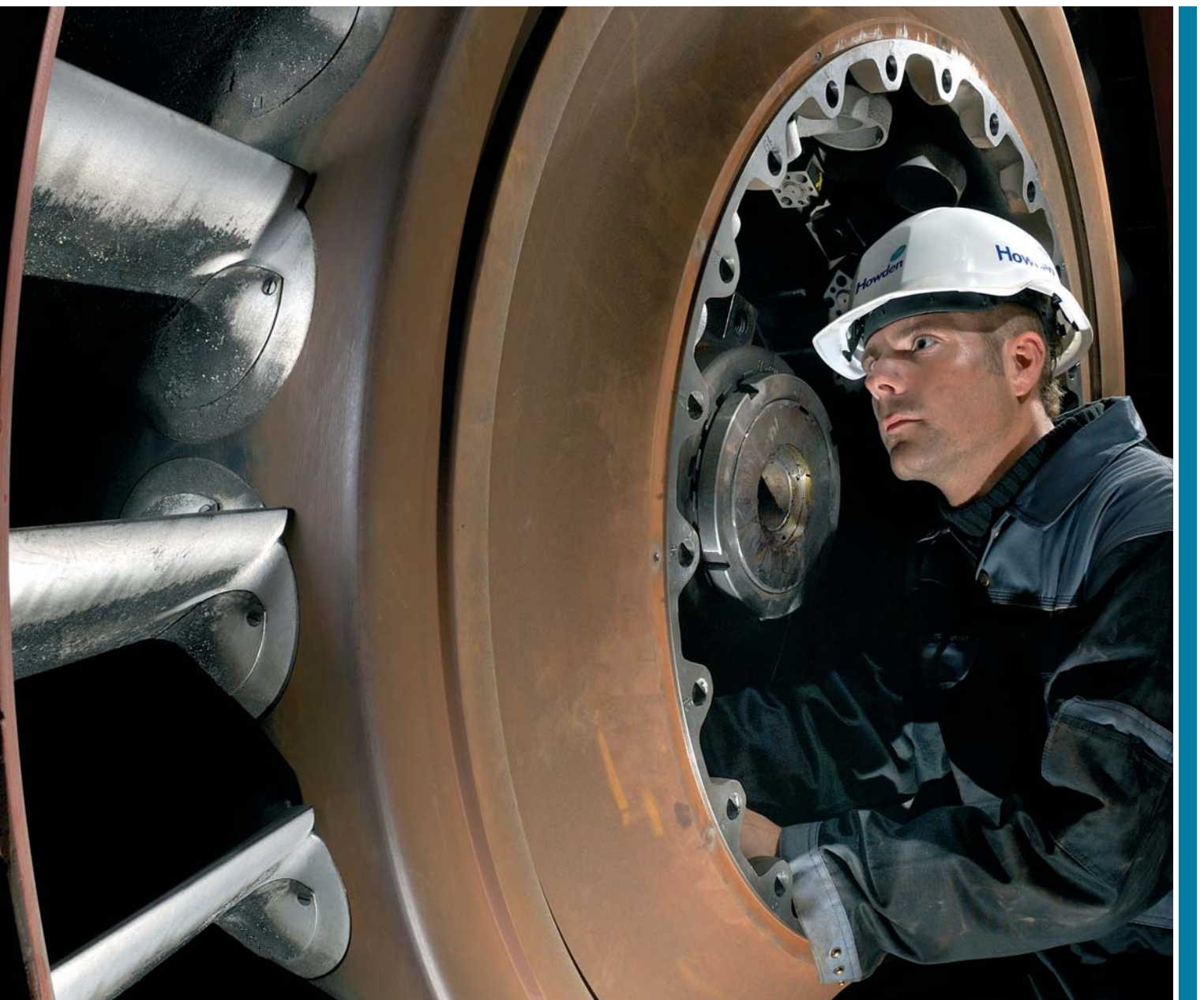


VARIAX[®] AXIAL FLOW FAN AFTERMARKET SERVICES, SPARES AND RETROFIT

HOWDEN DENMARK



YOUR CHOICE OF VARIAX® AXIAL FLOW FAN EQUIPMENT IS A SIGNIFICANT INVESTMENT. ONLY HOWDEN SPARES, SERVICES AND RETROFIT CAN ENSURE YOU GET THE MOST FROM IT.

For over 150 years Howden has been supplying innovative products to key industries where performance and reliability are paramount. Throughout the world, there is Howden equipment underpinning everyday life. It is used in steel mills and coal mines, in electricity generation and in the petrochemical industry. We are world leaders in heavy fan technology and rotary heat exchangers. We supply some of the largest compressor packages in the world. We have a reputation for high quality, integrity and absolute dependability, crucial in our areas of operation.

Howden Denmark is the global centre of excellence for variable pitch axial flow fans. Since the middle of the last century it has been pushing back the boundaries of axial flow design from its technology centre in Næstved, Denmark. Howden know-how will extend the life of your VARIAX® axial flow fan installation.

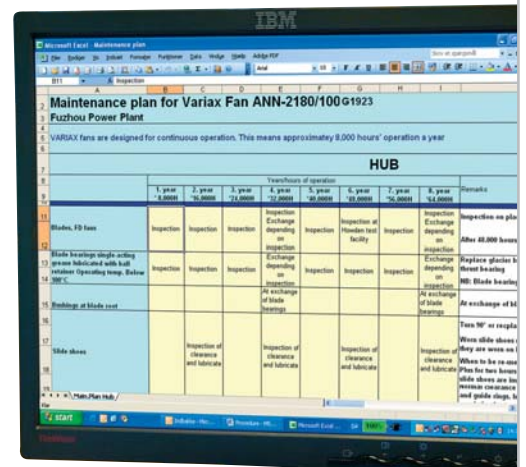


THE HOWDEN PEDIGREE

To date, we have engineered over 3,000 fans throughout the world, with power ratings from 2,000 to 16,000kW. The impellers in the fans range from one metre to over five metres in diameter. And, just as each fan is tailored to meet the demands and performance of its unique situation, service and maintenance programmes should be specifically designed to optimise performance throughout the life of the fan, which is typically 40 years or more.

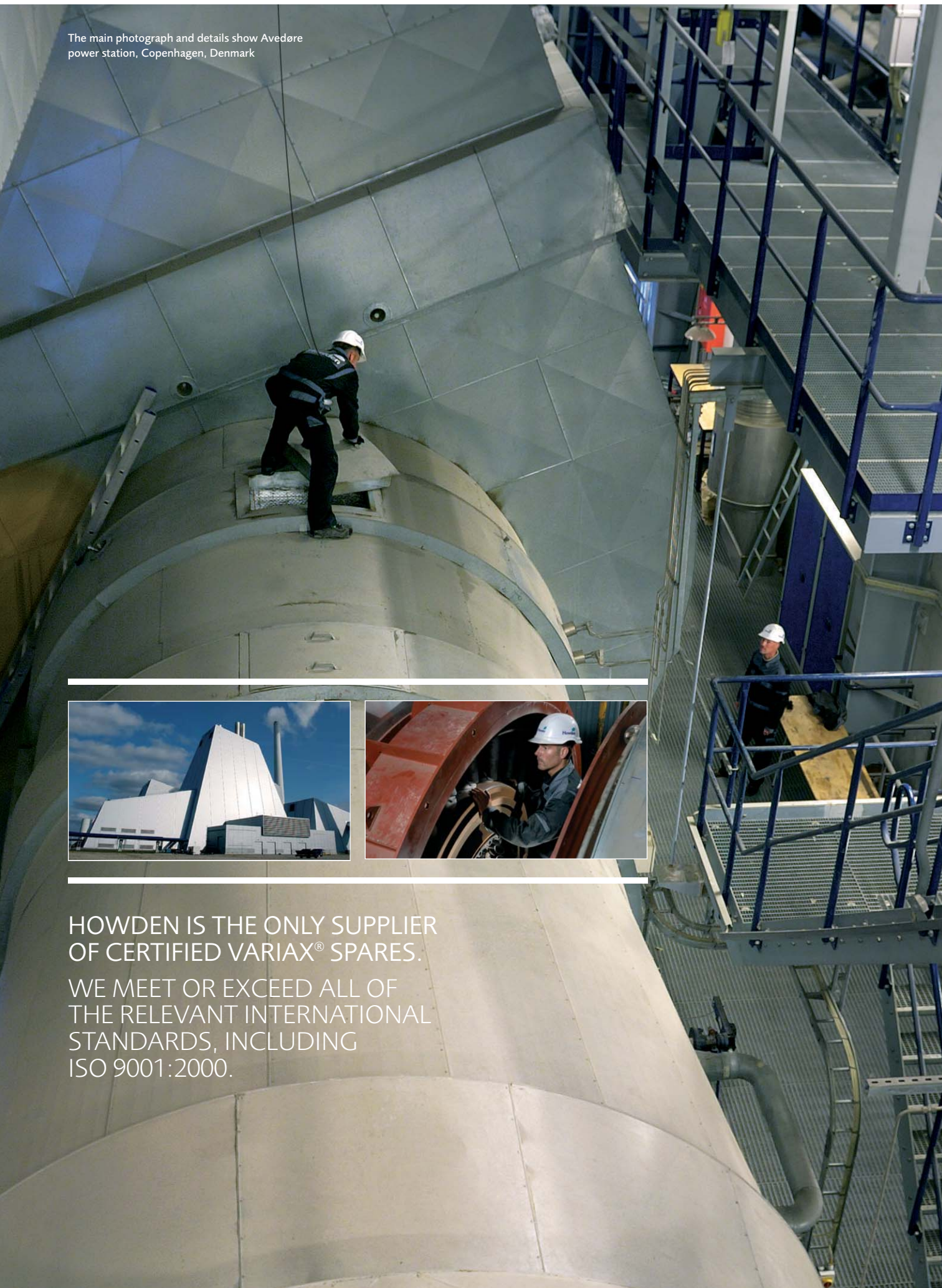
We offer a complete service package, drawing on certified VARIAX® spare parts, servicing and retrofit as required, from the company who engineered and installed the equipment originally. It is designed to avoid costly downtime and expensive compromises. Howden Denmark is the only company with the expertise to lift the maintenance burden from your own personnel, and allow you to concentrate on your core business.

We offer a single point of contact for all your enquiries about VARIAX® fans, whatever their age or location. We will always have the details of your installation on hand. And by using only Howden spares and service, you have the assurance that your VARIAX® fan installation will receive the best possible attention and care.



Dedicated customer maintenance system

The main photograph and details show Avedøre power station, Copenhagen, Denmark



HOWDEN IS THE ONLY SUPPLIER OF CERTIFIED VARIAX® SPARES.

WE MEET OR EXCEED ALL OF THE RELEVANT INTERNATIONAL STANDARDS, INCLUDING ISO 9001:2000.

VARIAX® SPARES

When a VARIAX® fan is designed and built, it is tailor-made to the most exacting standards. Every component is selected and tested to ensure it is capable of the extreme performance that will be demanded of it. Behind every installation there are hundreds of hours of engineering expertise and market-leading technology.

LIFETIME COMMITMENT

When we install a VARIAX® fan, we will continue to provide all the necessary parts and advice to maintain, and often improve, the performance of the installation throughout its working life. We will always have the details of your unique installation on hand.

Each fan has well over 1,500 different replaceable parts, and every part of every fan has been designed with its specific site and application in mind. The advantages of using original VARIAX® spares, that meet the exact specification, tolerances and performance of the original part, are obvious. Lower cost alternatives or adaptations can prove very expensive when they fail, and they may place intolerable burdens on other parts of the machinery.

THE ADVANTAGES OF USING ORIGINAL VARIAX® SPARES, THAT MEET THE EXACT SPECIFICATION, TOLERANCES AND PERFORMANCE OF THE ORIGINAL PART, ARE OBVIOUS.



Axial Thrust Bearing

Regulating Arm

Hydraulic Cylinder

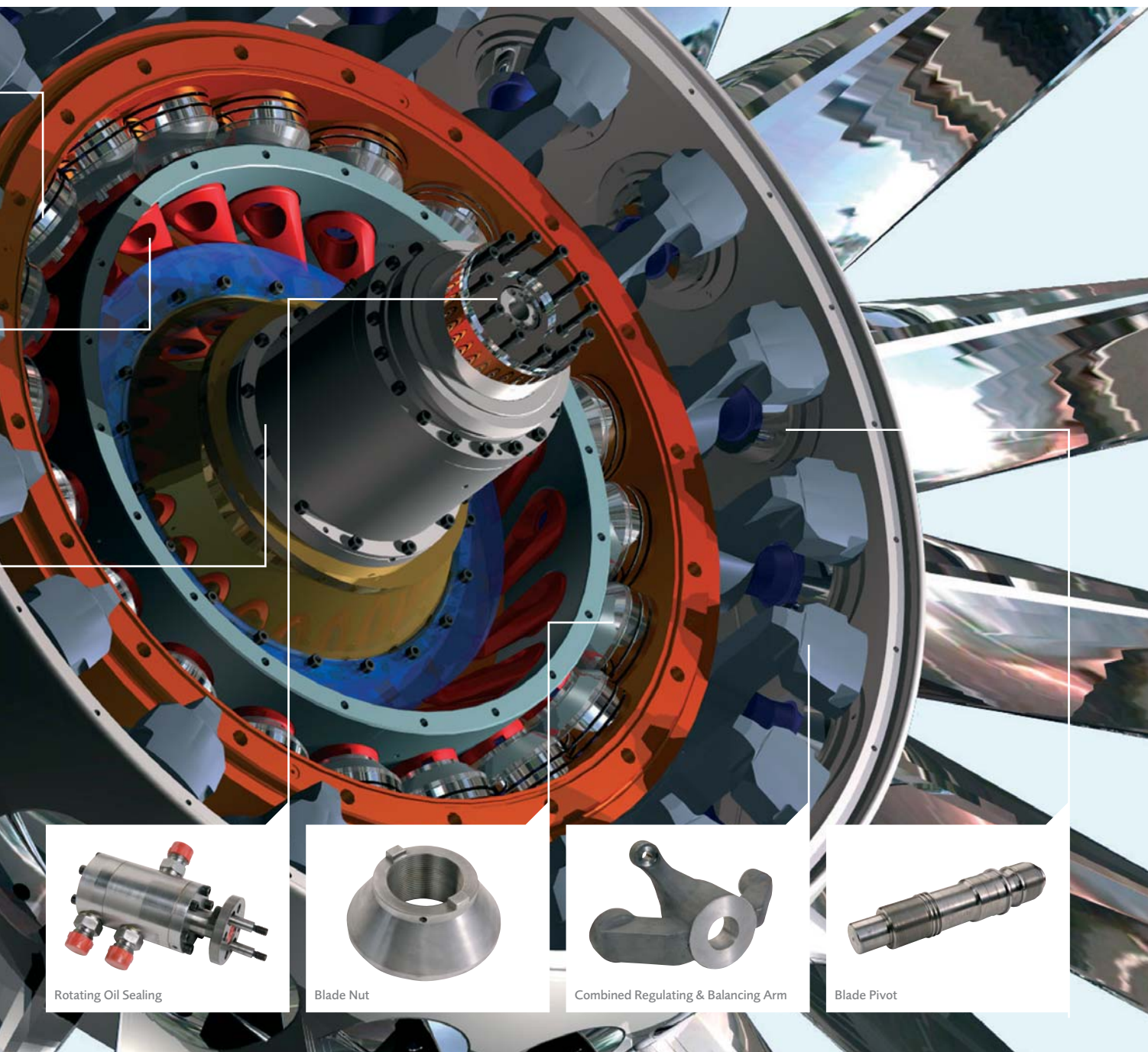
Blade

All of the handling of spares, from initial enquiry through to shipping, is carried out by our highly knowledgeable and experienced staff. Crucially, they have access to the specification and maintenance history of your own installation. They can not only ensure that the replacement sent out is correct in every respect, they can advise on new technologies and developments that may be appropriate to your situation. We call this 'customer orientation' and we take it very seriously.

From our knowledge of your installation, we can also help you to plan your future needs, recommending a list of parts to stock or replace or suggesting upgrades that will improve economy or performance, based on your maintenance record.

The advantages of using experienced Howden personnel to carry out the fitting of new parts is also clear. Our engineers are skilled in replacing or upgrading these parts with the minimum of downtime.





Rotating Oil Sealing

Blade Nut

Combined Regulating & Balancing Arm

Blade Pivot

VARIAX® SERVICING

We have been building and installing VARIAX® fans since we invented the variable pitch axial flow fan in 1951. Over that time, we have developed a wide choice of service patterns tailored, just like the fans themselves, to the needs of the users. We don't believe that you should pay for a higher level of servicing than you actually require. But we do believe the essential servicing should be done professionally, by personnel with the experience of 3,000 fans behind them.

INSIDE KNOWLEDGE

Howden service staff operate globally. We have a team of supervisors and site engineers dedicated entirely to VARIAX® fans. They are backed up by a highly experienced team of specialist engineers to advise on aerodynamics, construction, noise reduction, stress analysis and mechanical

engineering. Where necessary, they can draw on other parts of the Group's worldwide service network.

The optimal service is the one that keeps your fan available, raises performance, reduces downtime and extends the life of the installation. The best way to meet that ideal is to work in partnership with us. We can carry out regular service needs assessments and planning, and undertake predictive and preventive maintenance. We know which parts can be reconditioned, which parts should be replaced. And, significantly, we can often turn a problem into an opportunity with an upgrade that improves efficiency and performance.

Starting from the installation of the fan, and supervising the start-up and commissioning, we offer a complete lifetime relationship. In addition to regular monitoring, inspection and repair, we can

upgrade to optimise system performance. We maintain a complete installation and service record for your VARIAX® fan. From emergencies and troubleshooting through to training your own personnel, we offer the only total VARIAX® service package.

THE SERVICE OPTIONS INCLUDE

- regular inspection and maintenance
- preventive maintenance and system diagnosis
- upgrade and optimisation of performance
- troubleshooting and noise reduction
- on-site testing and balancing
- training
- spare and replacement parts
- reconditioning of moving parts
- 24-hour hotline (+45 80206262)

VARIAX® RETROFIT

VARIAX® fans installed in the power industry in the 60s and 70s are now in the final phase of their designed life. Maintenance, operational costs and failure rates naturally increase as the equipment ages. However, complete replacement of a fan is an expensive commitment. In addition to the cost of the fan itself, there are further cost implications in rebuilding foundations and ducting, and there are always compromises involved in placing a new fan in a space intended for its predecessor.

BRAND NEW PERFORMANCE

Recognising this, we have designed a comprehensive and flexible retrofit service, allowing us to produce improved replacements for critical parts of the VARIAX® installation. Our retrofit programme builds on the superior aerodynamics and the extremely low dynamic force and vibration levels that are a feature of VARIAX® fans, enabling us to install the most up-to-date upgrades within the original parameters of the installation. Existing foundation bolt positions, the natural frequency of the foundation, the duct arrangement and the specification and design of the motor are all taken into consideration.

The rotating system, shaft and bearings will be manufactured to introduce state of the art developments into the static parts already in situ. The outcome offers the performance of a brand new VARIAX® fan at a substantially lower cost and downtime of a full replacement, and adds enormously to the designed life of the plant.

Where a fan is third or fourth decade, or where improved performance is being demanded within critical constraints of time and cost, retrofit should always be the first avenue to explore.





Howden

Howden is the only supplier of certified VARIAX® spares. We meet or exceed all of the relevant international standards, including ISO 9001:2000. We offer a lifelong service, with all parts fully guaranteed. We keep a detailed production and maintenance record of your installation. In maintaining and extending the working life of your VARIAX® fan, we are the obvious choice of partner.



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