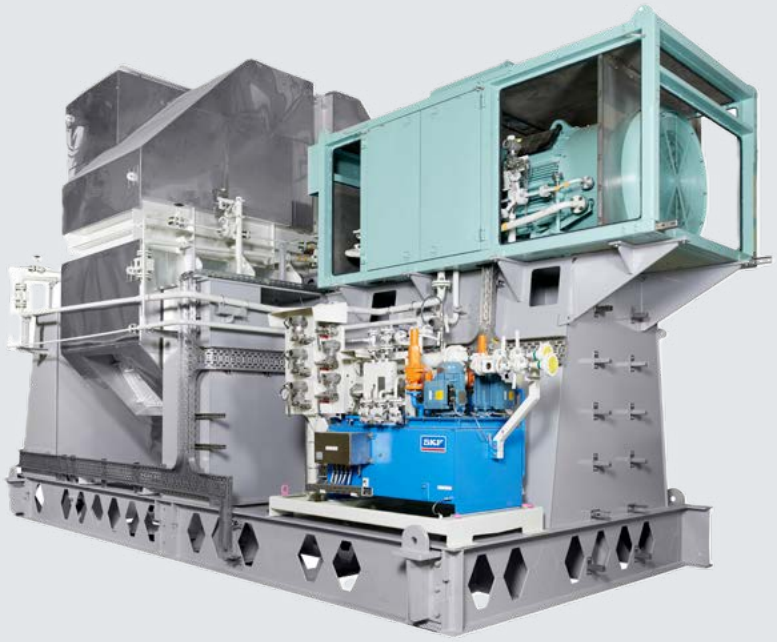
Air & Gas Fans

Engineered equipment for Direct Reduced Iron (DRI) production



High-performance, reliable air and gas handling proven across DRI applications

Key benefits

- Exceptional efficiency based on precise impeller designs
- Flue gas fans performing reliably at temperatures of up to 400°C/752°F
- High levels of flow control to optimize operation
- High availability and low lifetime costs from durable design
- Wide selection range across all application to match specifications

Howden, a Chart Industries company, leverages decades of proven expertize in demanding industrial fan applications to engineer high-performance, energy-efficient fans for DRI plants.

A DRI plant requires high-performance air and gas handling systems to ensure efficient and reliable operation.

Main air fans supply combustion air to the reformer or hot DRI reactor, supporting the heating process. Flue gas fans extract waste gases, while auxiliary fans serve various secondary functions.

Due to the high-pressure requirements of these systems, centrifugal fans are preferred over axial fans for this application.

Highly demanding applications, such as these require indepth knowledge of fan design, material selection and manufacture to ensure high performance and durability.

Howden's large fan technology portfolio and design expertize across heavy industrial processes, means our engineers can select and configure fans that perfectly match the process requirements to assured quality standards.

Main air fans

These fans operate at high speeds to deliver large volumes of combustion air into the process.

Flue gas fans

These fans are designed for continuous operation at elevated temperatures (up to 400°C). The fan must also withstand emergency conditions reaching 500°C.



Our air and gas fans are part of a wider solution portfolio supporting DRI steel production.



Compression equipment for applications such as process gas, cooling gas, seal gas and Pneumatic Tube Systems (PTS)



Solutions for hydrogen production, liquid storage and regasification.

Flue gas fans

Continuous operation at elevated temperatures places a number of specific demands on the fan:

- Selection of high-grade materials
- Precision-engineered impeller geometry
- High-quality welding
- Effective bearing cooling systems
- Design considerations for thermal expansion

To ensure safety and prevent damage during standstill - especially in the event of main drive train failure - the fan is equipped with a turning gear. This system allows the fan to rotate at 200 RPM in safety mode, ensuring continuous airflow through the ductwork to evacuate residual hot air. This not only prevents overheating, but also protects the fan structure from thermal distortion or shaft bending.

For speed regulation, the fan is typically controlled via a Variable Frequency Drive (VFD), enabling precise and energy-efficient operation.

Flow control comes from box-type vanes mounted on top of the fan inlet box.

Main air fans

Given the high power involved to deliver the required air volume, efficiency and precise control are critical.

Additionally, excellent rotor balancing is essential to minimize vibration and ensure long-term mechanical integrity.

High-performance conical vanes are integrated into the inlet bell of the fan to regulate flow. These provide excellent modulation, even at near-closed positions, ensuring superior controllability.

Design principles

The design process begins with the aerodynamic selection of the impeller, aiming for the highest possible efficiency. This is followed by an iterative evaluation of the impeller's mechanical strength under high-temperature operating conditions.

We refine the design by considering thermal stresses and expansion, material and fabrication costs, and operational reliability and longevity.

By cycling between aerodynamic optimization and mechanical validation, we ensure that the final solution is both technically sound and cost-effective.

When required, fans are validated using a workshop Mechanical Running Test (MRT) prior to shipment and a Site Acceptance Test (SAT) under actual operating conditions to confirm performance and compliance with specifications.

Project example: New Build DRI Plants

One of the world's leading producers of DRI relies on Howden fans to maintain an efficient and reliable operation.

The plants are designed to be flexible and can operate with up to 100% hydrogen, enabling green steel production and realizing their objective to reduce carbon emissions and scrap dependency.

The main air fan, driven by a 4.5MW motor, feeds the process with 560,000 m^3 of ambient air per hour.

The flue gas fan, driven by a 1.2MW motor, processes 810,000 m^3/h of gas composed of CO_2 (15%), N_2 (62%), O_2 (1%), H_2O (remainder).

For further information contact our team today:

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