



David Brown Santasalo



Cement

Chemicals
Defence
Fibre, paper & tissue
Food & beverage
Marine & port operations
Metals
Mining & minerals
Oil & gas
Panelboard
Power generation
Rail
Rubber
Sugar
Water & wastewater

Cement Industry

Heavy-duty power transmission
solutions for the cement industry

David Brown Santasalo delivers a full range of drive solutions for the intense requirements of cement processing.

We're geared to deal with any challenge at every stage of cement processing and our diverse experience founded on almost three centuries of global gear engineering ensures we can provide the absolute reliability you need. Experts in the development, layout design, and manufacturing of gear units, David Brown Santasalo's cement drive solutions offer improved efficiency, an optimised torque/weight ratio, high capacity utilisation, and reduced noise and vibration levels.

Our application-specific products include a full range of foot and shaft mounted helical, bevel-helical, and planetary gear units.

Power transmission solutions for all areas of the cement manufacturing process



Grinding

Our proven product range includes industrial gear systems for horizontal and vertical grinding mill applications, as well as girth gear and pinion sets. Each gear system is engineered to customer requirements to ensure exact gearbox – application fit and maximum performance.

- SAG & AG mill drives
- Ball & rod mill drives
- Vertical roller mill drives
- Girth gears and pinions
- Roller press gearboxes
- Tower mill gearboxes
- High pressure grinding roll drives



Material Handling

Our material handling gear systems are in operation in some of the world's harshest environments – thermal efficiency, mounting and sealing systems are optimised to ensure supreme performance whatever the weather. To ensure a perfect fit, gearboxes can be supplied with optional backstops and auxiliary or inching drives.

- Conveyor drives
- Bucket elevator and bucket wheel excavator drives
- Stacker / reclaimer drives
- Feeder drives
- Slewing gears
- Shovel & dragline gears
- Apron feeder drives

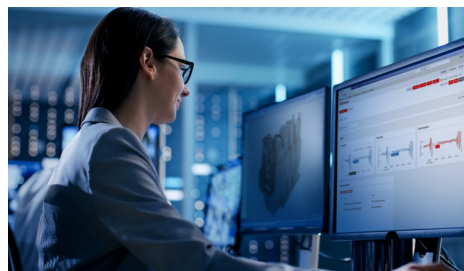


Pyro Processing

David Brown Santasalo has extensive experience in delivering large, multi-segment, cast and fabricated girth gears for pyro processing and grinding applications.

Application-based design techniques ensure each segment is matched to our customers' specifications, delivering optimal and reliable performance. Our girth gears are machined to exacting tolerances.

- Girth gears
- Kiln and dryer drives



GearWatch condition management

GearWatch condition management system is a smart, compact and value-adding tool for predictive remote process equipment monitoring. GearWatch measures, records and analyses data, reporting any changes in measured parameters in real time, 24/7 via the internet. Oil particle content monitoring enables early detection of potential gear unit failures months, or even a year in advance. This allows you to plan maintenance activities around your operational requirements.



Full life support – whenever you need us

With almost three centuries of combined gear engineering experience, David Brown Santasalo is recognised as an expert in the cement industry. We work in partnership with a number of OEMs and end users to engineer gear systems that maximise output. This gives us deep understanding of the challenges our customers face, and what we need to do to ensure these challenges are overcome – no matter how demanding.



Your single source supplier:

- Full service solutions for new and rebuilt gear systems
- Concept design and end to end engineering
- Dimensioning and component selection
- Manufacture to ISO 9001 quality standards
- Thorough product testing
- Installation and commissioning
- Full service support including maintenance, field service and spares



Girth Gears

Cast & fabricated girth gears for all applications

David Brown Santasalo has almost three centuries of gear engineering expertise and a huge installed base of successfully operating girth gears worldwide. Usually fitted to the outside of horizontal mills, rotary mills and kilns, girth gears provide the system’s primary rotational drive and as such need to be robust, efficient and built to last.

David Brown Santasalo delivers a full range of girth gears with cast, fabricated and multi-segment options available for the following applications:

Mills • Kilns • Dryers • Coolers • Scrubbers

Key benefits:

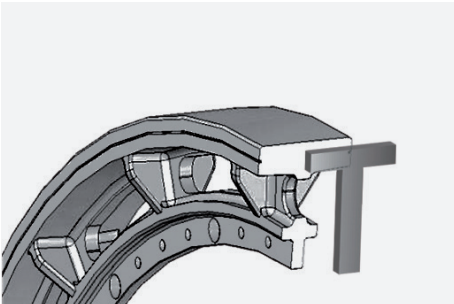
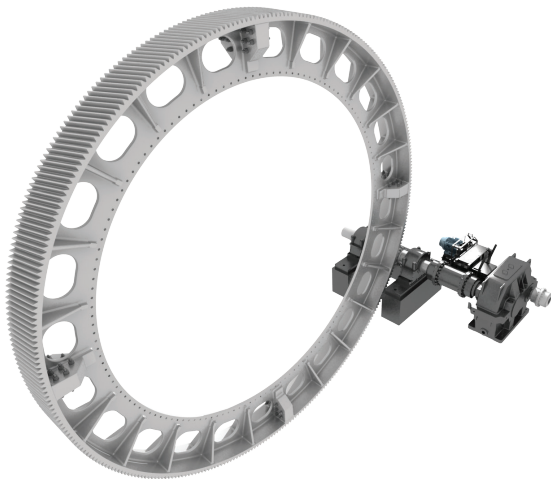
- Cast and fabricated gears rated up to 10MW per pinion
- Diameter up to 14m
- Weight up to 105 tonnes
- Pitch up to 50 module
- Options for multiple segment manufacture in cast and fabricated material
- Designed to the latest AGMA standards for complete assurance

Individual gears or a fully optimised system

Girth gears can be supplied individually, or as part of a fully optimised package which includes:

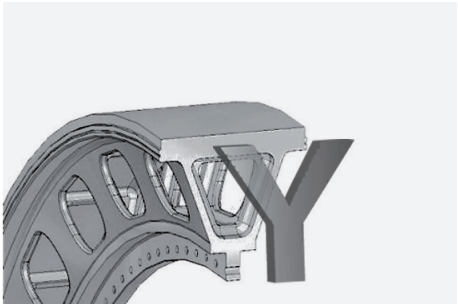
- Mill drive gearbox
- Girth gear
- Pinions
- Barring drive
- Auxiliary equipment including couplings, brakes, pedestal bearings and clutches

Whichever option you chose, rest assured that your girth gear will be designed to complement your whole system.



T section gearing options

T section gears are designed to optimise stiffness across the gear’s facewidth. David Brown Santasalo T section gears are resilient to pinion misalignment, ensuring robust, reliable operation. David Brown Santasalo uses Finite Element Analysis (FEA) to deliver optimal gear performance.



Y section gearing options

Y section designs have been extensively used on rotating mills and kilns for many years and David Brown Santasalo has long standing experience in providing this type of girth gear. Y section gears offer optimal rim support and stiffness over the facewidth of the gear, ensuring the girth gear is as robust and reliable as our customers need it to be.

Material options: SG iron

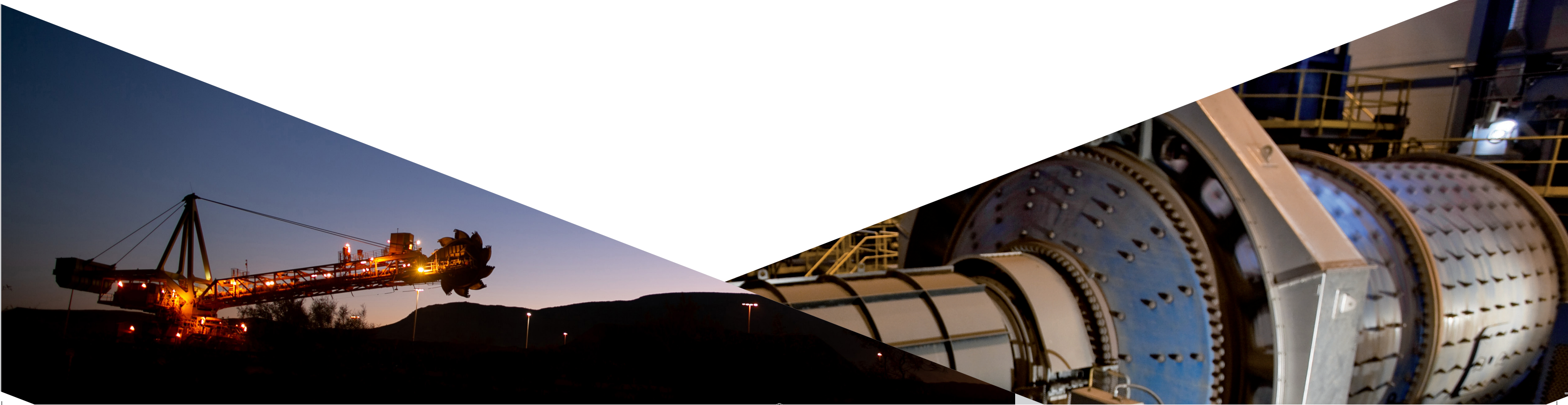
- Hardness ranges up to 320BHN
- Spheroidal Graphite Iron (SGI) gear castings deliver excellent material quality
- A lower stiffness rating improves load sharing across the face and between teeth, reducing pitting and ensuring a long lasting, reliable gear
- FEA techniques are used to model deflections under load to optimise and match the design to the material properties

Material options: cast steel

- Hardness ranges up to 320BHN
- Alloys designed to achieve the required mechanical properties and retain the ability for weld repairs in the field
- Castings can be liquid quenched during casting manufacture to achieve the desired mechanical properties with reduced risk of cracking
- Field proven procedures for managing the upgrading process to improve integrity

Material options: fabricated steel

- Proven alloys are used for gear rim construction, resulting in hardness values from 180 to 340BHN and high impact strengths - typically 35J, but can be as high as 90J
- Gear segment rims are hot forged using our unique hot forming process for greater material consistency and reduction of residual stresses
- FEA techniques are used to model stress patterns and ensure appropriate material choice for robust operation



Multi-Segmented Girth Gears

Application-based multi-segmented girth gears matched to customer specifications

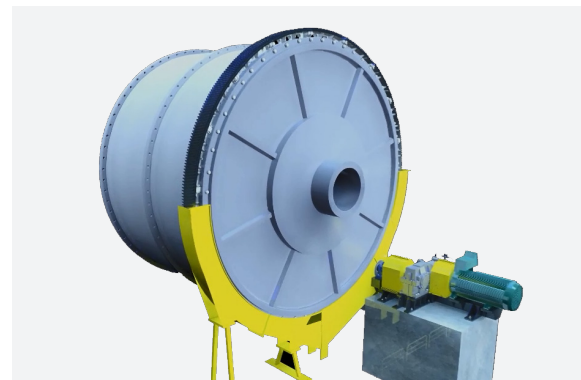
If you need large diameter girth gears in your process or machinery, then you need a product you can rely on. David Brown Santasalo are pioneers of the multi-segmented girth gears which are used to rotate large drums, kilns and mills from diameters of 3 metres and up; in fact, no upper limit exists.

The multiple segment design of David Brown Santasalo's girth gears provides significant advantages for precision manufacturing, transportation, installation and maintenance with added benefits of high fatigue and wear resistance.

With hundreds operating worldwide and so far up to 9 metres diameter, the multi-segmented girth gear design has proven durable and reliable in minerals, steel, chemical, sugar and pulp and paper applications.

Key benefits:

- Multi-segmented girth gears with a complete drive package
- Spur and helical designs
- Diameter of 3 metres+, no upper limit exists
- Advanced ADI material (Austempered Ductile Iron) minimises gear wear
- High reliability with more accurate tooth geometry
- Low transportation costs
- Easy and cost-effective replacement of individual segments
- Machined to exact tolerances, up to AGMA10 or ISO7 for certain applications



Spur & helical designs available

David Brown Santasalo's helical gears run smoothly and quietly, offering a refinement over spur gears in certain applications. Thrust bearings are required to carry the additional load along the axis of helical gears and a specific lubricant is used to cope with the sliding friction between the meshing teeth.

Improved logistics

Traditionally large girth gears have been made from two or four segments bolted together for machining and therefore require large machining centres. Multi-segmented girth gears can be manufactured in a normal machining centre, one segment at a time. Heat treatment, transportation and handling can also be easier and cost efficient. The David Brown Santasalo girth gear consists of multi-segments bolted together to make immensely strong and precise large diameter gears. The length and number of segments depends on gear diameter and is optimised for each application. The result is a significant reduction in lead-times as well as easier and less costly transportation. Assembly on-site presents less difficulty, with the compact segments being easier to lift and position.

Lower lifecycle costs

Gear wear is minimised by the use of (ADI) in castings. ADI has the high torque/weight ratio required together with high resistance to fatigue and wear for long ring gear life. Highly accurate production and assembly techniques minimise vibration and further enhance the long service life of the gear. Condition monitoring tools enable the performance of a drive to be followed either in real-time or as a part of regular inspections. If damage to the gear should occur, individual segments are replaced instead of changing the whole gear, making it possible to carry spare parts for critical applications.



Quatro

Advanced planetary gear units designed to customer specifications

The well established Quatro range of planetary gear units designed and manufactured by David Brown Santasalo offers higher torque without the requirement to increase the gear unit size or weight, giving you more for your investment. The Quatro will provide enhanced availability and reduced maintenance costs for your application.

Key benefits:

- Increase in maximum torque from 1,180 kNm
- Short lead times with fast availability of main components and optimised manufacturing
- Modular construction to suit application specific requirements combined with high variability of the input and output
- Fulfils the requirements of ISO, AGMA and DIN standards

Technical data	
Design Sizes	15
Number of Stages	2 - 5
Power Range	up to 1,500 kW
Transmission Ratio	up to 18,500
Nominal Output Torque	up to 1,180 kNm

Efficient solutions for a range of applications

- Agitators
- Mixers
- Conveyors
- Mills
- Pumps



Vertical Roll Mill Series

Bevel planetary gear units for heavy duty grinding applications

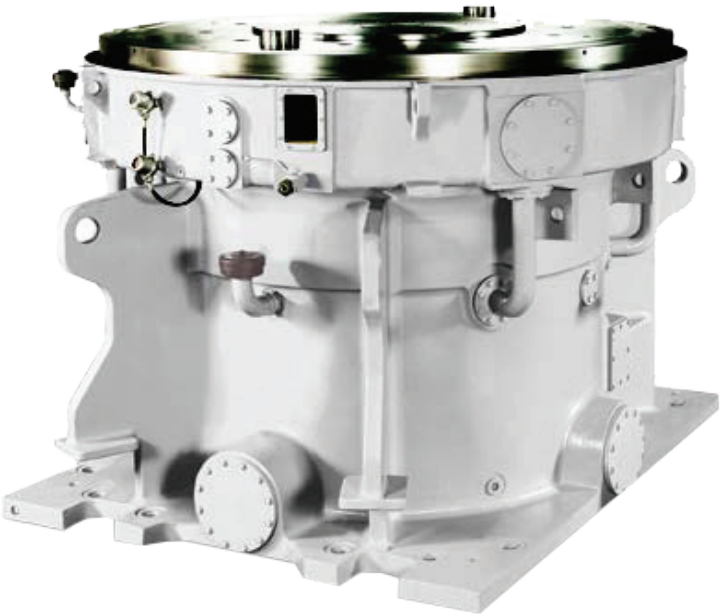
Extreme industrial applications require reliable gear units all year round. Gearboxes with longer bearing life, improved power density and increased product lifecycle are key factors in the decision-making process.

David Brown Santasalo’s vertical roller mill series delivers power, durability and reliability even under extreme conditions.

Key benefits:

- Designed in close cooperation with manufacturers for different mill types to provide an optimal solution for each application
- Gear unit operates efficiently and transfers acting loads accurately, ensuring continuous and failure-free production flow
- Surface finishing process for advanced fatigue strength and increased wear resistance
- Profile and longitudinal modifications provide optimum tooth flank contact guaranteeing low vibration, low noise levels and longer lifecycle

Technical data	
Design Sizes	10
Number of Stages	2
Power Range	up to 4,000 kW
Transmission Ratio	20-45
Nominal Output Torque	up to 3,000 kNm



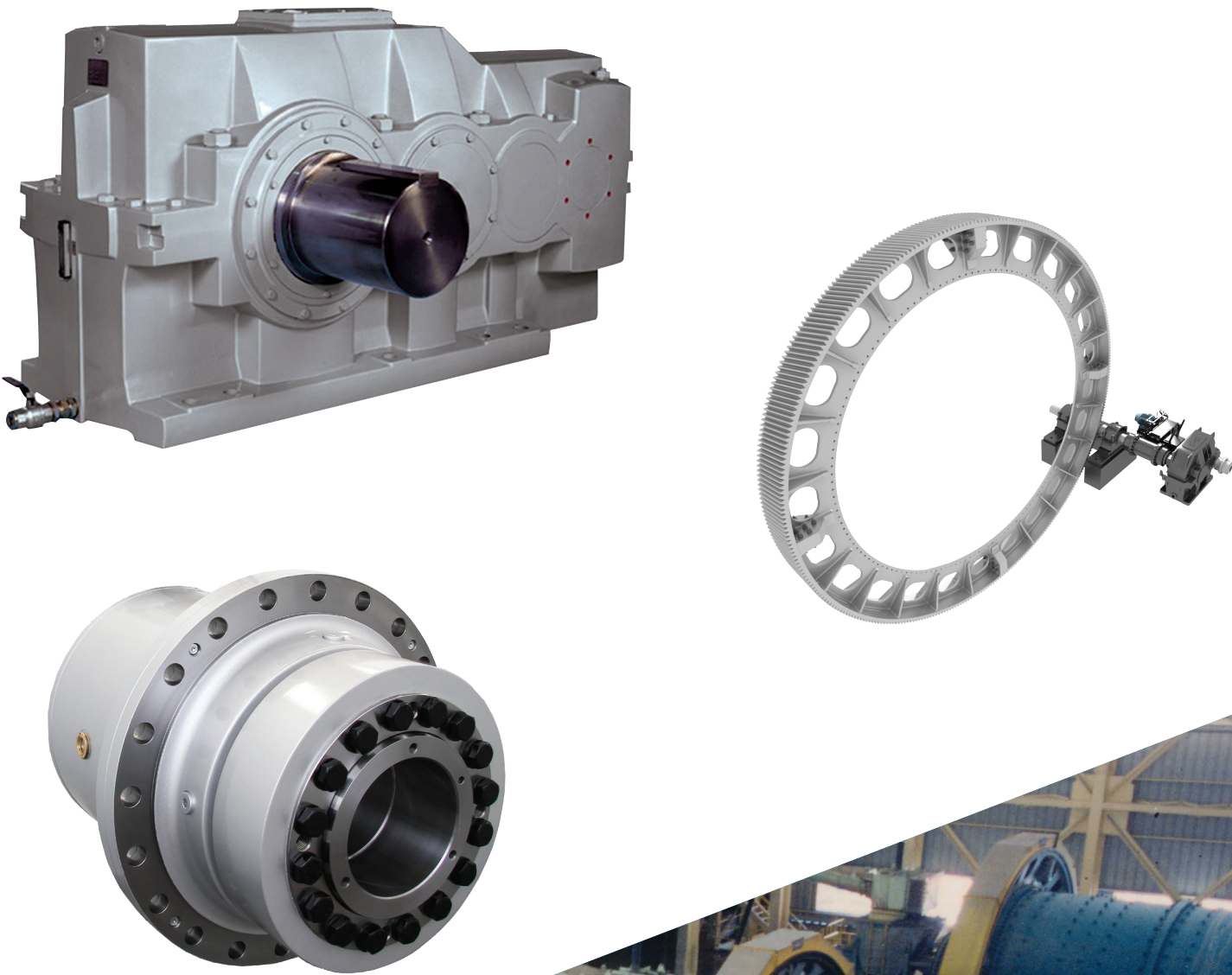
Ball Mill Drives

Single & two stage helical and planetary gear units

David Brown Santasalo’s horizontal grinding drives are engineered to customer specifications ensuring optimal performance while offering low running costs. Single and two-stage helical and planetary drives are supported by our extensive lifecycle service program. Designed to meet the demanding conditions and requirements of the grinding circuits, each gear unit is built to customer specifications to ensure an optimal and reliable performance.

- Key benefits:**
- Helical drives with accessories according to customer specifications
 - Planetary centre drives
 - Auxiliary drives with accessories according to customer specifications
 - Multi-segmented, cast and fabricated girth gears and pinion sets are also available
 - High performance with low running costs
 - High process availability
 - 24/7 real-time condition management (option)

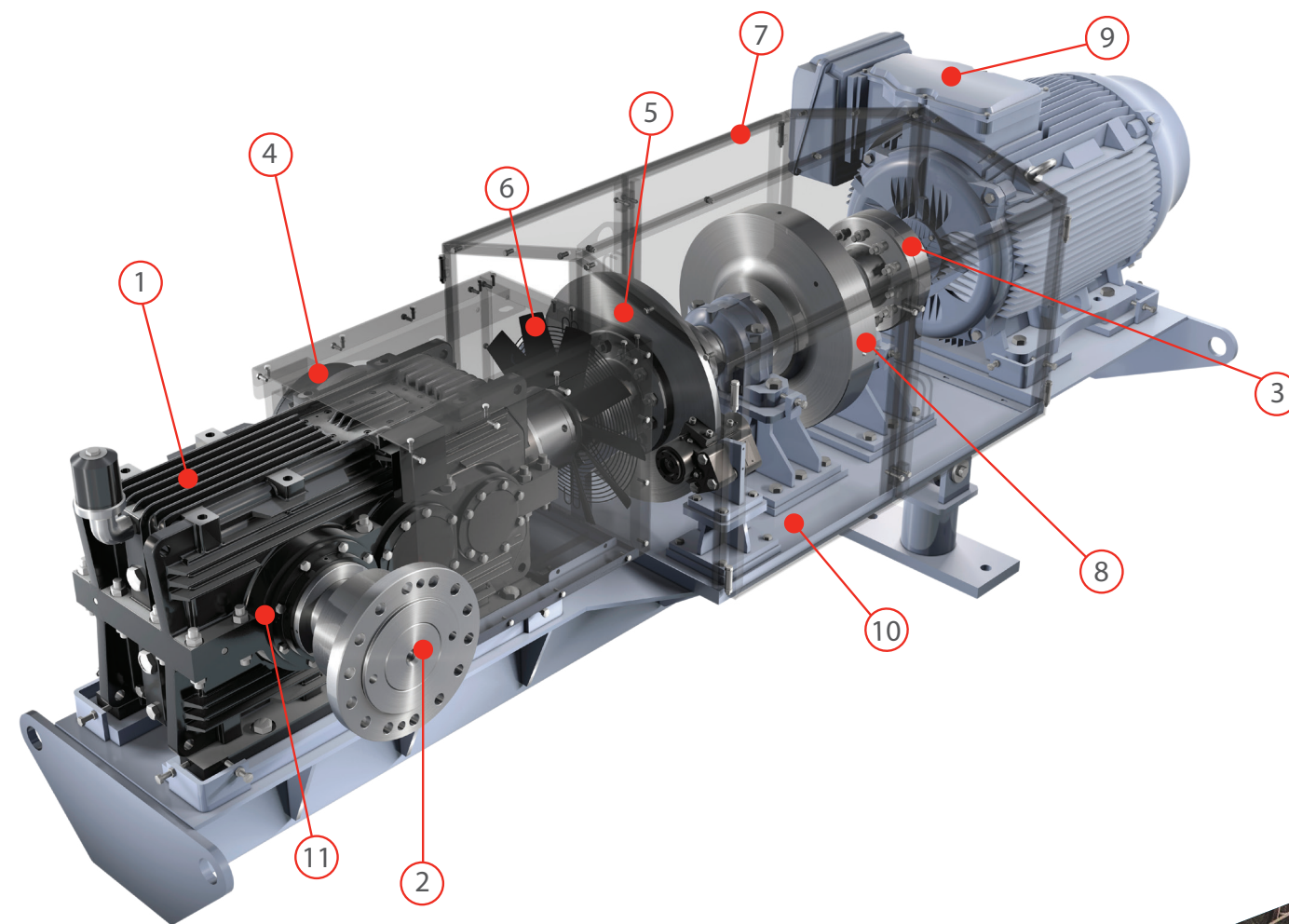
Technical data	
Number of Stages	1 & 2
Power Range	up to 22,000 kW
Transmission Ratio	3-100
Nominal Output Torque	5,000 kNm



CX Series

Mechanical power transmissions for conveyor applications

The CX series offers exceptional field proven levels of performance, versatility and life expectancy, which exceed the demanding requirements of modern conveyor applications and work to maximise the availability of our customers' processes wherever they are in the world.



David Brown Santasalo can supply any CX series gearbox individually or as a complete conveyor drive unit comprising some or all of the following parts:

1. CX series gearbox
2. Low speed output couplings
3. Conventional or fluid type input couplings
4. Holdback/backstop
5. Disc or drum brakes
6. Fan
7. Safety guards
8. Fly wheel (inertia wheel) with independent support bearings
9. Electrical motors (HV or LV)
10. Base frame in floor mounted, swing base or tunnel mount versions with torque arm
11. Output coupling guard



Apron Feeder Drives

Planetary and bevel helical gear units

Extreme industrial applications demand gear units that deliver a reliable performance 365 days per year. This requires gearboxes with longer bearing life, improved thermal performance and increased product lifecycle. David Brown Santasalo's gear units for apron feeders deliver power, durability and reliability under extreme conditions coupled with short lead times, convenient serviceability and faster, easy-access support.

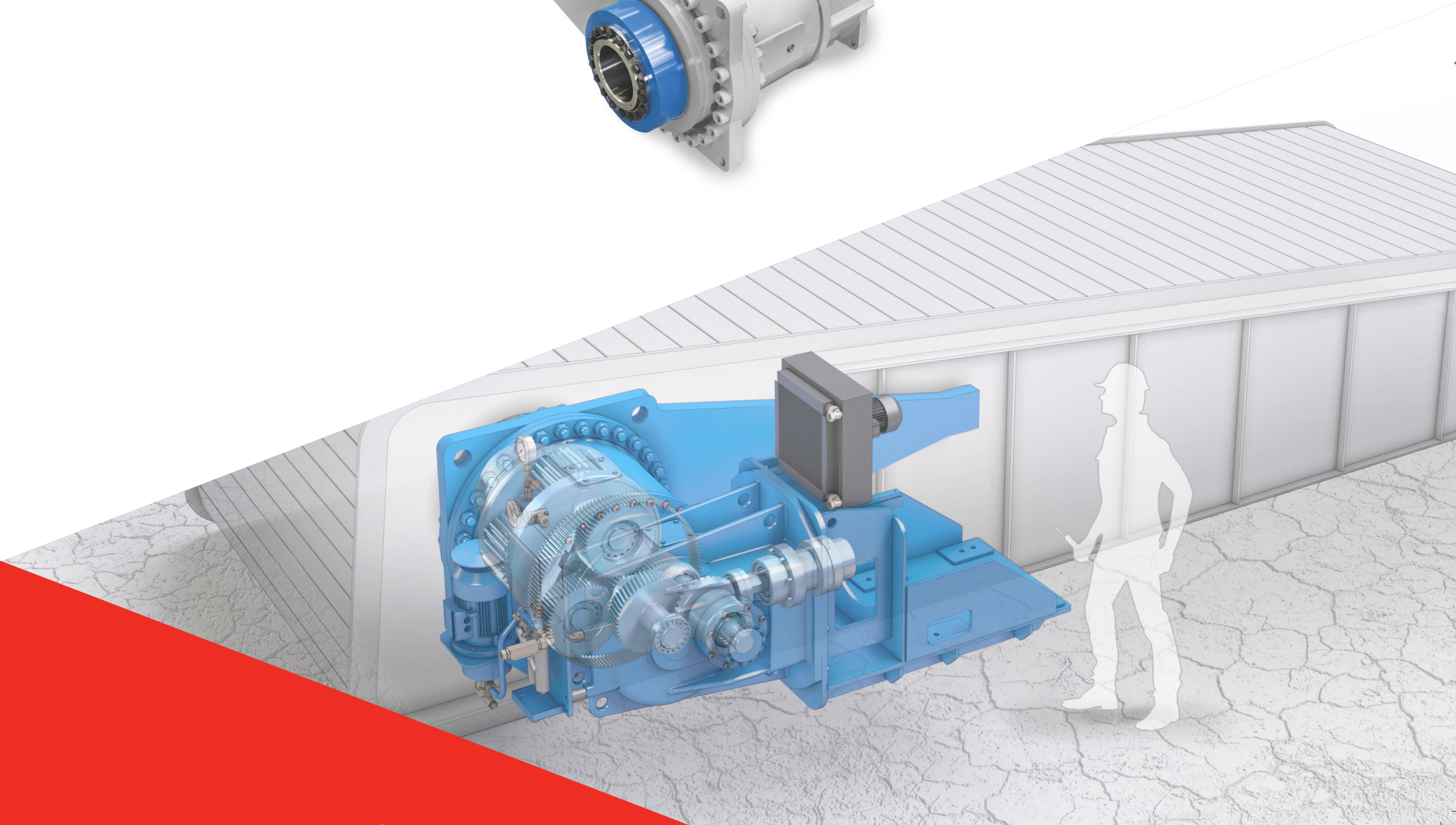
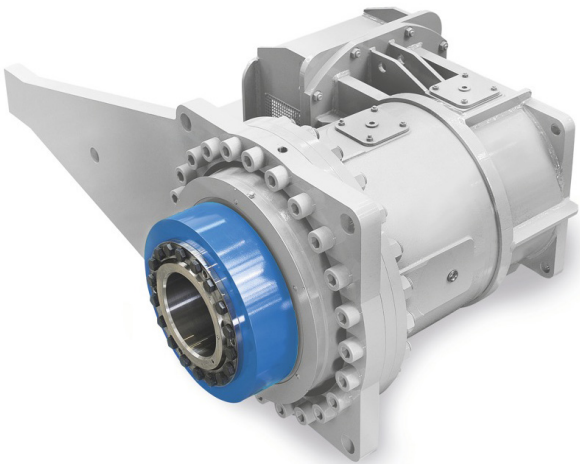
Key benefits:

- Hollow shaft or flange output shaft design
- Special torque arm design
- Pump-fed lubrication unit
- Complete drive package including motor flange and swing base
- Customised according to customer needs
- Low weight, compact, space-saving design
- Serviceability
- Short lead times
- Faster, easy access support

Technical data	
Design Sizes	12
Number of Stages	3 - 5
Power Range	up to 2,550 kW
Transmission Ratio	100 - 2800
Nominal Output Torque	up to 1,200 kNm

Standard accessories

- Solid or hollow output shaft
- Input coupling including guard
- Torque arm
- Motor flange and swing base
- Backstop Output coupling
- Drum or disc brake
- Instrumentation
- Pump-fed lubrication unit
- Cooling fan
- Condition Management System (GearWatch)



AMF Series

High thermal capacity, two or three stage, vertically mounted helical gear units

Gear units located in harsh or remote environments where external cooling is not available require tremendous reliability. David Brown Santasalo's AMF vertical gear unit incorporates a bi-directional axial fan and optimised housing design, providing high thermal capacity and eliminating the need for external cooling in extreme ambient conditions. Robustly built, David Brown Santasalo AMF gear units feature our proven drive technology in operation in hundreds of vertical mixing applications around the world.

Key benefits:

- Designed and manufactured for demanding vertical applications with severe external forces coming from the customer processes
- Direct drive construction with electrical motor and flexible HSS coupling for high efficiency
- Reversible operational direction
- No requirement for external cooling due to an optimised structure
- Easy to transport and locate without risk of damage

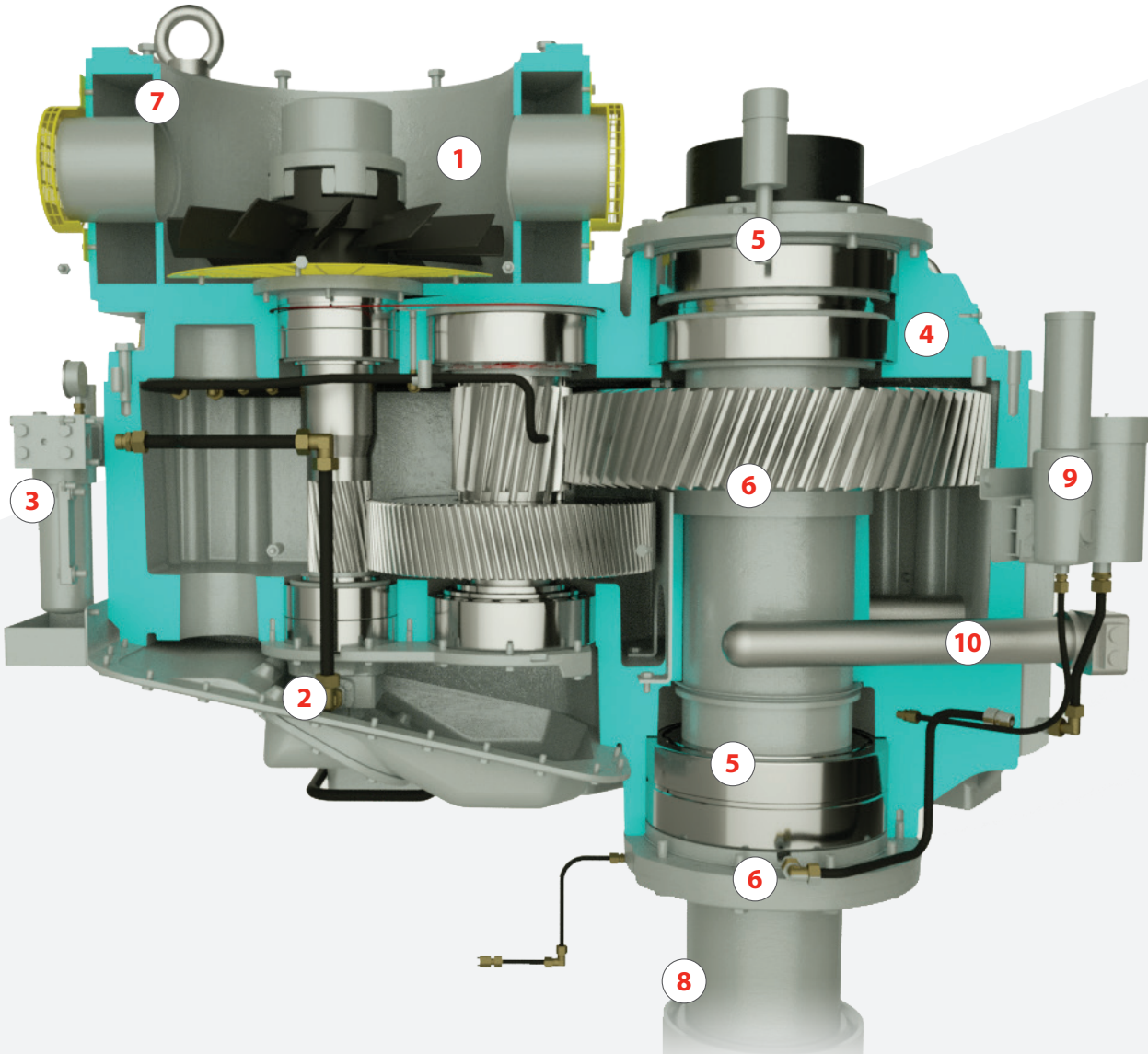
Technical data	
Design Sizes	4
Number of Stages	2 - 3
Power Range	up to 750 kW
Transmission Ratio	7 - 90
Nominal Output Torque	up to 200 kNm



Highly optimised gear unit lay-out delivers cost savings and smaller footprint



1. Bi-directional fan integrated on the flexible HSS-coupling
2. Shaft end pump (electrical as an option)
3. Lubrication assembly with filter & optional instrumentation
4. Optimised housing design for high thermal capacity and strength
5. Extended bearing distance
6. Dry well and grease lubricated lower bearing for leak prevention
7. Integrated motor flange
8. LSS flange with shrink fit connection
9. Automatic grease dispenser as an option
10. Oil heater as an option



Geared for service

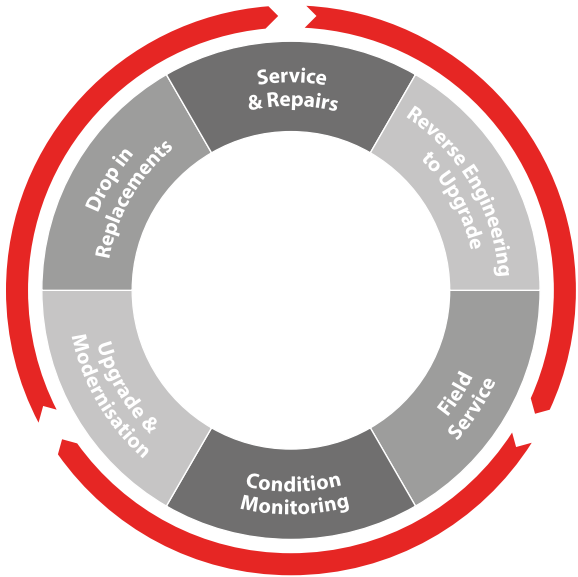
We understand that fast response is key to anyone who needs gearbox service and repair in the cement industry. Our global network of manufacturing and service facilities spanning six continents ensures we can provide support to you and your customers wherever you are, whenever you need us.

With almost three centuries of gear unit design and manufacturing expertise, we understand how to maintain and service even the most difficult, mission critical gear units to ensure optimal results and long gear unit life – regardless of the brand.

As a full service solution provider, we not only provide support for all David Brown Santasalo gearboxes, we can also service and repair other manufacturers’ units and our heritage brands.



- Manufacturing & Service
- Service
- Sales



David Brown Santasalo understands how to service mission-critical gear units to ensure optimal results and long gear unit life



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