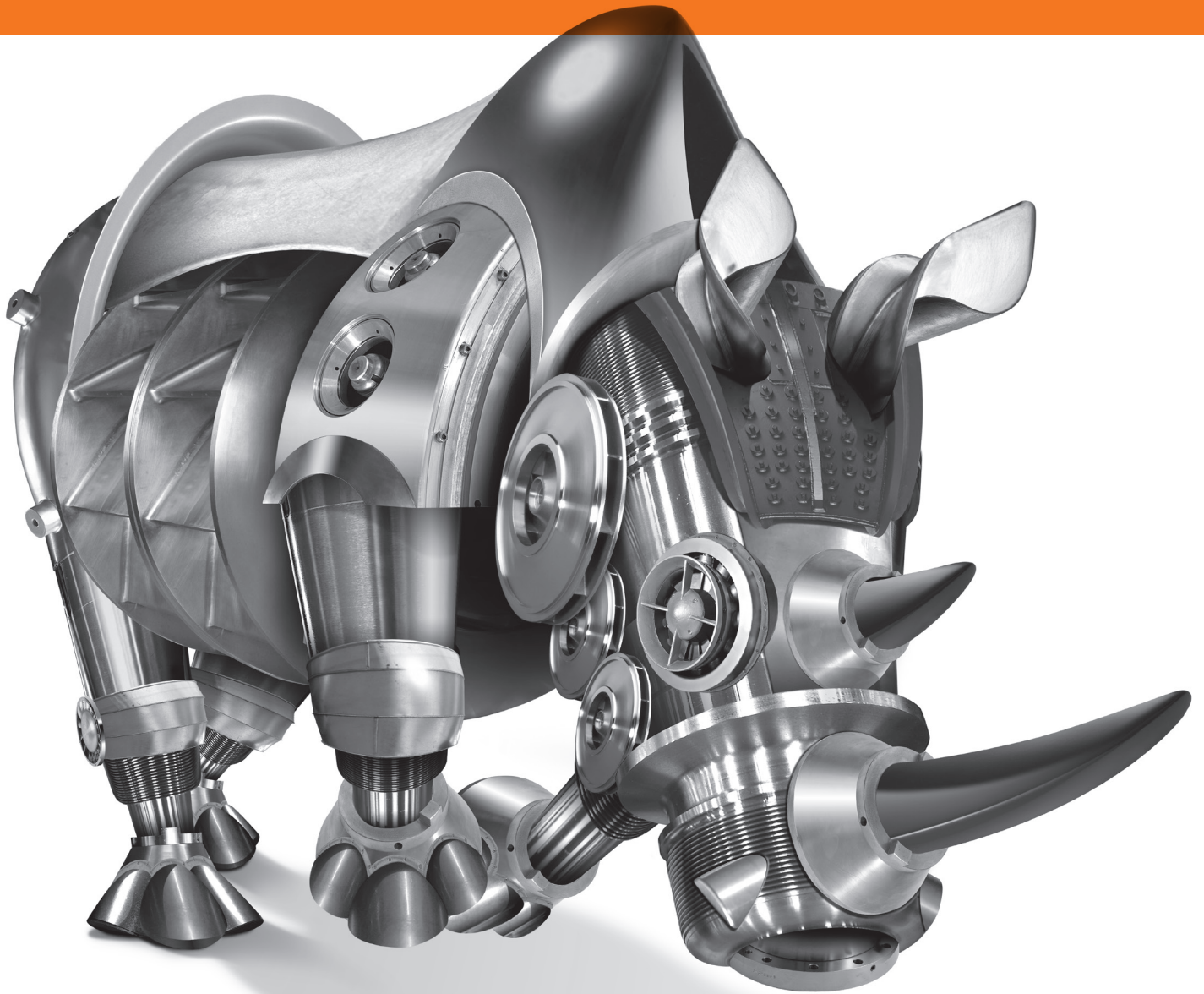


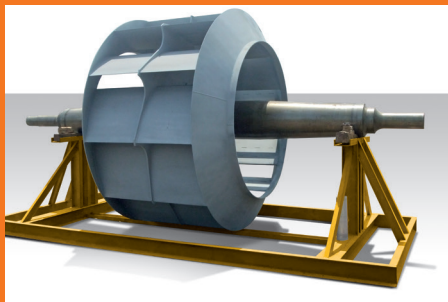
Armored fan technology for cement process plants

Ultra-reliable performance in the most challenging environments



Revolving Around You™

With unrivaled capabilities that have grown in parallel with modern cement manufacturing, Howden fans provide the industry with a solid foundation.



As a global organization with more than 160 years experience in air and gas handling technology, we know how to make high-efficiency, heavy-duty fans that cope effortlessly with the most dust and particulate-laden processes. Our equipment is providing constant, dependable service in many of the world's most modern and productive cement plants. We design the fans that operators need, because every technical development we introduce is based on our long working relationship with cement plant operators, and on decades of listening to their needs. From maximizing energy efficiency to controlling particulate emissions, we're listening and responding.

Revolving Around You™

The pathway to increased productivity and reduced costs

Cement manufacturing is one of the world's most fundamental industries. It makes an essential contribution to virtually every factory, office and infrastructure project. It is also an industry that presents some extreme challenges.

Extremely high particulate levels place enormous demands on fans, and within an enormously energy intensive industry the fans are the major consumers of power. As energy prices and environmental issues grow in importance, improved fan efficiency is an increasingly important route to reducing costs.

We bring more than a century and a half of experience to fan design and continue to set benchmarks for efficiency and reliability, reducing maintenance and downtime as well as energy costs. Every process fan we make for the cement industry is custom engineered

using designs that have been validated by continuous long term operation in the field, and that continue to benefit from our program of continual improvement.

In addition to the heavy duty process fans, we can supply cooling fans, auxiliary fans and every other type of fan required in a cement plant. We can offer a full turnkey service of design through to installation and commissioning if required, and provide an upgrade service for any cement fan from any manufacturer. Our unequivocal lifetime commitment to support and spares is inherent in every project we undertake.

We help plant operators to achieve

significantly lower energy costs.

better emissions control.

shorter Mean Time To Repair (MTTR).

elimination of unplanned downtime for fan repairs.

lower noise.

better profitability.

greater peace of mind.



Robust fan technology where it really matters

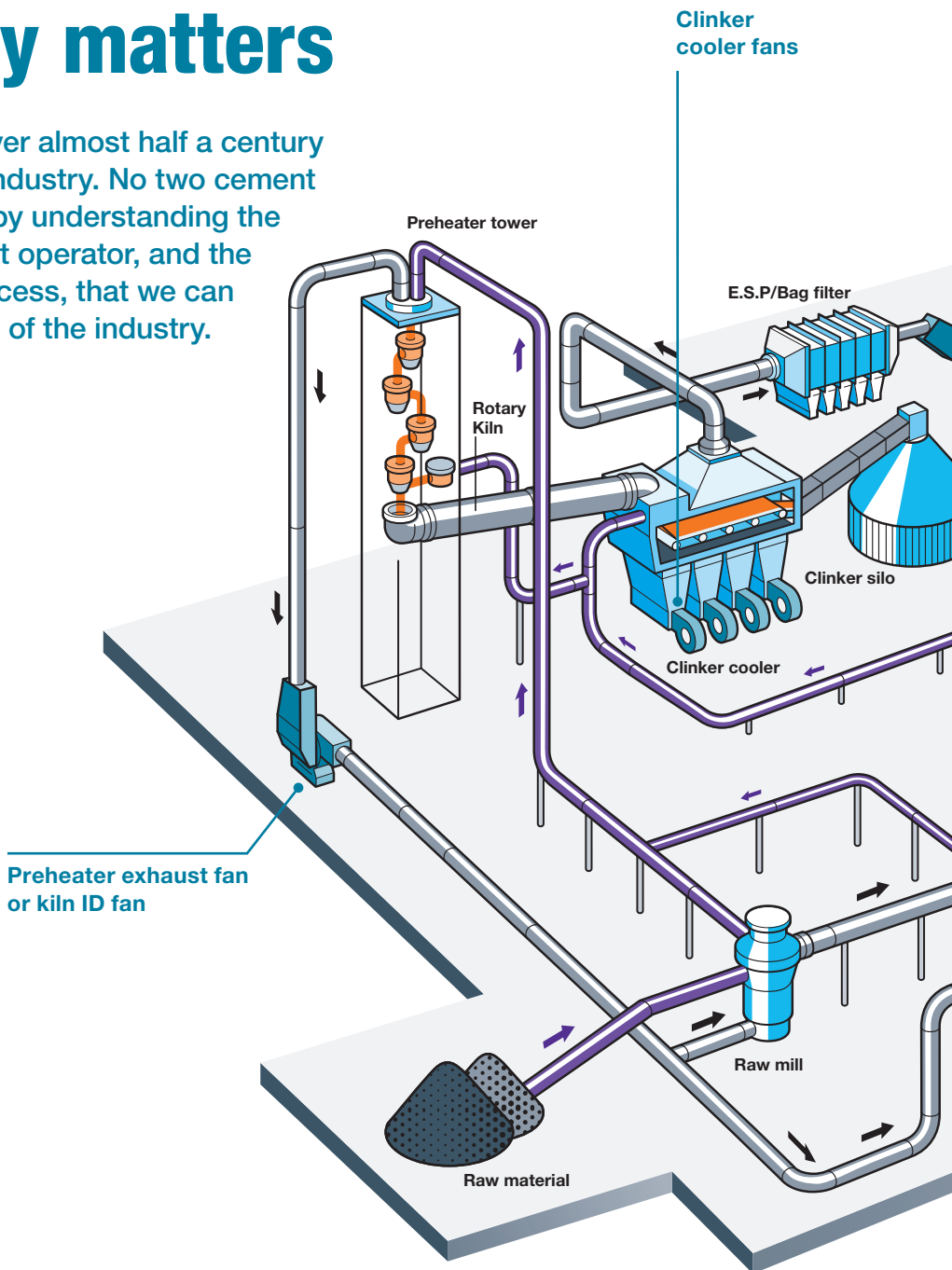
Our expertise has been built up over almost half a century of collaboration with the cement industry. No two cement plants are identical, and it is only by understanding the precise requirements of each plant operator, and the demands of each stage of the process, that we can provide fans that meet every need of the industry.

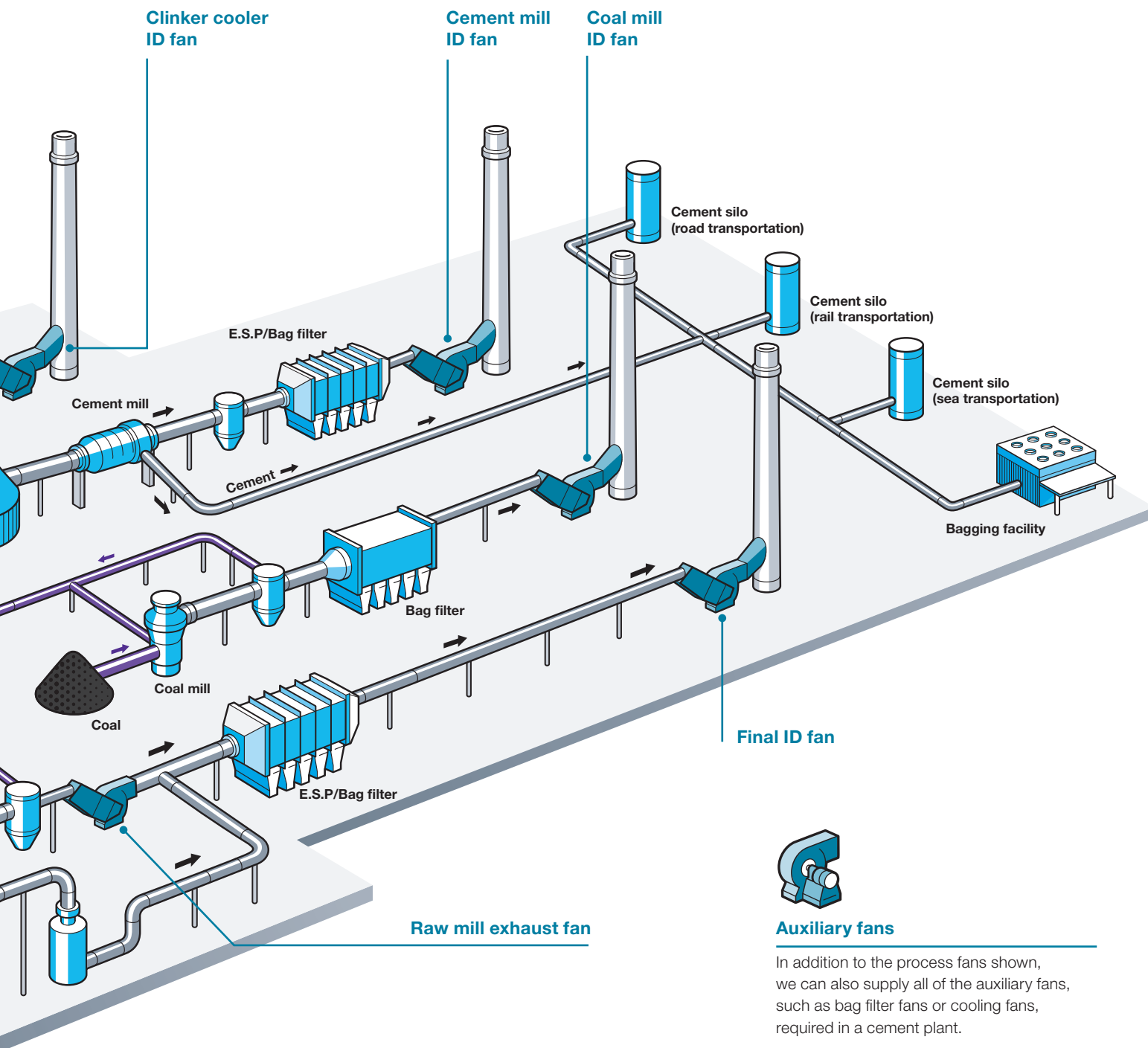


Efficiency is the key to economy

One of the most serious threats to economic operation is a mismatch between fan specifications and its duties. If the fan under-performs, plant capacity will suffer. If it is over-specified, energy will be wasted. And running the fan outside its optimum efficiency to compensate brings dead areas into the airflow and increases dust deposits, creating a downward spiral.

Every Howden fan is engineered to precisely match the demands that will be placed on it, and to maintain the same high efficiency over years of continuous operation. And because we can supply every fan required in a cement plant, including auxiliary, booster and cooling units as well as the heavy-duty process fans, we can bring the same absolute reliability to every area of the operation.





Auxiliary fans

In addition to the process fans shown, we can also supply all of the auxiliary fans, such as bag filter fans or cooling fans, required in a cement plant.

Outstanding performance built on unrivaled experience

Abrasive and dusty conditions have complex consequences. As well as causing uneven wear on the blades, dust can build up within the impeller, increase its weight and lead to imbalances that cause vibration.

During our long partnership with the cement industry, we have researched the effects of particulate matter. We have investigated the trajectories and energy of differing particle sizes and chemical compositions, and

designed deflectors that modify flow patterns to minimize detrimental effects. We can incorporate highly effective cleaning mechanisms to remove dust deposits.

We use materials specially formulated for their resistance to abrasion, and add shields and liners in areas of extreme wear, and to protect nuts and bolts. We increase the stiffness of the rotor and the blades themselves to offset the effects of vibration.

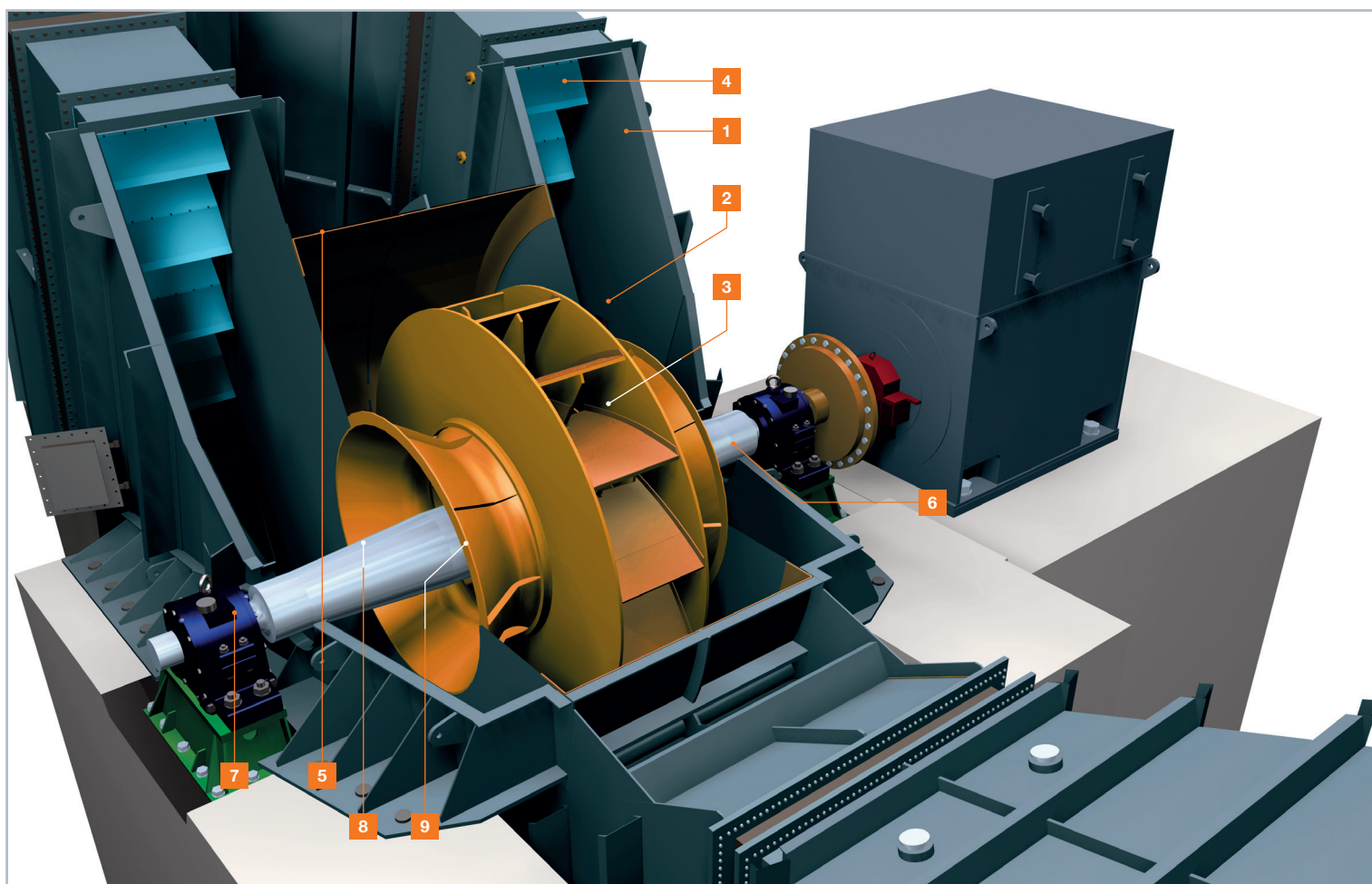
Our low-noise impeller design can also substantially reduce noise levels within the plant, and we offer a range of drive options, including fluid drives, to maximize efficiency.

Thermal stresses are a significant factor in fatigue failures. As well as selecting materials for their performance at high temperatures, we introduce bespoke reinforcements specifically to counteract thermal stress.

A modular approach to a perfect fit

The heavy duty centrifugal process fans we produce for the cement industry are the culmination of our unique global experience and our continual investment in research. The product of constant, evolutionary development, they use a flexible design approach and incorporate a number of features that offer particular advantages in cement processing.

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| 1. Inlet boxes can be provided at any angle for easy integration with existing ductwork. | 4. Inlet Louver Dampers (ILD) are bringing power savings even in high temperature. ILD can use high wear resistant materials in case of use in very abrasive environments. | 7. Ball, roller and sleeve bearings with various lubrication, mounting and cooling options are available. |
| 2. We can draw on a wide range of impeller types, materials and sizes up to five meters | 5. All fan housings are of welded construction, and can support thermal or acoustic protection. | 8. Integral forged shaft designs suitable for high-temperature environments can be incorporated. |
| 3. Wear protection and stiffeners can be added to any blade profile. | 6. Various shaft seals are available to suit individual applications. | 9. Finite Element Analysis (FEA) is used to optimize the mechanical structure, reducing maintenance and costs. |





Around 10,000 Howden process fans are already providing dependable, proven service in cement plants around the globe.



1. TXI Riverside Cement, Oro Grande plant, CA, USA.



2. Lafarge Ciba, Oggaz plant, Algeria.



3. Vicat Cement, Montalieu plant, France.



4. Lafarge Tarmac, Dunbar plant, Scotland.



5. Southern Province Cement Co., Gizan plant, Saudi Arabia.



6. Heidelberg PT Indocement, Citeureup P14 plant, Indonesia.



7. Cockburn Cement, Munster plant, Australia.

We're with you from turnkey installation to lifetime support

Where required, we can provide a full turnkey service extending from analysis and design through to installation and commissioning. Whether we install or simply deliver the unit, every Howden fan comes with a lifetime commitment to the supply of spare parts and servicing.

We have found that the most cost effective maintenance comes through partnership working and regular inspections, based on schedules and levels of intervention agreed with the operators.

In addition to regular contract maintenance or one-off projects, we can carry out troubleshooting exercises or produce full vibration, acoustic and fluid dynamic reports.

New fan performance in existing fan casings

One of the most important parts of our support to cement plant operators is our ability to raise the performance and energy efficiency of existing plant without the cost, downtime and disruption of installing new fans.

We can design and install a new rotor assembly for any existing fan casing, retaining all of the infrastructure, foundations, drive, static parts, inlet and outlet arrangements and control and monitoring equipment. This can bring valuable improvements to performance and productivity, with significant reductions in energy costs, at far lower capital expenditure than fan replacement. This is a service we can provide for any type of centrifugal cement fan, irrespective of the original manufacturer.

Our aim, in every case, is to provide the plant operator with the lowest lifetime costs. We would be happy to provide a full costed proposal that will demonstrate the energy savings, reduced maintenance costs, longer intervals between scheduled maintenance breaks and, crucially, the elimination of unplanned stoppages.

For more information, contact:

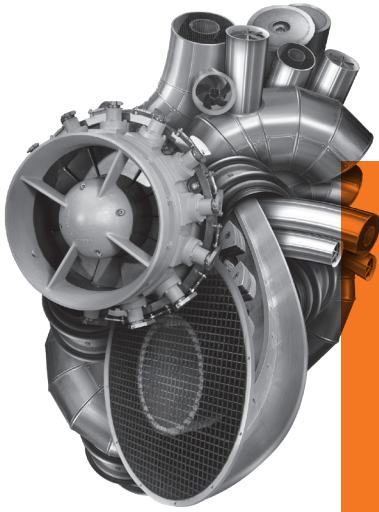
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At the heart of your operations

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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