products.

A chemical company that specializes in chromium-based chemical products processes chromium ore at its facility in Texas. Although the company has other locations, the products produced at this facility include chromic acid, which is used in chrome-plating processes; chromic oxide, which is used to produce aerospace super-alloys and refractory bricks for kilns; and sodium dichromate, which is the building block for almost all other chromium compounds.

Drying is a necessary step in the chromium production process. Therefore, all product – regardless of the specific formulation – must be dried in a kiln. Ore that has a high water content requires longer drying time and increased air flow than ore with less moisture. The kiln's recirculation fan provides this air flow. However, the original kiln fan at this facility required frequent maintenance and it was time to replace it. The chemical company turned to their Twin City Fan & Blower (TCF) represenative to supply the replacement fan.



CASE STUDY



Model MBR

Heavy-Duty Pressure Blowers

Twin City Fan & Blower has the engineering and manufacturing capabilities to accommodate virtually every conceivable application. We have completed thousands of successful installations worldwide and have a proven track record for tackling the most technically complex and unique applications.

We separate ourselves from the competition by offering a greater breadth of products and quickly adapting to the needs of our customers. This is truly a testament to our company philosophy – respond to the needs of the customer, the first time, every time.

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Challenges

Maintenance technicians at the chromium processing plant were replacing bearings on the original kiln recirculation fan every 38 to 45 days. Production had to be halted during repairs, which cost the company through lost production, maintenance resources, and replacement bearings. Although TCF engineers were confident they could provide a satisfactory solution, the biggest challenge was convincing the chemical company that the fan and bearings would be robust enough to not fail so quickly.

In addition to meeting performance requirements for current production levels, the chemical company wanted a fan that would provide increased capacity to accommodate the company's growth. The company determined that the kiln recirculation fan should provide 14,000 CFM at 76 inches WC static pressure.

The challenges didn't stop there. Elevated temperatures, particulate matter and a corrosive air stream complicated this application. TCF would have to supply a reliable fan that can withstand this type of harsh environment.

Solution

Twin City Fan & Blower supplied a direct-drive MBR 589 heavy-duty pressure blower with a 58-inch wheel and 300-hp motor, a spare wheel and spare bearings. The MBR wheel features heavy-gauge back plate, blades and wheel shroud that is matched to the inlet size of the fan. This fan model develops high pressure and offers resistance to material build-up because of the radial bladed wheel.

TCF determined that the original fan was not sized correctly. The 30-inch wheel had to run at 3,600 RPM to provide enough recirculation air flow for the kiln. At this speed, the bearings frequently failed. However, the (maximum) speed of 58-inch wheel MBR fan is 2,200 RPM – even slower at the current level of production. Because the bigger TCF fan can run at a lower speed, the bearings have a much longer life.

To withstand the chemical plant's harsh environment, Twin City Fan used 2205 duplex stainless steel to construct the air stream components of the fan. This high grade stainless steel is excellent for high-temperature, corrosive applications that require high strength.

Results

The specialty chemicals facility received the customized MBR pressure blower as well as reassurance from TCF that the provided calculations – which accounted for temperature, speed and loading – indicated long bearing life. The fan exceeded the current performance requirements, and provided increased capacity at multiple performance points to accommodate the company's growth. And because 2205 duplex stainless steel is used for critical air stream components, the fan resists corrosion and wear. Due to Twin City Fan's ability to deliver a long-term solution for the chemical company, the plant has already ordered two more fans for other processes.