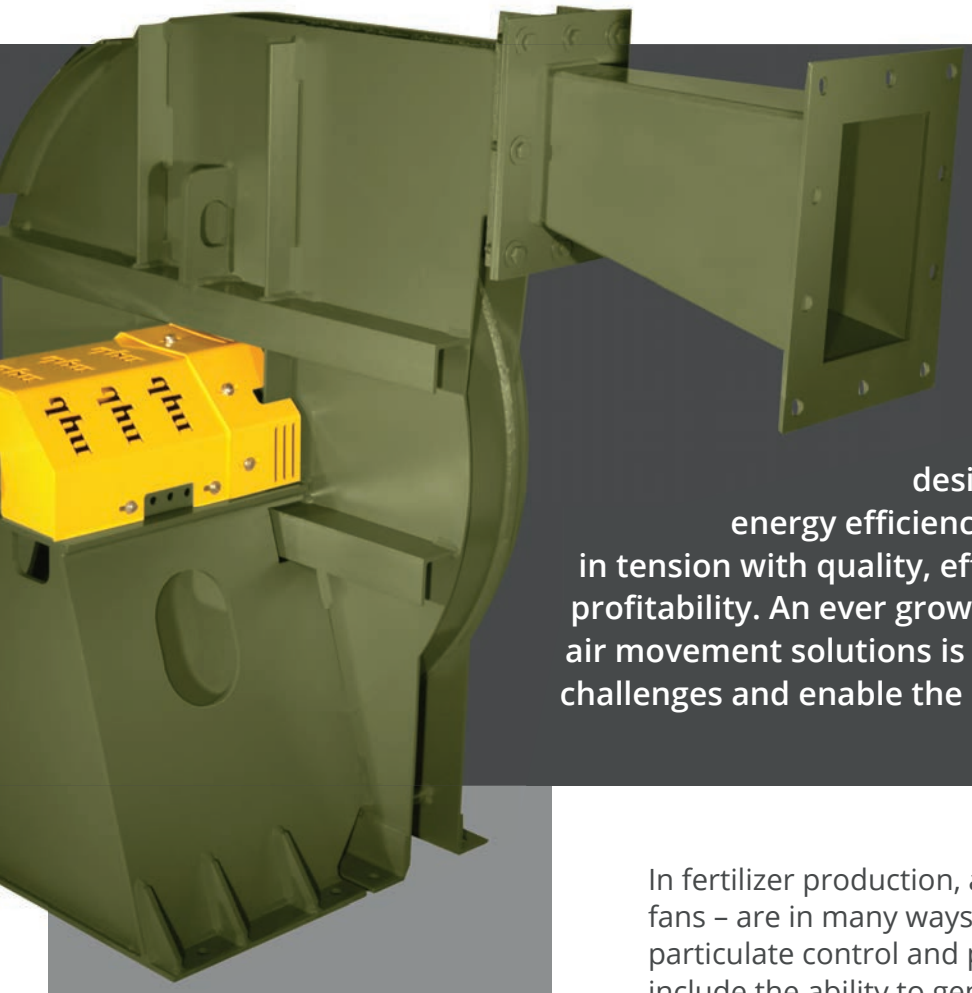
# CHALLENGES FACED BY FANS IN FERTILIZER APPLICATIONS

## in the Fertilizer Industry



Surge Limiting Pressure Blowers can be used for fertilizer applications involving high pressure and low flow.

**WORLDWIDE GROWTH IN FERTILIZER** demand continues to drive innovation in literally every facet of production, from the most fundamental new process technologies to the construction of new plants that will employ them. Multiple design engineering challenges include energy efficiency, regulatory pressure and safety in tension with quality, efficient throughput and, ultimately, profitability. An ever growing, constantly evolving choice of air movement solutions is essential in order to meet those challenges and enable the innovation from which they spring.

In fertilizer production, air movers – industrial blowers and fans – are in many ways the power behind air handling, fine particulate control and pneumatic conveyance. Requirements include the ability to generate controlled high pressures and flowrates, operate reliably in highly corrosive, abrasive and high temperature environments, simplify maintenance and, most importantly, offer facility and system designers the ability to move, contain, redirect and control airflows in even the most

highly specified applications. These may include dust control, pollution control, process heating, pneumatic conveying, material conveying, scrubbers, oxidisers and dryers.

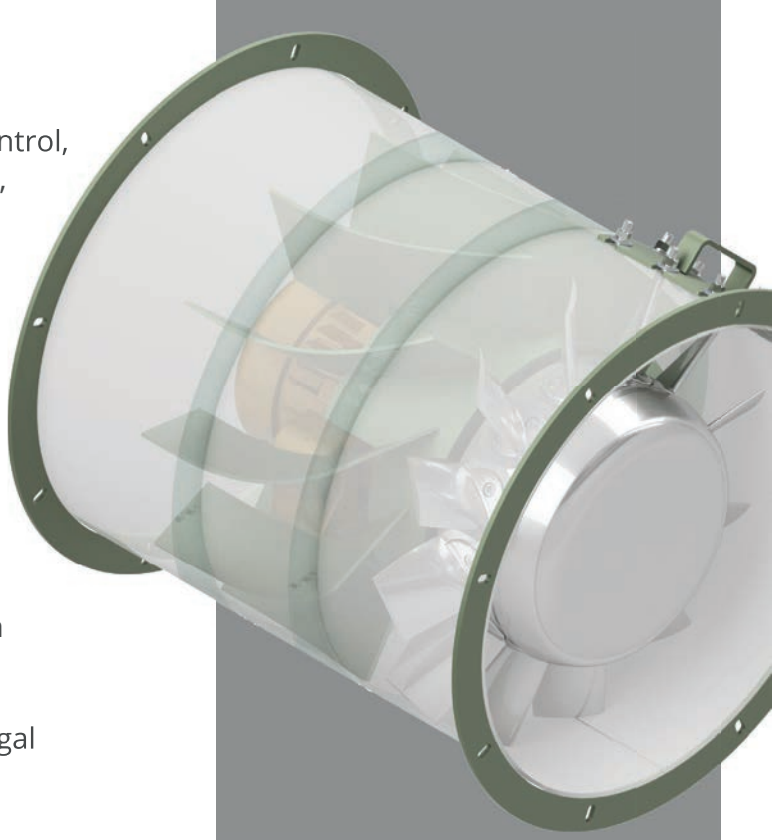
Given that nitrate fertilizer dust is based on a volatile substrate that poses a particular ignition risk, while other types may include caustics and heavy metals, dust control is of critical importance throughout the manufacturing process as well as in handling. Capture and control of such emissions are accomplished by creating air movement. A wide range of fan designs may be used to move air through a filter or process scrubber. Fans may be installed on the clean side of a given capture device or the dirty air side depending on system requirements.

New York Blower Co. offers a complete array of centrifugal and axial products appropriate for fertilizer industry applications. Both centrifugal and axial fan designs may be appropriate for a given application. In general, axial fan designs are preferable where space is at a premium.

Fans can range from standard, predesigned fans to highly customised or entirely custom-designed products. Off-the-shelf designs can be modified to meet specific application needs, such as zero leakage construction, abrupt temperature change, cyclical speed changes, etc.

Fans are designed to offer the highest aerodynamic efficiencies compatible with specific systems and gas-stream requirements. Fan construction includes mild steel, high strength alloy steels, aluminium, 300 series stainless steels, Inconel, incoloy, hastalloy, titanium and other exotic alloys. Special coatings can be applied based on the application, and consist of baked phenolics, epoxies and rubber linings.

Each application is analysed on its own performance and unique design requirements. Designs are based on computer analysis of wheel metallurgical stresses, shaft critical speed and bearing limitations. Predesigned fans can be modified or custom fans are designed in accordance with customers' specifications. They are available in arrangements 1, 2, 3, 4, 7, 8, 9 and 10 – all the standard design features of the industry plus custom sizes, DWDI, inlet boxes, double-width



Vaneaxial fans are most typically used in fertilizer applications where space is at a premium.

## CUSTOM DESIGNS

CAN BE PROVIDED FOR THE FOLOWING:

**Flows over 1 million ft³/min. / 472 m³/sec.**

**Static pressures beyond 150 in. wg / 37.4 kPa.**

**Centrifugal wheels beyond 150 in. / 3810 mm dia.**


construction, split housings, independent pedestals, liners, elevated temperatures, alloy construction, gas tight construction, etc.

Two fan lines that would be suited for fertilizer applications are vaneaxials and pressure blowers. Vaneaxial fans are best suited for high pressure ventilating and industrial process applications requiring air flow through compact space. They are available in both fixed pitch and adjustable pitch units. Fixed pitch vaneaxial fans are belt-driven with flows to 100,000 $ft^3$/min., pressures to 8 in. wg, multiple choices of hub ratios and fan mounting positions, and 15 belt-drive sizes from 12 in. through 60 in.

Adjustable pitch vaneaxial fans are direct-drive units, which permit performance adjustments via blade adjustments (without special tools) in the field without V-belt drives or adjustable speed controllers. As such, they offer very attractive energy efficiency. Available in 11 sizes from 21 in. to 60 in., they offer flows up to 120,000 $ft^3$/min., pressures to 20 in. wg, and two mounting configurations.

Surge limiting pressure blowers are designed for high pressure, low flow applications, which include elevated temperatures, corrosive gas streams and stringent leakage requirements. They are designed to reduce surge and continue normal operation as process conditions approach shutoff without the need for auxiliary equipment/accessories. They are available in wheel sizes from 22 in. dia. to 98 in. dia., with flows to 30,000 $ft^3$/min., pressures to 180 in. wg, temperatures to 1200°F, and a choice of belt or direct drive. A full range of customization options includes protective coatings and insulation, heat fan construction, special diameter construction, spark resistant construction, special alloy construction, etc.

The New York Blower Company follows a custom in-house quality control programme proven efficient through years of experience. AWS D14.6 certified welders and documented weld procedures are used on all fans, not just when specified by customers. NDT checks, such as dye penetrant, mag particle, X-ray, ultrasonic and helium spectrometer leak tests, are performed by both in-house personnel and independent testing services.

In addition, The New York Blower Company dynamically balances every fan shipped, up to 150 in. dia. and 25,000 lb and offers field service for in-field alignment, balancing and analysis.

## Conclusion

When choosing fertilizer equipment, it is best to consider all of the application requirements and design features. Selection criteria, such as the amount of particulate and the volume of flow needed, are two important pieces that dictate which piece of equipment will work best for the job. The use of selection software or a design engineer familiar with the applications can help to select the right equipment, and make sure efficiency is factored into the decision.