

Howden

Centrifugal Fans

Maximising performance
in the most challenging
of conditions

Howden Power

Howden

High performance centrifugal fans

from the world's leading manufacturer

Total quality

The air and gas handling requirements of today's primary industries demand the highest standards of efficiency and reliability, together with the lowest possible maintenance commitment.

In power and petro-chemicals, as in steel, mining and cement, modern fans must be able to withstand extremes of operating temperature, as well as prolonged exposure to erosive and corrosive substances.

There is one group of companies today whose name is synonymous with total quality in air and gas handling equipment - Howden Power. Our fans are to be found in installations from the Americas to Asia, South Africa to the Arctic.

Customers turn to us because we bring over a century of expertise to some of the most robust, highly engineered plant in the world. To put it simply, no one has more experience.

The Howden Pedigree

Howden Group, which was founded in 1854, is the world's largest and longest established fan manufacturer and was the first company to form a joint venture with Fredrik Ljungström to produce rotary regenerative heat exchangers for the power generation industry. Today the Group has over 40 subsidiaries in 17 countries operating in a wide range of markets ranging from building services to heavy industry.

Howden Power products and services are extensively used in heavy industries such as power generation, iron and steel production and cement manufacture, where the highest levels of performance and integrity are of paramount importance. It has major engineering and manufacturing facilities in Denmark, The Netherlands, Spain, China and the United Kingdom. With a network of sales and service centres spread throughout the world, the division is ideally positioned to provide unrivalled assistance to customers, from project inception to post warranty operation and maintenance.



Fans on many power stations now operate for four years between outages



Fans on iron ore processing plant require a high degree of abrasion resistance



Good design and efficient project management can reduce construction cycles

Howden Power has companies, sales offices and agents in most major countries of the world.



Primary air fan being prepared for a works performance test

Engineering excellence

Howden fans represent engineering design and manufacture at its very best. We employ the most up-to-date research and development techniques to ensure that all our products represent the ultimate in fitness for purpose.

We combine engineering design expertise with careful materials selection to ensure customers obtain the highest possible performance from all our products. Centrifugal fan designs range from highly efficient aerofoil-bladed rotors to radial-bladed designs suitable for high temperatures and dust loadings.

Given the highly individual requirements of each separate installation, we ensure that the aerodynamic performance of our products is tailored to the specific range of duties and operating conditions anticipated.

Analysis and Testing

Our design process involves a range of advanced techniques including finite element analysis, fracture mechanics, computational fluid dynamics and dynamic response analysis.

Each design is thoroughly tested to national and international standards at our research facility, and is optimised to ensure that the specified performance will be achieved under the real conditions of an industrial plant.

Research and Development

At our Advanced Technology Centre, new concepts in air and gas handling, reflecting the different needs of markets worldwide, are continually under investigation.

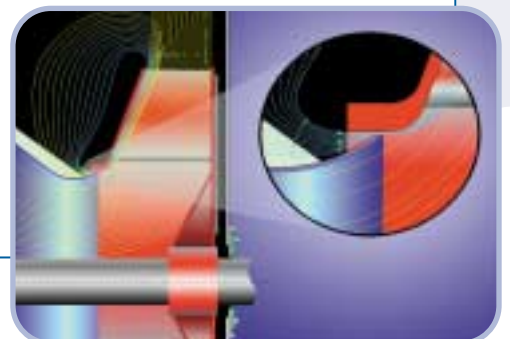
We strive to better our products through research, the ongoing development of new techniques and technologies, and the use of new materials. The Howden goal is always to produce high performance fans with proven reliability.



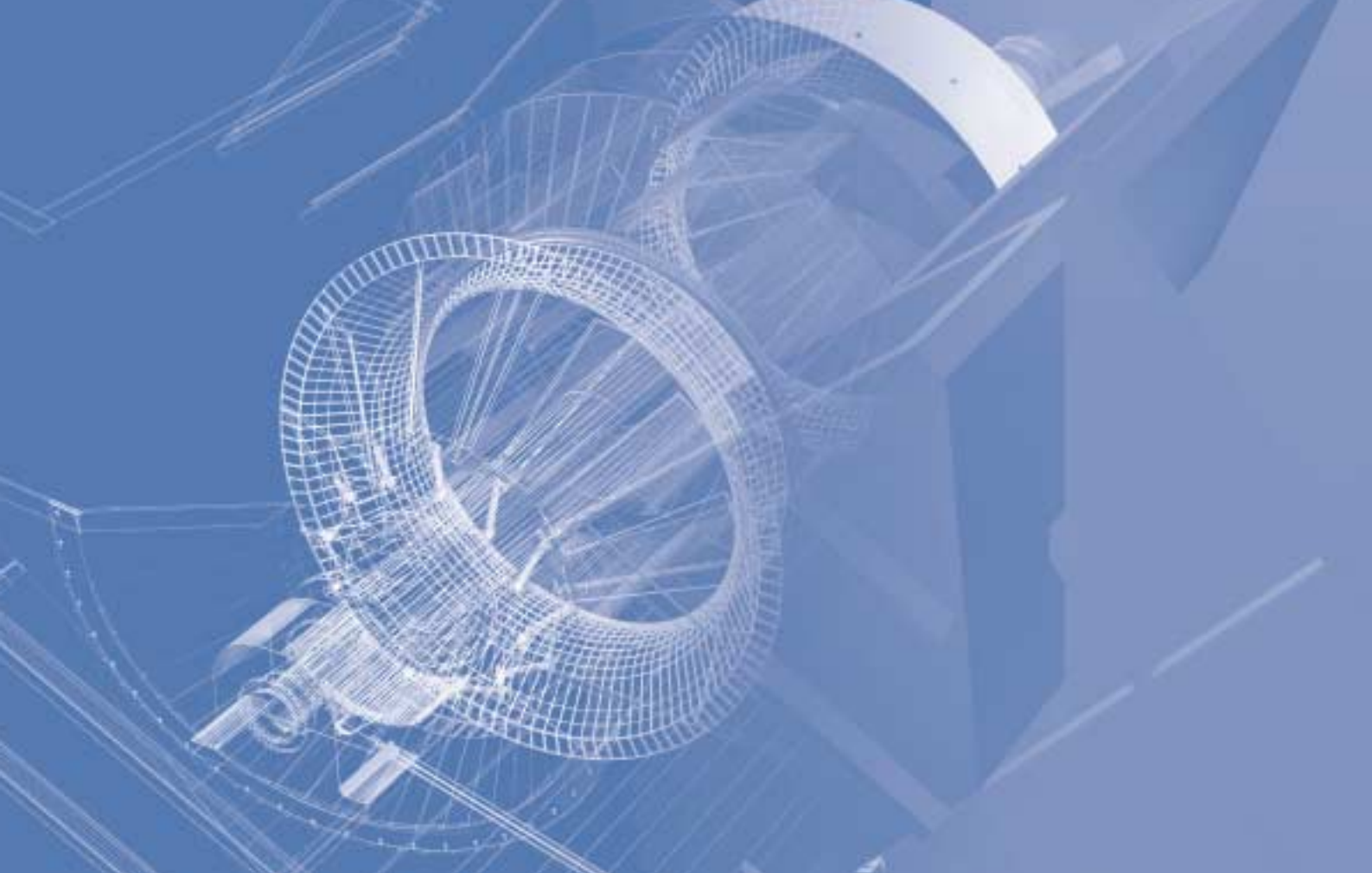
The search for improved fan design is never ending



Environmental considerations are an increasingly important part of modern fan design



Recirculation of fluid round the impeller side plate is fundamental in achieving optimum fan performance



Product Features

Our experience of many thousands of fan installations worldwide has led us to develop features that will maximise performance under the most challenging conditions. These include:

Optimised blade shape The blade shape for each design has been thoroughly tested and developed in terms of output, efficiency and resistance to gas-borne dust, resulting in high levels of performance over a wide range of duties.

Erosion protection Where needed, aerofoil blades contain heavy nose sections, and heavy armouring is available for erosive applications. Centre plates can be cut away to remove areas subject to excessive wear. Specialised welding and bolt encapsulation techniques permit replacement of liners in situ without post-weld heat treatment.

Impeller inlet Careful design of the stationary inlet cone and the rotating inlet ring are vital to ensure that the fan performs correctly over the full range of operating conditions.

Inlet vane control The inlet vane control, and its complementary dorsal fin stabiliser, have been optimised to permit an extremely large area of pressure-volume control without the threat of rotating stall occurring in the impeller.

Bearings A range of robust plain and rolling element bearings has been specially designed for fan applications.

Support systems Advanced techniques such as dynamic response analysis can model the complete support system, from soil to shaft, to ensure that resonances and fundamental frequencies do not coincide.

Special designs Designs can be adapted for specialised operating conditions, eg the scalloping of a fan sideplate to alter its natural frequency.

Manufacture Fabrication is carried out by coded welders working to approved welding procedures.



Enhancement of fatigue strength by contouring the impeller



Inlet vane control assemblies

Reliability and experience

Maintenance

The design features of Howden fans are intended not only to maximise performance but also to minimise maintenance. Attention to detail ensures that our products will operate for extended periods between outages without requiring routine servicing.

The inherent simplicity of the centrifugal fan together with the expertise of our site engineers means that maintenance time can be kept to a minimum. It is only when fans are operating in highly abrasive conditions that any significant maintenance is envisaged.

Quality and Safety

In accordance with ISO 9001, all our products are subjected to rigorous quality control at all stages from initial design through to installation and commissioning. We also operate a safety policy with a dedicated safety officer controlling the activities on each site.

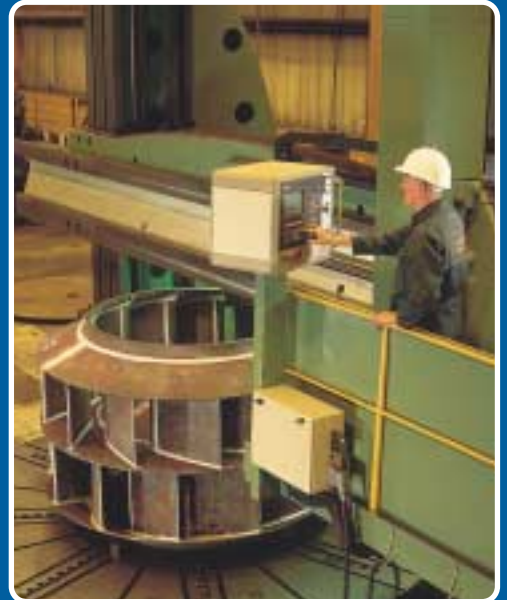
Customer Services

Given the differing requirements of each plant, and an operating life expectancy of up to 40 years and beyond, we make a major commitment to serving our customers before and after delivery.

We offer expert project management, along with the highest standards of installation and commissioning, maintenance and repair, and performance enhancement. Our engineering skills, and custom manufactured spare parts, are available at short notice anywhere in the world.



Non destructive testing is an important link in the chain of quality assurance



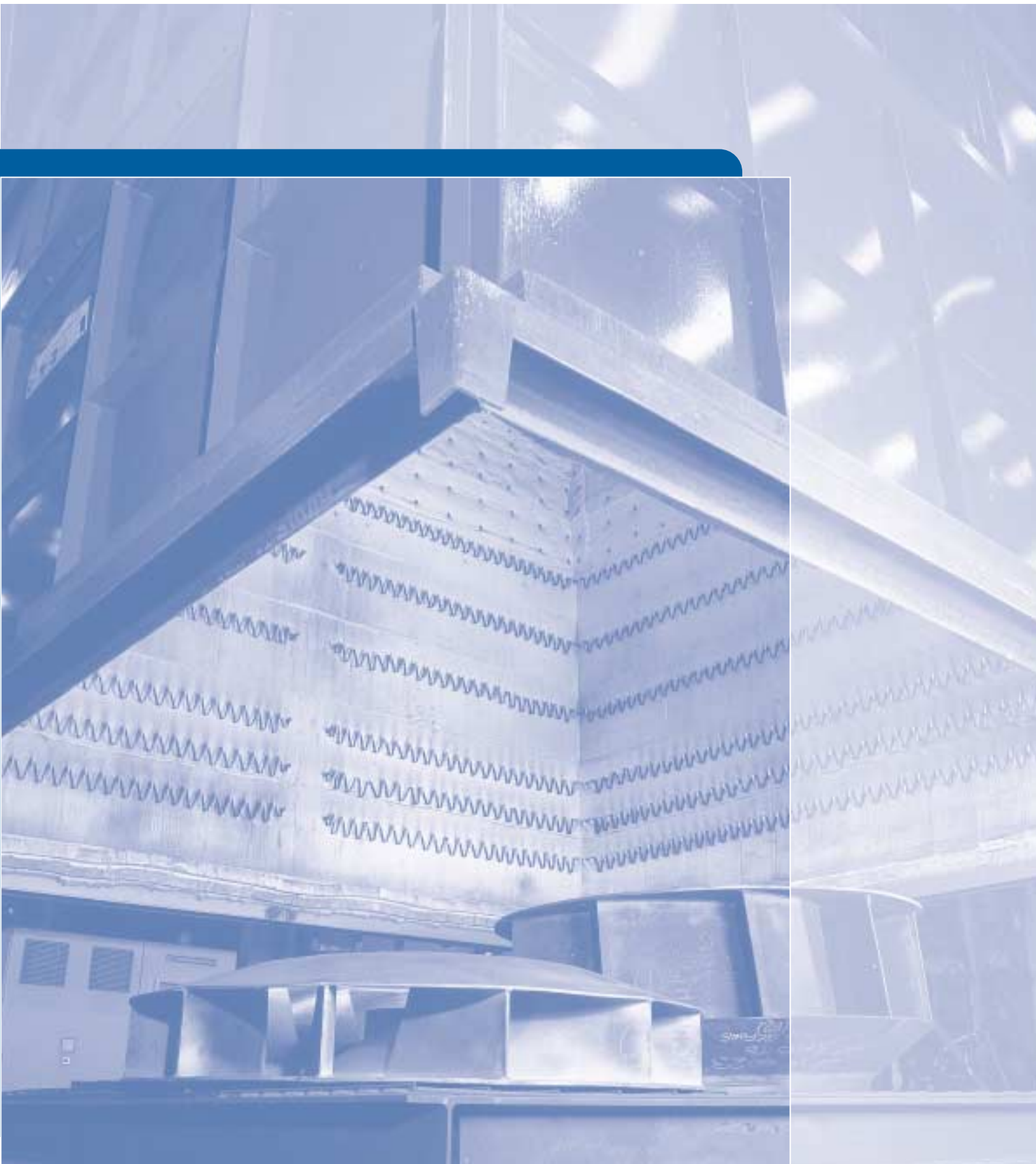
Inlet ring machining is vital in ensuring correct performance



3-axis coordinate inspection system applied to a high-speed fan impeller

the next step

For further information on any of the subjects covered in this brochure, or for any advice regarding fans and heat exchangers please contact us at the address overleaf.



Impeller stress relieving





Howden is the world's pre-eminent supplier of centrifugal fans



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