www.howden.com

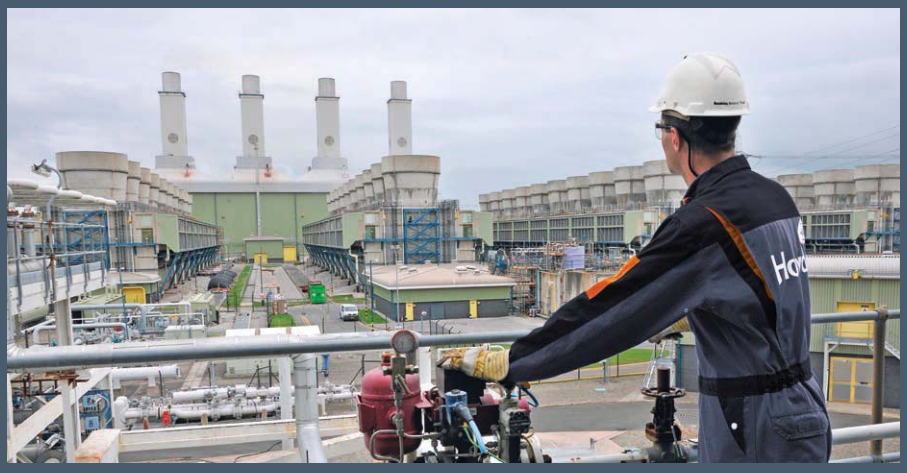
Howden

Cooling Fan technology

Maximising efficiency, minimising noise

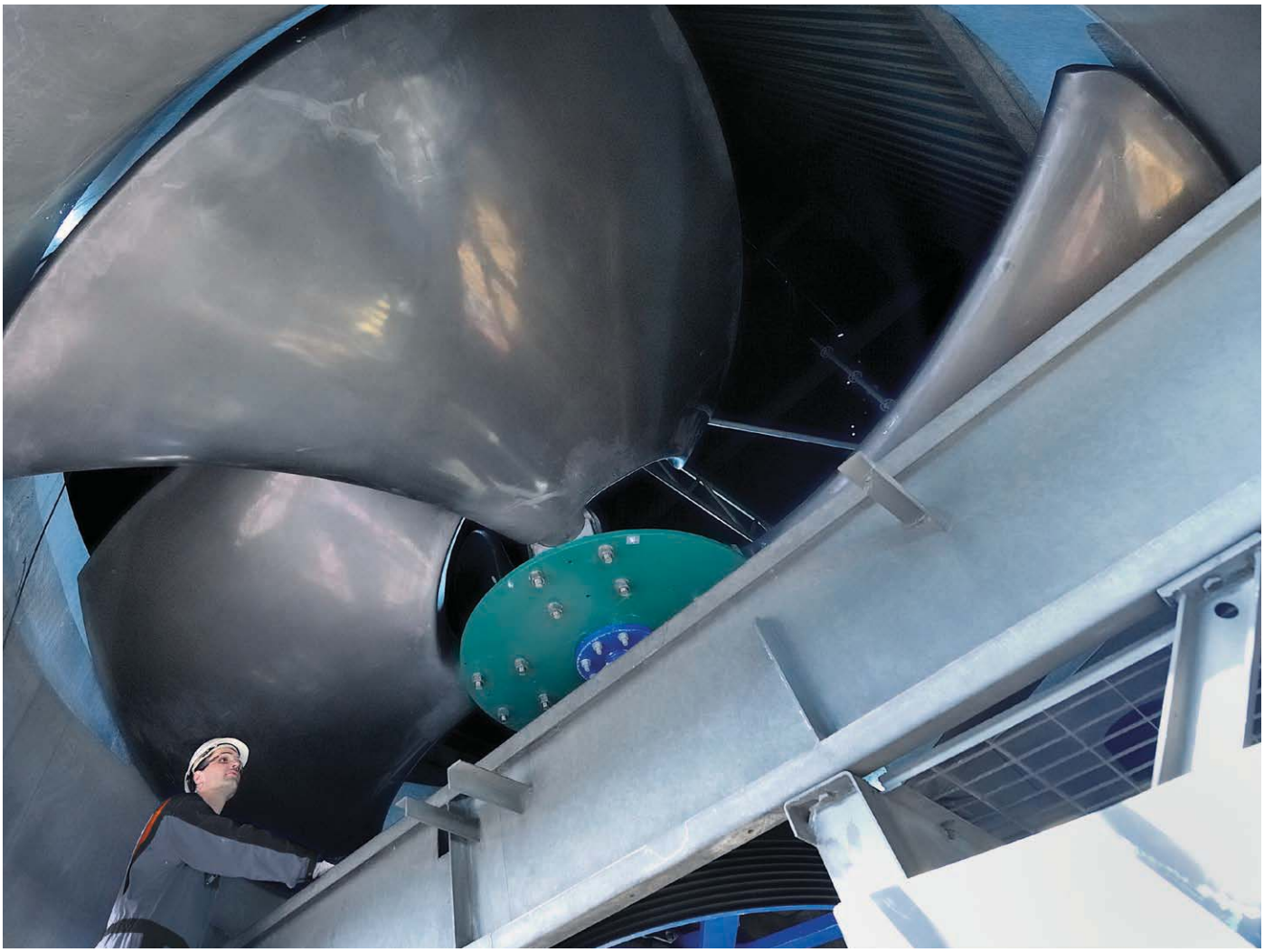
Revolving Around You™

Howden cooling fans achieve unprecedented heights of performance with the lowest noise levels available.



For more than 160 years, Howden has been at the forefront of air and gas handling technology, with a proud reputation for innovative engineering of the highest quality and an absolute commitment to service and lifetime support. Today, we are a global organisation with bases in 27 countries spread across every continent. Every project we undertake is focused on customer needs, and to each one we bring a unique combination of worldwide experience and expertise supported by an agile and responsive local presence.

Revolving Around You™



Over the course of 50 years experience in cooling fan technology, our innovations have shaped customer expectations. Today we're still well ahead of the competition.

We have been leading the world in the development of high efficiency, low-noise cooling fans for several decades by focusing on the fundamental issues. Our innovative Research and Development programme has been driven by a quest to eliminate noise and vibration, starting from first principles. Rather than develop ways of masking or attenuating noise, at Howden we set out to remove the sources. We succeeded.

Our fans can be found in industries ranging from power to petrochemicals, as well as many HVAC and refrigeration applications. Our pioneering developments allow the wide range of industries reliant on cooling fans to meet and exceed Ecodesign compliance requirements.

Proven by results

Advanced design and meticulous precision engineering pays great dividends for our customers. That's why, throughout the world, Howden fans are already installed in the majority of industrial cooling systems.

For any duty point, our cooling fans offer greater aerodynamic efficiency and thus lower power consumption.

We provide sophisticated selection tools that allow customers to make decisions on the basis of actual, deliverable fan performance.

Our production technology enables us to produce Fibreglass Reinforced Plastic (FRP) blades whose aerodynamically optimised blade profiles produce outstanding cooling performance and excellent damping and chemical resistance properties with the lowest achievable noise levels.

We can provide a total turnkey design, installation and commissioning service.

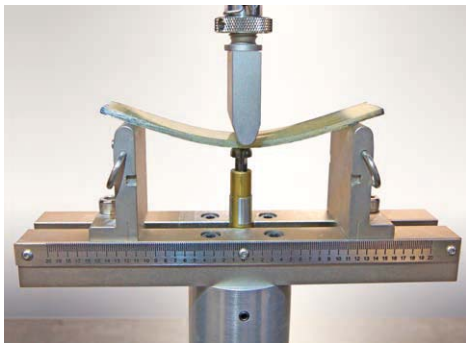
Our global local presence and unrivalled experience means we provide the most comprehensive, responsive and reliable technical support available.

All Howden FRP cooling fans comply fully with the relevant national and international regulations, and we are fully accredited to ISO 9001 Quality Management, ISO 14001 Environmental Management and OHSAS 18001 Occupational Health and Safety standards.

Pushing the boundaries of fan performance

Our position at the leading edge of cooling fan design is the outcome of dedicated, focused long-term research.

For decades, we have been investing in a major programme of research and development.



Our expert in-house R&D department formed working partnerships with a wide range of external authorities, including universities and other institutions, to explore the optimum blade profiles, materials and mechanical configurations. We have state-of-the-art test facilities to investigate each permutation and evaluate each development.

Our investment has brought dramatic results. Our low noise and ultra-low noise fans not only offer previously unreachable levels of quietness, they also remove the need for, and the cost of, additional acoustic attenuation measures that can themselves increase the static pressure difference across the cooling system and so raise the power consumption required to drive it.

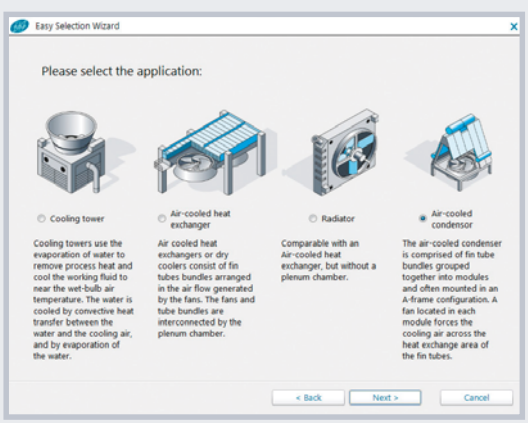
Howden cooling fans are now well established as the preferred choice in air cooled condensers, field erected cooling towers, packaged cooling towers, climate control and ventilation systems throughout the world, in situations where low noise, high efficiency and absolute reliability are essential.

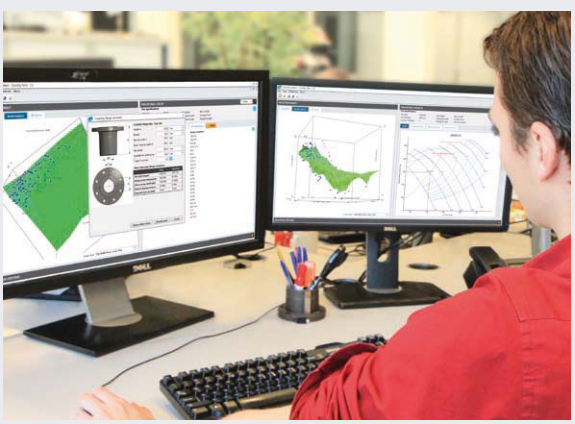
Howden Select

Because our fans have such a wide range of applications, ranging from power generating, petrochemicals, and large oil and gas processing plants to HVAC and building ventilation, we have developed Howden Select, a sophisticated software package to help customers find the right fan for their purposes quickly and easily.

Users are guided through a series of options to arrive at the right model, size and configuration for their requirements.

The programme, available free on request, is so accurate that fans are normally delivered ready for straightforward installation.





Our selection software package is highly intuitive. As long as users can provide basic information about the duties required of the fan, and the situation into which it will be installed, they will be guided toward the best fan type and a detailed specification. The software contains many useful additional functionalities, including an option to request support from our experienced technical team.

For a copy of the selection package, please contact us at: **www.howdencoolingfans.com**

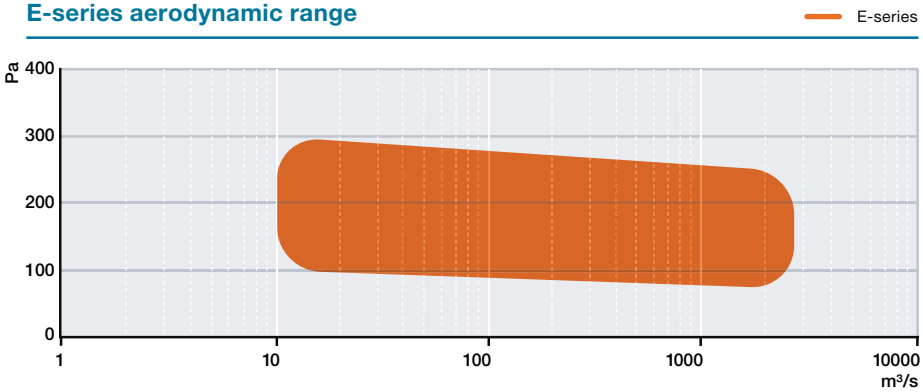
D-series and E-series fans

Optimised aerofoil designs for maximum efficiency and low noise performance.

E-series fan

4 feet (1,219mm) to 48 feet (14,630mm)

E-series aerodynamic range



The greatest efficiencies are gained by designing a fan as an integral part of a cooling process rather than as a single device in isolation. By considering the whole system, we can design each fan for its specific situation, and thus optimise overall performance and economy for the operator.

D-series

The D-series covers a range of diameters from 26 to 38 feet (7,925mm to 11,582mm). Designed for horizontal operation, the fan can be fitted with up to 11 blades.

E-series

The E-series extends the size range, with a minimum diameter of 4 feet (1,219mm) and a maximum of 48 feet (14,630mm). The right choice for heavier duty situations, E-series fans can be installed either horizontally or vertically.

Blade profiles

Designed to offer the optimum balance of cost, efficiency and low-noise operation, the D-series is available in a choice of three blade profiles.

The DNF/DNM blade is fitted with Howden Aerotip technology, an innovative design feature that enhances aerodynamic performance while significantly reducing the pressure pulse created by the blade and transmitted to the fan ring.

The DLF/DLM blade profile has been designed to give excellent cooling performance with low noise.

The DVF/DVM blade profile reduces the noise level still further, offering the best acoustic performance of any straight-bladed cooling fan available.

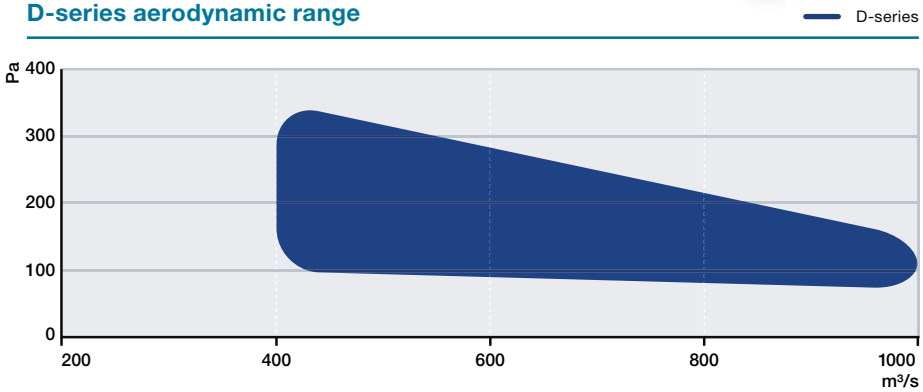
All three are suitable for a wide range of operating temperatures from -20°C to 65°C (-4°F to 149°F) as standard, and this temperature range can be extended on request.

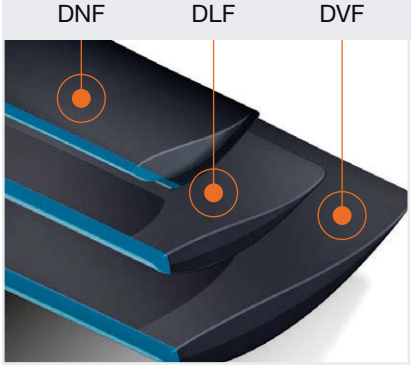
D-series fan

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

All D-series and E-series fans have optimised aerofoil FRP blades, fitted to a polyurethane-coated steel hub. The blades are manufactured with an integral shaft as this eliminates concentrations of stress at the mechanical joints.

D-series aerodynamic range





Options

- Diameter customisation
- Corrosive protection
- Sea water package
- Leading edge protection
- Temperature range upgrade

Options for the D-series and E-series include leading edge protection to extend fan life in wet conditions, and coatings and materials that allow the fan to be used in sea water cooling towers.

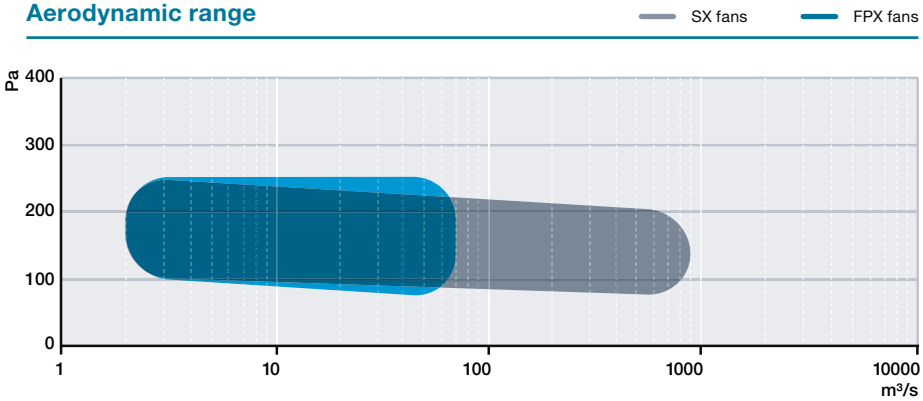
SX and FPX fans

The new standard for applications with stringent noise limits.

FPX fan

28 inches (710mm) to 108 inches (2,743mm)

Aerodynamic range



Cooling fans are often identified as a significant source of industrial noise. Through intensive and focused research and development over the past 50 years, we have consistently reduced cooling fan noise. One of the outcomes of our work is a series of curved aerofoil blade designs that reduce the causes of noise and remove the need for acoustic attenuation.

SX fans

The SX range reduces noise by up to 20dB(A) compared with standard cooling fans. They are fitted with advanced adjustable pitch blades attached to a polyurethane-coated steel hub, and the blade and shaft are manufactured as a single integrated unit, eliminating the joint stresses that can be a significant cause of fan failure.

The SX operating temperature range of -20°C to 65°C (-4°F to 149°F) can be extended on request, and the range of sizes, from 28 inches (710mm) to 36 feet (10,973mm) means it is an enormously versatile range, suitable for a wide range of applications. The SX profile also makes it possible to design a compact cooling installations while maintaining aerodynamic and acoustic performance.

FPX fans

The FPX range uses fixed-pitch blades, manufactured as a single impeller unit that offers very easy assembly and minimal maintenance while eliminating sources of wear. It combines ultra-low noise operation with excellent damping and chemical resistance properties.

FPX fans have an operating range of -20°C to 65°C (-4°F to 149°F), and the range of sizes, from 28 inches (710mm) to 108 inches (2,743mm) makes them suitable for a broad spectrum of HVAC and refrigeration applications.

Versatile installations

SX and FPX fans are suitable for either vertical or horizontal configurations. Where required, we can also supply either type of fan pre-assembled into a cooling units that include the drive, fan casing and suspension, delivered ready for fast, problem-free installation.

SX fan

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

Options

Diameter customisation

Corrosive protection

Sea water package

Leading edge protection

Temperature range upgrade

All SX and FPX fans can be upgraded for safe use in higher temperature environments, and they can also be supplied in materials and coatings suitable for operation in wet cooling applications. In addition, the SX range can be manufactured with materials for sea water cooling tower applications.

The intelligent response to changing demands

A new cooling fan is the effective route to increased cooling capacity and reduced noise.

Cooling system requirements change throughout the years and older installations may not match today's requirements in terms of capacity or noise. Where the production capacity has increased, or increases are planned, an inadequate cooling system may cause a production bottleneck. System enhancement can deliver the desired combination of increased capacity and significant noise reductions, ready for the demands of today and the future.

There are several advantages of cooling system enhancements

- Capacity can be quickly and easily increased.
- No extra space is required.
- The process can be arranged in stages so there is no need to shut down the whole cooling system.
- The investment required is low.
- A staged implementation makes it possible to accurately monitor the return on investment.

We offer a free consultation to assess the increase in performance and reduction in noise that could be achieved by exchanging a fan. If the outcome is positive, we can carry out a more detailed research programme and present a detailed proposal. From first assessment through performance measurements to the supply of parts, field erection and commissioning, all the work is carried out by Howden's experienced engineers and supervisors.

Blade reconditioning

Howden cooling fans are designed to operate in challenging environments and these conditions can have a serious effect on the fan blades. Over time, the leading edges of the blades can become eroded and small cracks and other detrimental effects can appear in the blade surfaces. If these impairments are identified early, it is often possible to refurbish and renovate the fan, to bring it back to peak performance at a fraction of the cost of replacement. The procedure is normally done on our premises, but sometimes it is possible to carry it out on site.

Blade reconditioning is the fastest and most cost-effective way to extend fan life and improve deteriorating performance, and it can also prevent the more serious problems that might lead to unplanned downtime or outages.

Cooling fans services

As well as providing a lifetime guarantee to provide spares and maintenance for every fan, we offer a menu of cooling fan services. We are dedicated to extending the working life, and minimising the lifetime operating costs, of every fan we supply.

The services we provide include

- aerodynamic and acoustic measurements.
- maintenance inspections.
- troubleshooting and commissioning.
- on-site FRP fan repair.
- supervision and turnkey project execution.

Cooling system enhancement examples

Petroplus Ingolstadt

Plant type: Refinery

Issue: Requirement for improvement of cooling performance and noise reduction

Solution: Replacement of air-cooler fans with ELFA fans

Result: 30% more air, 21% increase in plant production, 13 dB(A) noise reduction

E.ON UK Connah's Quay

Plant type: Power station

Issue: Plant noise emission exceeding the permitted noise levels

Solution: Replacement of cooling towers fans with SX fans

Result: Decrease of water temperature, Increase of turbine efficiency, 15,000 tonnes per year CO_2 reduction

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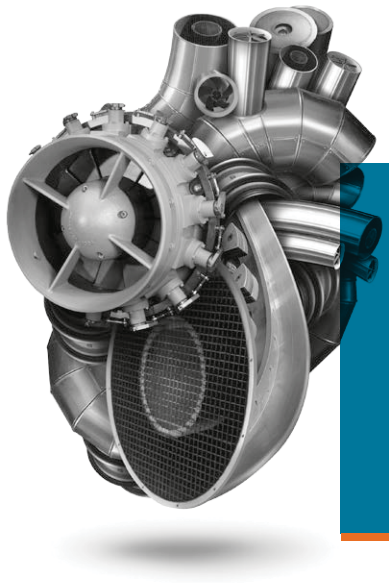

At the heart of your operations

Howden people live to improve our products and services and for over 160 years our world has revolved around our customers. This dedication means our air and gas handling equipment adds maximum value to your operations. We have innovation in our hearts and every day we focus on providing you with the best solutions for your vital operations.

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