Howden
A Chart Industries Company

Cooling fans for the Power Industry

Revolving Around You™

howden.com

Ultra-low noise fan delivering high efficiency with low maintenance

Howden, a Chart Industries Company, has been at the forefront of cooling fan technology for over 60 years and continues to innovate through our centre of excellence and R&D facility based in the Netherlands.

Our fans lead the way in high efficiency and low noise operation.

A full test capability based on mechanical, aerodynamic and acoustic criteria ensures confidence in the performance quality of each unit.

With over 50 operational sites globally we have the largest coverage for sales and service. This means we can respond swiftly to our customers' needs in the project stages as well as through the operational lifetime of equipment.

Our manufacturing facilities maintain the highest levels of excellence with modern equipment and strict quality controls accredited to international standards.

The need for cooling

The thermal combustion process used to generate electrical power inevitably results in the production of high amounts of waste heat.

Where this cannot be utilised for further energy recovery, it must be rejected responsibly to atmosphere using a cooling system.

These cooling systems typically circulate liquids in order to transfer heat away from the process and incorporate cooling towers, air cooled condensers (ACC) acting as condensers.

Howden's fans are used to ensure optimal volumes of air are passed through the cooling tower or ACC.

E series | **D series** | FPX series | **SX series**

Fans serving a wide range of cooling needs based on noise, capacity and efficiency requirements

Low to ultra-low noise performance enabling reduced footprint or more capacity potential

High efficiency with greater flow at lower absorbed power

Single piece fan unit **for ease of installation**

Large fan range flexible to all application duties

High performance configured to each application

Howden's fans are axial type and designed to meet not only the required flow, but critically operate within the specified noise level permitted on each site, an increasing factor in environmental considerations.

Our wide range of fans, from 3 ft to 50 ft (1.2m to 15.2m) in diameter, means that all levels of cooling system can be addressed.

Our models have varied profiles to enable customers to match or exceed the noise specification while maximising operating efficiency.

Key features

- High efficiency
- Compact system design
- Ultra-low noise
- Precise control
- Easy integration
- Low maintenance
- Assured performance
- Wide range

Applications

Air Cooled Condensers (ACC)

A large number of thermal power plants, regardless of fuel type, will rely on an ACC within their cooling system.

A-frame ACCs are configured for either forced draft or induced draft. Fans required for such systems are typically in the diameter range of 26ft to 40ft. Howden offers both D and SX series fans for this application, which provides customers with a wide size range and ability to match efficiency and noise considerations.

Cooling towers

Some plants base their cooling system on mechanical draft cooling towers. These can be cross or counter flow, including plume abated wet/dry cooling towers. Some natural draft cooling towers may also be fan assisted.

The normal diameter range of fans is between 14ft to 34ft. Howden supplies cooling fans for field-erected cooling towers with the SX suitable for smaller CTs and the D series able to match a wider size range.

Air Cooled Heat Exchangers (ACHE)

Certain thermal power plants, such as waste-to-energy incineration plants, use an ACHE as the condenser within their cooling system.

ACHEs can be configured for forced or induced draft. Fans are typically in the diameter range of 9ft to 18ft. The SX series is suitable for this application with its lower diameter coverage.

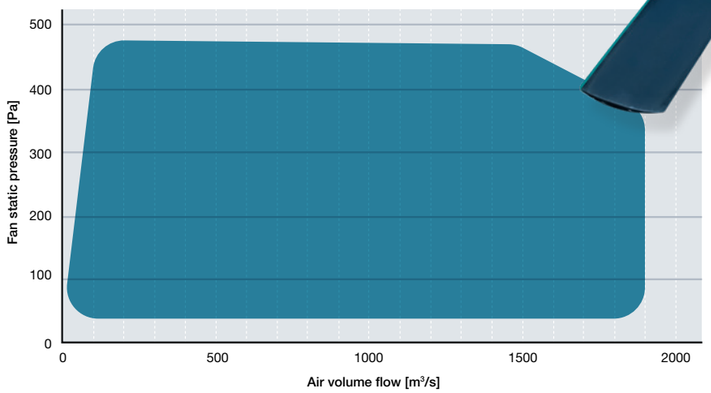
A flexible range of fans meeting the demands of cooling with cooling towers, ACHE and ACCs.

Product range series

D-series fan

26 feet (7,925mm) to 38 feet (11,582mm)

D series chart

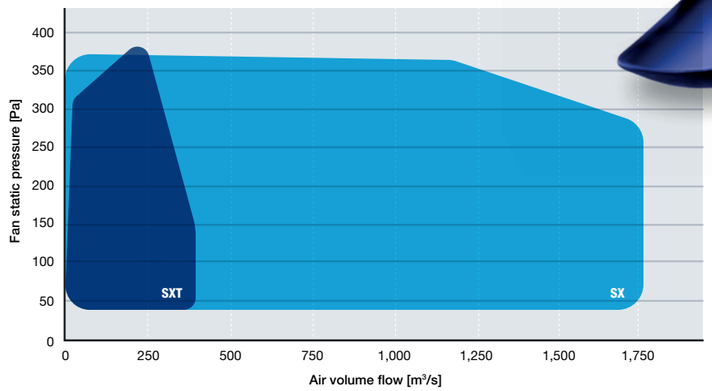


	D Series	SX Series
Manufacture and materials	Between 5 and 11 blades manufactured with an integral shaft	Between 3 and 8 blades fitted with forward swept curved, adjustable pitch blade profiles on an integral shaft
	Three blade profiles (DNF, DLF and DVF)	Two blade profiles (SX, SXT). SXT models equipped with air seal technology.
	Full composite technology - fibreglass reinforced polyester	
	Steel or polyester fan housing with bell inlet	
	Stiff single piece body	
	No components sensitive to corrosion	
	ATEX compliant	
Sizing and duties	Diameters from 26 feet (7925mm) to 38 feet (11582mm)	Diameters from 28 inches (710mm) to 36 feet (10973mm)
	Operating temperatures from -20°C to 65°C (-4°F to 149°F) as standard (extendable on request)	
	Noise savings over standard fans of up to 10 dB(A)	Noise savings over standard fans of up to 20 dB(A)
	Available to 1900 m^3/sec and 450 Pa	Available to 1750 m^3/sec and 300 Pa
Drive	Suitable for high power drives up to 350 kW	
	Direct, belt or gearbox drives	
Implementation	Suitable for either vertical or horizontal configurations	
	Suitable for dry and wet, induced and forced draft configurations	

SX fan

28 inches (710mm) to 36 feet (10,973mm)

SX series chart



SXT fan

10 feet (3,048mm) to 18 feet (5,545mm)

Featuring Air Seal Technology which significantly reduces backflow and increases fan efficiency.

Options

Available supply options

- **Impeller only**
- **Impeller with casing**
- **Impeller with casing and motor**

Additional options

- **Leading edge protection** - special layer to protect against erosion in wet applications
- **Optimised strength and temperature configurations** to reflect customer performance demands

Aftermarket services

Howden has a well-established global aftermarket network providing a permanent presence across every continent

With access to specialist engineers, we can bring quick resolutions to unexpected issues minimizing downtime and ensuring reliable long-term performance through expert operation and maintenance (O&M) services.

Our services in support of our cooling fans range from servicing and parts supply through to performance upgrades and retrofits. The more advanced services can maximise the life of the fans in each system as well as keep their operation aligned to the latest technical parameters.

Services to maintain reliable operation

- Maintenance and inspections
- Vibration analysis, alignment and balancing
- Spare part supply
- Troubleshooting and commissioning
- Service agreements
- In-house fan blade refurbishments
- On-site FRP fan repair
- Fan Scan

Services to improve performance

Aerodynamic/acoustic measurements, and performance tests

Upgrades and retrofit

Services related to projects

Turnkey installation works

Supervision and turnkey project execution

Services are delivered either on-site or in our workshops depending on the nature of the service and customer requirement.

Howden Uptime

Howden Uptime gives our customers another option in optimising the performance of our fans throughout their lifetime of operation.

Howden Uptime provides a unique and innovative platform for gathering, interpreting and analysing fan data on a real time basis.

The constant recording of operating parameters provides insight into the overall health status of the fans and prompts operational adjustments where beneficial to maximise performance.

Howden Experience

Our Cooling Fans have a long history of supply going back multiple decades with over 30,000 fans within the power sector

Sample projects

Connah's Quay Power Station, UK

The gas-fired combined cycle power plant is configured with four 330MW units delivering a capacity of 1420MW to the UK power grid. The plant was experiencing issues with unreliable cooling towers because of frequent drive-train issues.

Howden addressed the issue by removing the silencers and replacing the existing fans with ultra-low noise SX fans within 20 of the 40 cooling tower cells.

Since installation, the operator has seen improved uptime with no unexpected stoppages.

The changes made led to a 0.13% increase in cooling system efficiency, equates to a combined cycle output improvement of 0.8 MW.

Additional benefits have been the increase of gas turbine efficiency and up to 15,000 tonnes per year of related CO_2 savings.

Riyadh Power Plant No. 10, Saudi Arabia

Plant no.10 is one of the largest combined cycle power plants in the world with a total capacity of 4600MW based on 40 gas turbines generation sets operating in combined cycle.

The plant was originally a single cycle configuration, but extended to CCGT including the addition of 10 air-cooled condensers to manage the cooling requirements.

The customer selected Howden's D series fans and 205 units were installed to meet the large capacity demand.

The fans have 8 blades of 36ft diameter based on the DNF blade profile.

Browns Ferry Nuclear Power Plant, USA

One of the largest power plants in the USA with a capacity of nearly 4GW from its three generating units.

The plant technology is based on Boiling-Water Reactors (BWR) with a cooling water system drawing from the river and condensing via banks of cooling towers.

Over 100 Howden fans are used within the cooling towers. These are 8 bladed 34ft D series fans with double hub plates and stainless steel leading edges.

Our customers supply a global market with the fans integrated in their cooling equipment.

We also serve power industry operators directly through our aftermarket services.

Howden, a Chart Industries Company

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