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ⓜ Moventas approved service and repair centre

DAVID BROWN
Engineered around you

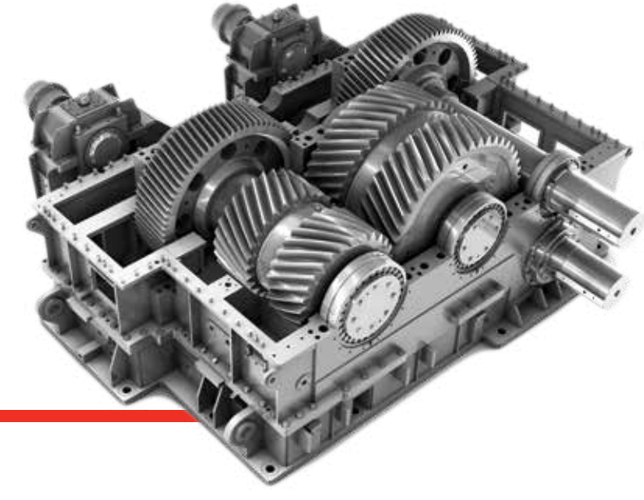
www.davidbrown.com

crane hoist drives
furnace and converter tilt drives
materials handling
kiln and mill drives

The metals industry driven by David Brown

mill drives
rolling mill pinions and pinionstands
coilers and uncoilers
levellers
standard and customised reducers
drop in replacements and upgrades
service and repair

Product catalogue



The metals industry driven by David Brown

David Brown offers an extensive product range to serve the metals production industry, including universal standard units through to specialist custom engineered orders. We can meet your needs whether that be one gearbox or drive system or a whole plant. David Brown is committed to being the best in industry.

With increasing demands for efficiency and productivity in an increasingly competitive global market place, here at David Brown we understand the critical nature of gearboxes to your process with no room for compromise on performance or reliability. In a world economy reliant on metals production, failure is not an option.

Geared for metals excellence

- Local engineering support in the same time zone, ensuring quick turn-around
- Best cost, quality and delivery times in the industry
- In-house test rig capabilities
- Global network of service centres, supported by strategically placed manufacturing facilities
- Repair to all David Brown and third party gearboxes
- Manufacturing and supply chain capability optimised to deliver industry expectations at optimum cost

Custom engineering capabilities

- Extensive range of products from raw materials to finished product
- Global supply chains across five continents including manufacturing and service capabilities
- Bespoke design and repair of gearboxes for the metals industry: engineering, design, manufacturing, service and sales
- State of the art design tools, manufacturing equipment and quality processes

Applying **our expertise** across the entire **metals production process**

Materials handling

Products

- Conveyor drives
- Stacker / reclaimer drives
- Kiln drives

Iron and steel making

Products

- Furnace and convertor tilt drives
- Kiln and pelletiser drives
- Crane hoist drives

Secondary steel processing

Products

- Rolling mill drives
- Pinion stands and mill pinions
- Coilers and uncoilers
- Levellers and edgers
- Continuous casting drives

Alumina and aluminium production

Products

- Kiln drives
- Hoist drives
- Furnace tilt drives

Secondary aluminium processing

Products

- Rolling mill drives
- Pinion stands and mill pinions
- Coilers and uncolliers
- Levellers and edgers

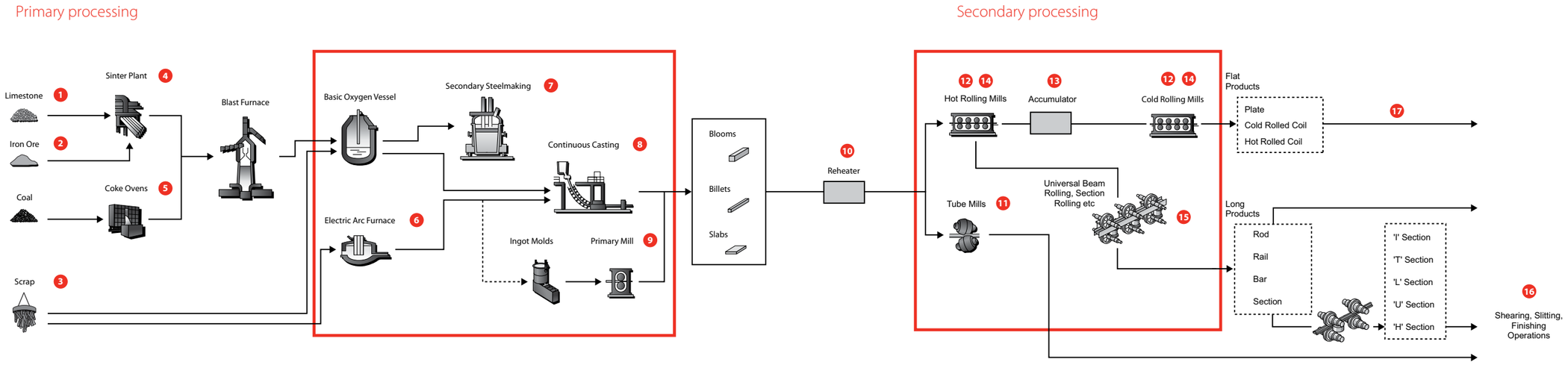
Other metals

Products for production of

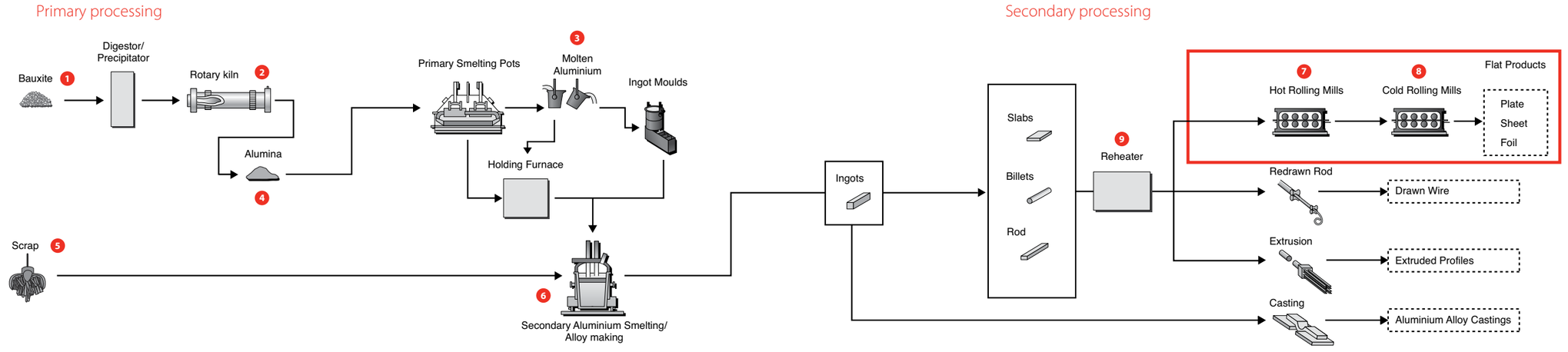
- Copper
- Titanium
- All other metals production

The metals production process

Steel production process



Aluminium production process



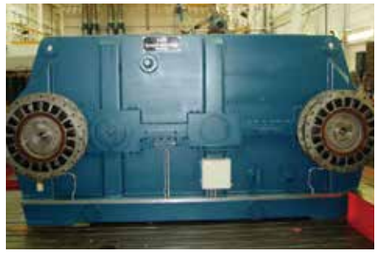
Steel production process

1. Gearboxes for conveyor drives, stacker/reclaimers
2. Pelletiser drives – girth gears, primary drives
3. & 5 Gearboxes for conveyor drives
4. Kiln drives – girth gears, primary drives, centre drives
6. & 7 Furnace tilt drives – bull gears and pinion drives
7. & 8 Main ladle hoists, overhead crane travel drives
8. Worm units for bar straightening
8. Roller stand drives
9. Mill stands – combined reduction pinion stands, screw downs for roller positioning
10. Reheater – roller table conveyor drives
11. Tube mill drives, levellers, roller table conveyor drives
12. & 14 Mill stands – combined reduction pinion stands, screw downs for roller positioning, flying shears
13. Accumulators – Winch drives
14. Edgers, levellers, roller table conveyor drives, coilers, uncoilers
15. Mill drives, roller table conveyor drives
16. & 17 Shears, coilers and levellers

Aluminium production process

1. Gearboxes for conveyor drives, stacker/reclaimers
2. Kiln drives – girth gears, primary drives, centre drives
3. Ladle hoists, overhead crane travel drives
4. & 5 Gearboxes for conveyor drives
6. Furnace tilt drives
7. Mill stands – combined reduction pinion stands, screw downs for roller positioning, flying shears, accumulator drives
8. Edgers, levellers, roller table conveyor drives, coilers and uncoilers
9. Reheater – roller table conveyor drives

Complete metals product range



Crane hoist drives

David Brown has a range of main hoist drives and long travel drives suitable for heavy duty cranes used in the metals industry, with capacities up to 500 tonnes.

Furnace and converter tilt drives

David Brown offers tilt drives suitable for tilting of large furnaces and converters, with both double and quadruple inputs. Suitable for converters up to 300 tonnes capacity.

Kiln and pelletiser drives

David Browns large industrial reducers are an ideal solution for slow speed high torque kiln drives, with output torques up to 1MNm.

Girth gears

David Brown has manufacturing and design capability for girth gears up to 14m diameter, in all grades of cast steel, nodular iron and fabricated construction.

Rolling mill drives

David Brown rolling mill drives cover hot and cold rolling, in continuous and reversing applications. Powers up to 15MW, torques up to 2.5MNm and gearbox weights of 250 tonnes and more.

Rolling mill pinions

David Brown can manufacture pinions up to 1.5m diameter and 1.8m face width. Materials include through hardened and case hardened options, allowing replacement pinions to be significantly upgraded from their original duties.

Levellers

The David Brown range of levellers covers the widest range of output shaft options, supplying drives with up to 24 output shafts, and ratio options customised to meet your process layout, including change speed options.

Shears

David Brown can offer varied solutions from our existing applications references including flying shears and pendulum shears.

Accumulator drives

David Brown's range of industrial reducers provides an ideal solution for the variable speed duty encountered in winch drives for accumulators.

Continuous casting drives

David Brown can offer both planetary and worm driven units for roller drivers and straighteners in continuous casting of steel and aluminium.

Mill drives

The MDX range of mill drive gearboxes is specifically designed for primary drives for pinions driving open geared drives for ball and roller mills, with powers up to 8MW.

Conveyor drives

The CX range of gearboxes can be used for all belt conveyor applications, with power range from 100kW to 3MW, available as packaged drives or separate gear units.

Pinion stands

David Brown offers pinion stands with up to 1.5m centre distance and powers of 15MW in 2 and 3 output shaft options for hot and cold rolling applications.

Roll screw down drives

Double enveloping worm gear technology means David Brown can offer highest torque and static overload capacity in minimum space for screw down drives, with worm gears up to 1m centres.

Coilers and uncoilers

David Brown's range of coilers and uncoilers covers the full range of torques up to 1MNm. Speed ranges include change speed options. Designs can incorporate hollow shaft or integral mandrel designs.

Edgers

For vertical and horizontal edgers, David Brown offers a range of customised units.

Custom designed drives

David Brown can tailor a solution to meet your exact metals industry needs, drawing on our database of thousands of field proven applications.

Stacker/reclaimer drives

Full range of products for stacker / reclaimer applications.

- Long travel drives
- Conveyor drives
- Bucket wheel drives

Proven engineering expertise

David Brown has a dedicated global team of design and application engineers, experienced in providing tailored solutions for all power transmission applications in the metals industry.

All designs are optimised using state of the art design tools and crafted using the latest manufacturing equipment.

Housings, couplings and shafts

- Designed to be thermally efficient
- Using the latest software design tools for FEA analysis and 3D modelling

Gear design

- David Brown design to AS/AGMA, JIS, DIN or ISO standards
- Tooth modifications to achieve optiomal gear load conditions
- Using the latest software design tools for power transmission vibration and noise analysis

Requirements

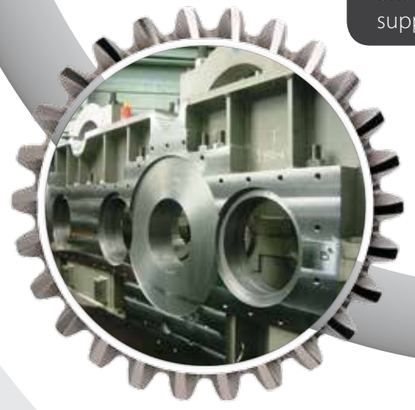
- Reliability
- Cost effectiveness
- Short delivery period

START

FINISH

Solutions

- Trouble free operation
- Lowest lifetime cost
- Short lead times due to optimised supply chains



Assembly and load testing

All gearboxes and associated metals products following strict quality control guidelines and review before being shipped to our customers worldwide.

Our full load testing capabilities includes the measurement of temperature, vibration, noise and provision for supply of full inspection and documentation packs. .

David Brown offers no-load spin testing and full scale load testing of stand alone gear units or complete drive assemblies depending on customer requirements.

Testing facilities worldwide with capabilities to test gearboxes exceeding 3MW.

State of the art manufacturing capabilities

David Brown has global engineering and manufacturing facilities equipped with latest gear manufacturing equipment and machine tools.

- David Brown is fully accredited to ISO 9001
- Worldwide manufacturing facilities
- Girth gears to 14.4m in diameter and up to 105,000kg in weight
- Pinions tailored to suit your requirements
- Annulus / internal ring gears up to 12m in diameter
- Induction hardening of external or internal gears to 4.5m in diameter
- Case carburising to 3m diameter and 4.5m length
- Nitrided heat treatment can be available on request
- David Brown operates a zero defect policy
- Gear units up to 250 tonnes

Quality control

Equipped with the latest and best gear inspection equipment available.

Modern manufacturing and service facilities showcase our abilities.

David Brown utilises the latest onboard and stand alone gear measurement technology.

Inspection equipment is integrated with manufacturing processes to ensure optimum quality at minimum lead time.

With proven expertise and global capabilities, David Brown gives you peace of mind throughout the whole process

Engineering and manufacturing capabilities

David Brown has a dedicated global team of design and application engineers to provide around the clock support. David Brown products are designed using state of the art design software for gears, shafts and housings, aiming to be your complete gearing authority.

We have skilled technicians and engineers ready to solve your gearbox and associated product needs. We can design from scratch or service and upgrade an existing product. Whether you wish to change the ratio or an existing gearbox, David Brown is your one stop gearbox shop. We can evaluate your current gearbox and offer replacements which have higher ratings to maximise your process.

Send us your gearbox during a regular shutdown and we will evaluate its condition.

We can make drop-in assemblies that will help minimise downtime.

A team of skilled professionals provide expert assistance who can either work from detailed engineered drawings or from sample pieces. If required, original engineered specifications and drawings can be designed and developed. David Brown is your complete metals solution provider however complex or time dependant your requirements are.

David Brown manufactures gears and gearboxes to any rating or gear grade currently in existence and draw on their wealth of engineering expertise across the world.

Quality & testing

David Brown ulilises some of the industry's most sophisticated gear inspection machines. This ensures David Brown products are of the highest quality and robustness.

Our fully automatic CNC controlled gear measuring machines are designed for larger work piece diameters up to 2600mm.

These measuring machines are suitable for testing spur and helical gears as well as hobs, shaper cutters, worm gears and bevel gears. The machines are critical to establish the exact lead and pitch of the gear to ensure manufacturing processes are constantly checked against design intent.

Overview primary processing

Gears and gearboxes for primary processing of metals

Because we understand the industry from an end user's point of view we can supply reliable, engineered products to suit your exact requirements, that maximise your uptime and efficiency.

Over 150 years experience of the tough environment of metals processing means David Brown has in-depth understanding of the specific problems encountered and has created innovative engineering solutions to cope with the harsh environment and optimise the reliability of the gearboxes in service.

David Brown's product range covers all the critical processes in the primary processing of metals. Whatever your primary metals processing application, David Brown have the product to fit the task.

Crane hoist drives

- David Brown has a range of main hoist drives and long travel drives suitable for heavy duty cranes used in the metals industry, with capacities up to 500 tonnes.

Furnace and converter tilt drives

- David Brown has the product range for all sizes of furnace and converter tilting applications, for converter capacities of up to 300 tonnes with either double or quadruple inputs. David Brown's experience of manufacturer of gear units is in excess of 250 tonnes in weight.

  Our long standing and extensive references list proves that we can supply all your furnace and converter tilt drive needs with full assurance.

Stacker reclaimer

- We offer a full range of products for all stacker / reclaimer applications including bucket wheel drives, long travel drives and conveyor applications.

Conveyor drives

- The CX series range of gearboxes can be used for all belt conveyor applications, with power range from 100kw to 3MW, available as packaged drives or separate gear units.

Kiln and mill drives

- Main drive gearboxes, barring drives, pinions and girth gears can all be supplied using David Brown's extensive experience and global manufacturing capability, making David Brown a "one stop shop" for mill and kiln drive solutions of all sizes.
- The MXR series range of mill drive gearboxes is specifically designed for horizontal mill and kiln drive applications.

Girth gears

- David Brown has manufacturing and design capability for girth gears up to 14m diameter, in all grades of cast steel, modular iron and fabricated construction.

David Brown excels where failure is not an option, this means we have the in-depth knowledge and experience to provide **high quality products** into critical aspects of the **primary processing of metals.**

Crane hoist drives

Innovative | reliable | quality

The demanding nature of the heavy duty cranes used in steel and aluminium works needs a special kind of engineering. Through relationships with both leading OEMs and end users David Brown has developed a range of special purpose gear units for main hoists and travel drives for heavy lifting in the metals industry. David Brown can provide main hoist and travel drive gearboxes for cranes with capacities up to 500 tonnes, with many examples of these units in use around the world.

Typical applications for main hoists will see a twin motor input driving through a differential unit to drive dual rope drums. Long experience of this arduous application means David Brown has an in depth understanding of the specific problems encountered and has created innovative engineering solutions to cope with the harsh environment and improve the reliability of the gearboxes in service.

Key features

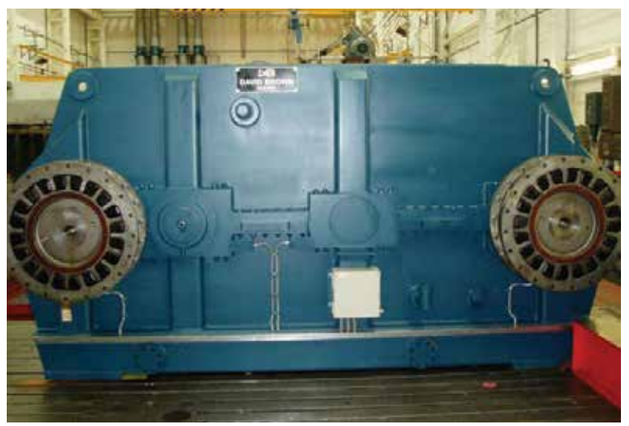
- Units have levelling pads, which are used for the initial installation and for future maintenance, this is to ensure all gear units are correctly aligned
- Robust fabricated housing, designed using FEA techniques
- Units include case hardened and ground gears to ISO grade 6 or better
- Special non contact oil sealing system for contra-rotating shafts
- Units are designed to accept a forced lubrication system feeding to all gear meshes and bearings
- In house capability to manufacture all major components
- Units can be supplied with integral lubrication systems
- Planetary differential unit

Key benefits

- The levelling pads enable the end user to measure deflection on the crane in various positions and under different loads, optimising the best installation position and without having to open the case to inspect the gear mesh for contact. This minimises the risk of contamination from debris in a dust laden atmosphere usually experienced in steel
- Maximum case rigidity means constant accurate alignment of gears during operation, ensuring reliable operation and long life
- Accurate gearing for highest overload capability, long life and minimised noise and vibration levels
- Avoids shaft wear from contacting seals and minimises chance of oil leakage. The design means constant flow of pressurised oil to critical bearings, ensuring lubrication at all times, even under static loads
- All critical processes managed using David Browns quality control systems
- Splits available torque evenly between the two drives. Allowing operation at half speed full load in the event of one motor failure

Reference list includes:

Customer	Product	Year	End user	Country
Newell Dunford	Long travel drive	1988	Tata steel	UK
Tata Steel	Main hoist drive for 500 tonne crane	1993	Tata steel	UK
Pakistan Steel	Hoist drives, 16 gearboxes with motor and brake	1993	Pakistan steel	Pakistan
Morris Mechanical Handling	Hoist drives	1994	Tata steel	UK
Tata Steel	Long travel drives for 500 tonne crane	2000	Tata steel	UK
Tata Steel	Twin input differential hoist drive for 500 tonne crane	2000 - 2008	Tata steel	UK
Arcelor Mittal	Hoist drive	2011	Arcelor mittal	France
Wellman Booth	Twin input differential hoist drive for 500 tonne crane	Various	Various	Various



Furnace and converter tilt drives

Flexible | established | versatile

David Brown has a long history of supplying of special purpose gear units for tilting of furnaces and converters in metals production processes, many of which have been in continuous operation for 40 years or more. To safely tilt a 300 tonne capacity converter needs sophisticated engineering on a huge scale, with very slow speeds and very high torque, up to 8 MNm.

Typically these units will have a central “bull wheel” assembly, this is then driven by multiple primary drives (normally 2 or 4) which share the load equally, maximising the available torque for the smooth and safe tilting of the load in the minimum space. Typically large sizes of these units (often well over 100 tonnes) means that David Brown are one of the few manufacturers in the world with global manufacturing facilities, capable and experienced in the manufacture of such large units.

David Brown’s application experience dealing with the world’s leading OEMs and end users means we can design new units to fit in with you existing equipment, or upgrade existing equipment to increased duties and / or increase service factors. For smaller furnaces, double enveloping worm gears are used to maximise the overload capacity of the drive in minimum space.

Key features

- Robust fabricated main bull wheel housing, designed using FEA techniques
- Bull wheels can be fabricated or cast
- Primary units have case hardened and ground gears to ISO grade 6 or better
- Motors, brakes and emergency drives (air motor or electrical) can be incorporated into the design, and mounted onto the primary units
- Double enveloping worm gear technology for smaller units
- In house capability to manufacture all major components
- Units can be supplied with integral lubrications systems

Key benefits

- Maximum case rigidity means constant accurate alignment of gears during tilting operation, ensuring reliable operation and long life
- Optimum materials selection giving highest possible overload capacity ratings in minimum space
- Accurate gearing for highest overload capability, long life and minimised noise and vibration levels
- Whole design optimised for maximum efficiency and overload capability, with one source of supply for the whole unit, and no split responsibility
- More teeth in contact at any one time means much higher overload capabilities compared to conventional worm gear solutions
- All critical processes managed using David Browns quality control systems
- No need for connection to central lubrications systems, unit is free standing

Reference list includes:

Customer	Product	Year	End user	Country	Converter / furnace capacity
Ashmore Benson Pease & Co	2x primary drives plus bull gear assembly	1970	Tata Steel - Scunthorpe	UK	220 tonnes
Ashmore Benson Pease & Co	2x primary drives plus bull gear assembly	1972	Tata Steel - Port Talbot	UK	300 tonnes
Ashmore Benson Pease & Co	Twin helical worm inputs plus bull gear assembly	1971	Tata Steel - Panteg	UK	50 tonne
Davy McKee	Combined twin input and bull gear unit, plus torque reaction buffers	1983	New zealand Steel	New Zealand	70 tonnes
Tata Steel	Replacement bull gear for 300 tonne converter	2006	Tata Steel	UK	300 tonne
Tangshan Stainless	4x primary units plus bull gear assembly	2008	Tangshan Stainless	China	110 tonnes
China First Heavy Industries	4x primary units plus bull gear assembly	2011	China end user	China	180 tonnes

Many of David Brown gearboxes for tilting furnaces and converters have been in continuous operation for more than 40 years

Stacker reclaimer

Highest quality | international quality standards | designed to last

These enormous machines are crucial in the transportation of bulk materials in ports, mines and processing plants, therefore it is vital to use high quality and reliable products in all their components.

Complete conveyor systems for the stacker

We can design and manufacture all kinds of conveyor systems to suit your specifications; radial stackers, belt conveyors, coal conveyors, screw conveyors, bucket elevators or load hoppers.

- Cases can be manufactured using high grade castings or fabrications
- A range of components offering high reliability and performance
- A variety of radial stacker conveyor components with features and material options to suit your requirements
- Managing your equipment requirements with expert in-house designing, machining and testing capabilities
- Heavy industrial components made especially to exceed international quality standards
- Superior quality and built-to-last construction
- Longer life needing minimal maintenance and service

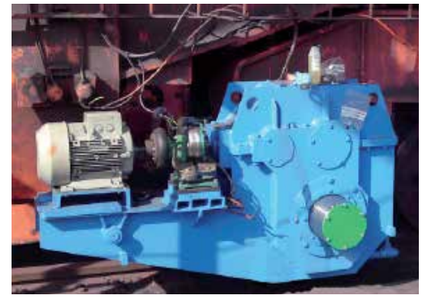
Drive systems for the bucker wheel excavator

David Brown can supply reliable drive systems for bucket wheel elevators as well as components for conveyor belts, spreaders, crushing stations, mine materials and waste.

- Components built to last
- Heavily engineered for heavy usage
- Reliability and performance, second to none
- Manufactured to customer's specifications and service requirements

Reference list includes:

Job No	Customer	Description
Arcelor Mittal	Canada	Bucket wheel drive
Tata Steel	UK	Bucket wheel drive
Tata Steel	UK	Slew drives
Standard Steel	USA	Travel drives
POSCO	South Korea	Long travel drives



Dependable systems to guarantee efficient running of the bulk material handling process.

Conveyor drives

Innovative design | efficient | effective solutions

The CX series range of helical and bevel helical gear units is designed to meet the most arduous of power transmission application needs. Reliable and efficient in operation, it provides a cost effective solution to all our customers' needs. Designed to David Brown's proven quality standards, these quiet running units provide exceptional levels of performance, versatility and life expectancy to meet the demanding requirements of modern industry.

Key features

- Gearbox, hold backs, brakes and fluid couplings for conveying systems to over 3000kW per unit
- Drives are no load tested and measured prior to dispatch for temperature, noise and vibration
- No external cooling or lubrication system required
- Increased reliability with no loss in performance
- Double ended output and invertible design minimise spares requirements
- Drives can be load tested before despatch
- High thermal efficiency allowing higher balanced mechanical loading

Special feature options

- Alignment free tunnel mount is available on selected drives
- Output shaft cover (for unused output extension)
- Double lipped seals
- Non-contact double grease labyrinth shaft sealing (input or output)
- Forced lube system and heating system
- Immersion heater
- Base mounted or torque arms for shaft mounts
- Fluid coupling
- Brakes
- Flywheels

Key benefits

- Ductile iron two piece housing ensures no case leaks and easy serviceability during rebuilds
- Heat dissipating cooling fins increases reliability; no auxiliary cooling systems required
- Bevel or parallel input shaft options
- Rigid high speed bevel cartridge design on right angle drives minimises bevel noise and easy to service
- Optimised gear geometry
- Keyed or shrink fit (oil injection) coupling options

Reference list includes:

Project	Motor Size
UK steel plant	75kW
UK OEM for UK steel plant	11-18.5kW
Korean steel plant	N/a
Portugal steel plant	18.5kW
Port Talbot steel works UK	67kW
New Zealand steel	28.5 - 70kW
Sicartsa steel Mexico	22kW
New Zealand steel	132kW

Product range

Ten different final centres (13 gearbox sizes): Starting at 185mm final centres, largest size extends to 800mm final centres

- Speed range (input speeds) 580 rpm to 1750 rpm
- Humidity up to 100% including direct rain
- Ambient temperature range -20°C to 45°C (-4°F to 113°F)
- Maximum operating sump temperature 90°C (194°F)
- Nominal rated sump temperature 80°C (176°F)
- Mean time to repair 50,000 hours
- 3 years warranty, 5 years optional (subject to maintenance agreement)

Gearing design

Units can be rated to all international standards such as DIN, AGMA, and ISO BS

Right angle units 2 and 3 stage as well as 2 stage 1450, parallel units for conveyor application. 1 stage parallel units can be available but not as standard

Power range from 55 to 3000kW, input speeds, 985,1190, 1450, 1750rpm

The scope of configuration offerings and ratio by size range for the CX product line

2-stage parallel (P2)	2-stage right angle (R2)	3-stage right angle (R3)
185 to 800	185 - 800	185 to 800

Mill and kiln drive gearboxes

Simple | durable | cost effective

With more than 150 years of gearing expertise of manufacturing, designing and developing gearing solutions, David Brown offers a range of horizontal mill drive reducers. The MDX series range of gearboxes series is a simple, durable unit designed to achieve cost effective solutions designed for various mill applications.

Key features

- Single, double or triple reduction depending on the required ratio and motor speed
- Gear cases are machined using CNC technology
- Simple lubrication and cooling system
- Specially optimised ratios are available on request for replacement units, or designed as part of a MDX mill drive system
- Cases manufactured from high quality cast iron with good damping properties
- Customised designs are available

Key benefits

- Reducers and their ratios are selected to compliment the girth gear design and reduce the cost of the entire system
- Ensuring optimum shaft alignment for smooth operation
- Allows the system to operate at many speeds with the use of an external lubrication system as required
- To achieve the most economic solution for the full range of mill, kiln and dryer applications
- Reducing noise emissions and dynamic deflections
- Allows drop in replacement for existing units to simplify installation

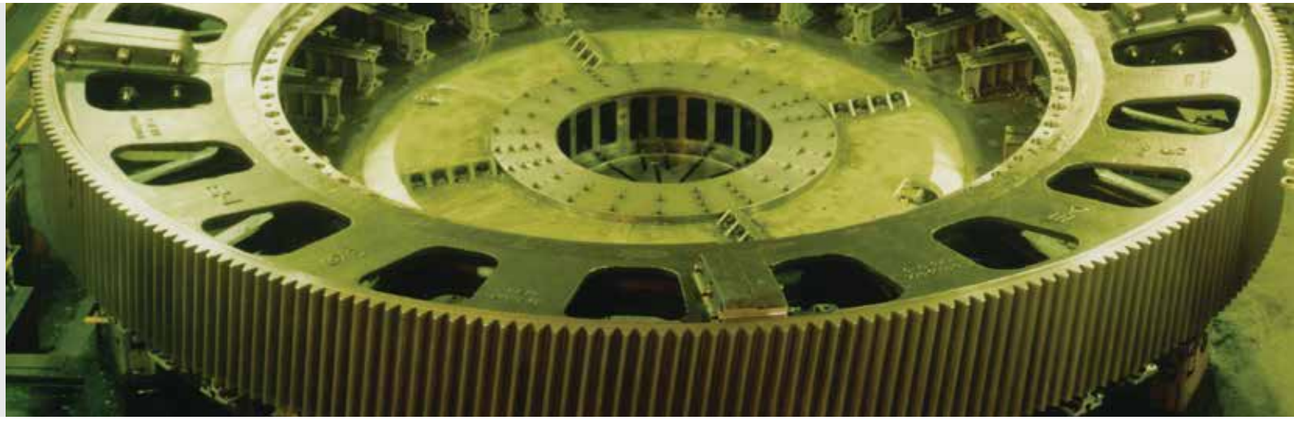
The MDX series is specially optimized and available as replacement units, drop in designs or designed as part of a mill drive system to achieve the most economic solution.

Reference list includes:

Job No	Customer	Description
705081	UK steel plant	Tube mills
705080	Redcar steel works	Kiln drives
705064	USA steel plant	Kiln drives
705060	Port Talbot steel works UK	Sinter plant mill
705058	Iron ore producer Norway	Ball mill drives
705050	UK steel plant	Ball mill drives
705051	Iron ore producer Canada	Ball mill drives

Girth gears

Quality craftmanship | established product | highest integrity



David Brown girth gears are used to drive horizontal grinding mills, kilns and driers globally, in many industries including metals production. Girth gears manufactured by David Brown have reached a high installed base with worldwide applications in the steel and aluminium industries.

David Brown's extensive design experience and list of existing references across all industries means we have the technical and manufacturing experience to supply any girth gears for metals industry applications. Our global manufacturing capability, situated in strategic locations around the world, includes sizes up to 14m diameter and over 100 tonnes in weight.

Our service engineers are experienced in some of the most arduous applications, and able to offer assistance with installation, maintenance and repair of girth gears, whether supplied by David Brown or by competitors.

Key features

- Girth gears can be manufactured in 2, 3, 4, 5, 6 or 8 segments and both T and Y section gears
- Weight optimised through FEA simulation
- Power range up to 10,000 MW
- Sizes up to 14m diameter
- High integrity girth gears to AGMA level 10 and beyond, ideal for all type of horizontal mills
- Up to 105,000kg in weight
- Manufactured in temperature controlled rooms, to ensure highest accuracy and efficiency
- Girth gears can be manufactured for hardness ranges between 180-340BHN
- Can be manufactured from either cast steel to BS3100 ductile iron to ASTM A536, or fabricated forged steel plate
- Manufacturing equipment with integral meshing and machine measurement facilities ensures David Brown can conform to specification

Reference list includes:

Job No	Customer	Description
705081	UK steel plant	Tube mills
705080	Redcar steel works	Kiln drives
705064	USA steel plant	Kiln drives
705060	Port Talbot steel works UK	Sinter plant
705058	Iron ore producer Norway	Ball mill drives
705050	UK steel plant	Ball mill drives
705051	Iron ore producer Canada	Ball mill drives

Investment in advanced machining and gear cutting technology, combined with development of new materials and techniques used in the manufacturing process, has seen David Brown rewrite the handbook on girth gears

Overview secondary processing

Gears and gearboxes for secondary processing of metals

David Brown has vast experience and expertise in supplying high quality engineered products into the secondary processing of metals. This gives our customers products they can fit and forget in metals rolling processes.

David Brown offers a number of products specifically engineered for the demanding requirements of metals rolling mill applications, for all types and sizes of rolling mills:-

Rolling mill drives

- Large gearboxes up to 250 tonnes in weight for driving the world's largest rolling mills, with powers up to 15MW

Pinion stands

- Double and triple output shaft configuration pinion stands for hot and cold rolling mills.

Combined pinion stands / reducers

- For smaller applications combining the mill drive and pinion stand into one unit saves space, cost and installation time.

Rolling mill pinions

- Using state of the art materials technology, manufacturing expertise and heat treatment know how, David Brown can offer pinions up to 1.5m diameter and 1.8 m facewidth, following original specifications or offering significantly upgraded capabilities.

Coilers and uncoilers

- The design can be customised to suit your choice of mandrel and manufacturing equipment, which can either be directly assembled with the gears and integrated into the gearbox, or connected through a hollow shaft. Ratio ranges (including change speed options) can be customised to suit all other aspects of your process.

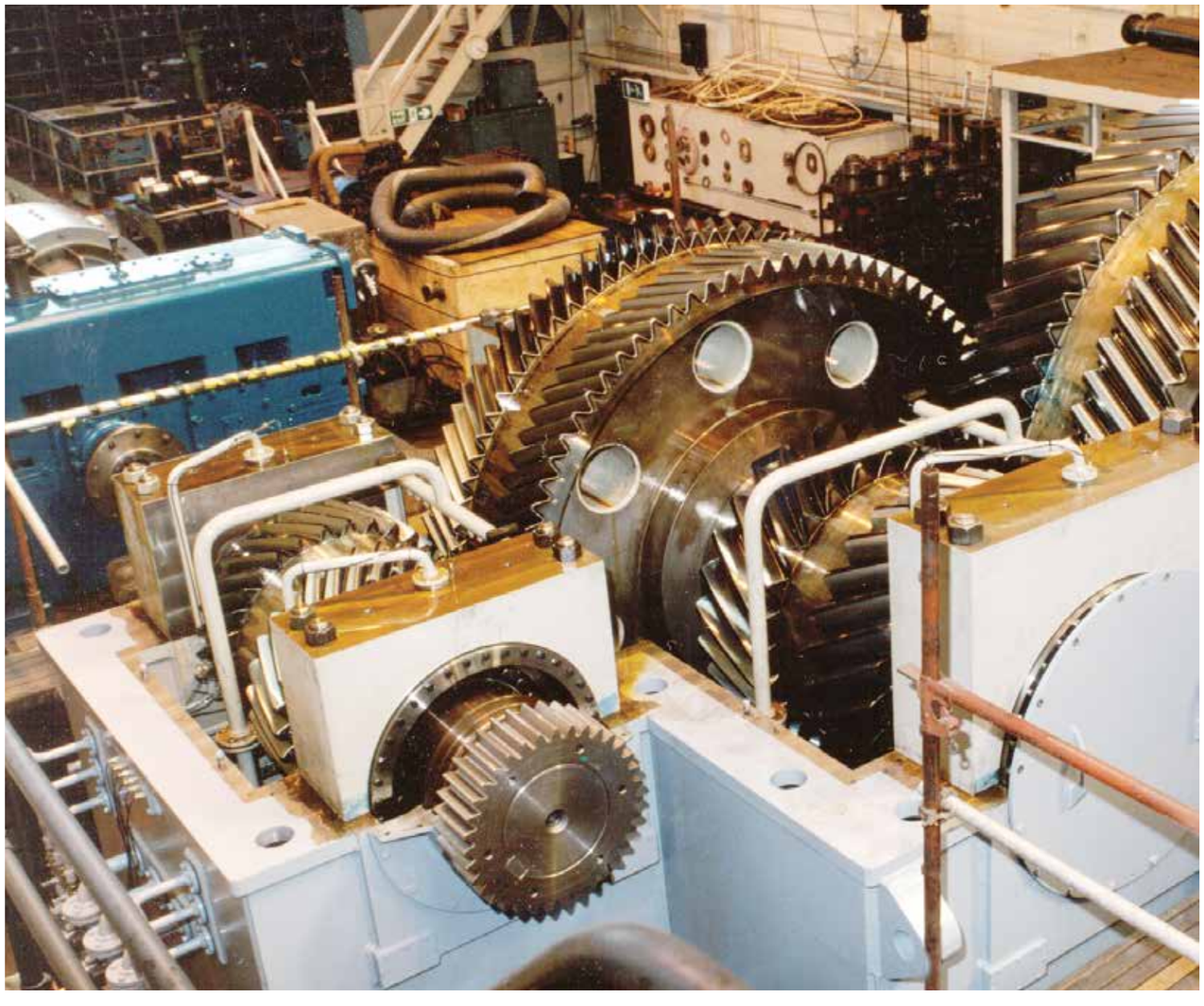
Levellers

- The range covers the widest range of output shaft options, supplying drives with up to 24 output shafts and ratio options to meet your process layout, including change speed options.

David Brown has vast **experience and expertise** in supplying **high quality engineered products** into the secondary processing of metals, this gives our **customers products** that they can fit and forget in processes of hot and cold rolling and ancillary processes.

Rolling mill drives

Highly engineered | flexible designs | reputable references



David Brown has extensive experience in the design and manufacture of primary drives for pinion stands, for both hot and cold rolling mills, and for new and existing applications. David Brown can offer total design flexibility to tailor the gearbox to the application, offering powers up to 15MW and torques up to 2.5 MNm. With gearboxes weighing up to 250 tonnes, David Brown are also able to advise and assist with site installation and commissioning.

In addition to providing “drop in replacement” gear units, modern manufacturing techniques and improvements in materials and heat treatment technology often means that the replacement unit can be updated from the original design, without changing the space requirements or interfaces. In addition to the confidence that the unit can be quickly changed over without alteration of the mountings, this can allow you to improve the productivity of your existing process, whilst ensuring equal or better reliability than the original product.

Key features

- Modern design and manufacturing techniques
- High quality materials such as clean steel gear material and approved brand bearings
- Double helical gears, either though hardened or carburised depending on the application and duty
- Fabricated steel gearcases designed using Finite Element Analysis (FEA) to verify material selection, gear case deflections, and structural analysis
- Large inspection covers
- Levelling pads
- Eccentric high tensile forged steel bearing liners allow for easy adjustment of gear contacts after installation

Rolling mill drives

Highly engineered | flexible designs | reputable references

Key benefits

- Robust gear and gearcase design optimised for the required duty
- High quality materials and construction give long and trouble free service
- Replacement units fit into the same space envelope and mounting positions as the existing units
- Replacement units can often accommodate significant increases in power handling capabilities to significantly upgrade the capability of mills
- Ease of in service internal inspection
- Ease of level checking on site
- Ease of installation by enabling simple gear contact modifications

Optional features and equipment

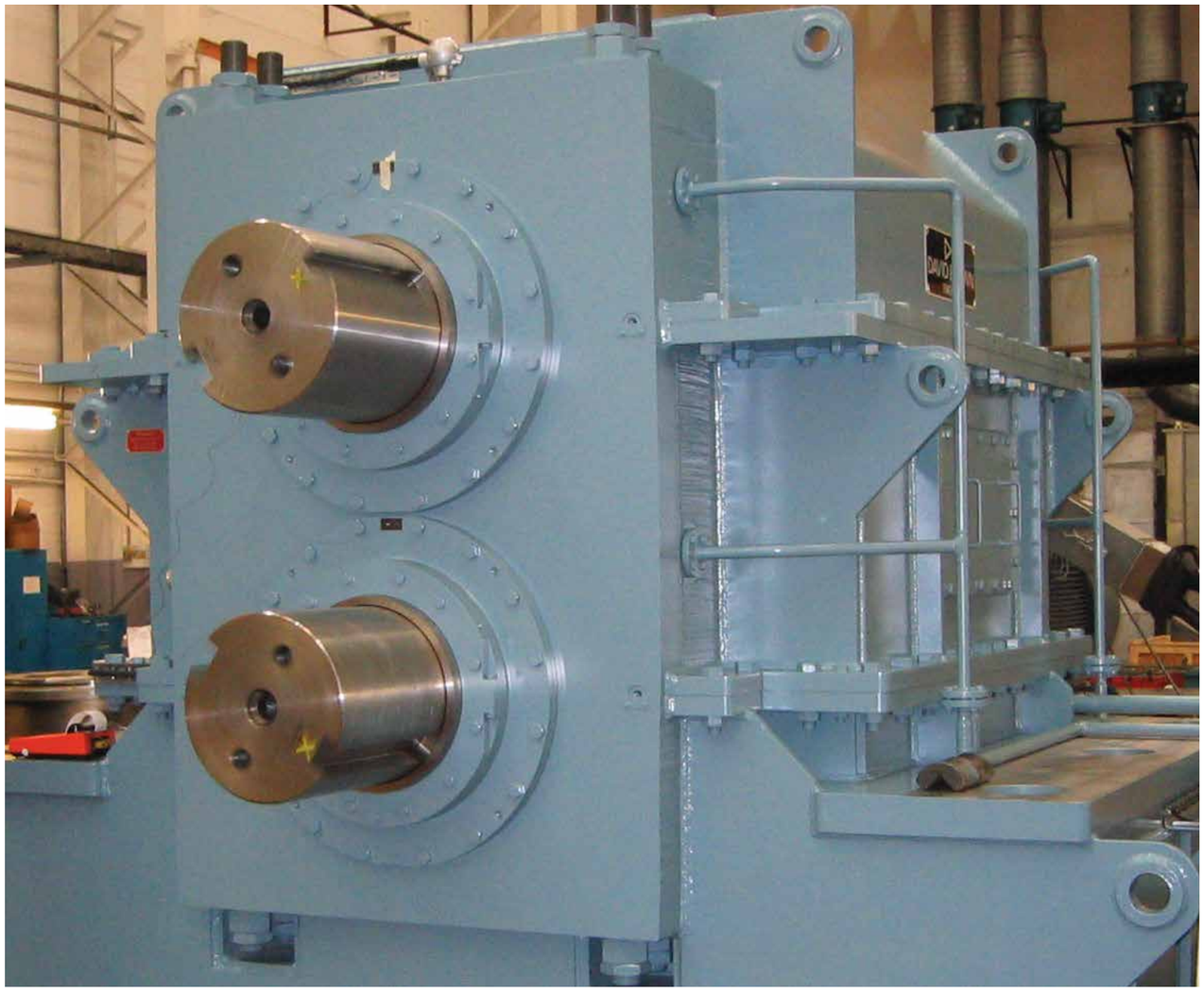
- Condition monitoring systems for bearing temperature, vibration, oil flow, and oil condition can be tailored to suit your requirements
- Ancillary equipment such as lubrication oil supply and cooling systems
- Base plates for ease of installation
- Input and output drive couplings

Reference list includes:

Description	Application	Location	Nominal Power	Nominal Torque	Gearbox weight kg
Roughing mill reduction gearbox	Steel rolling mill	France	6MW	3339kNm	126,000
Reduction gearbox	F1 hot mill drive	China	5.8MW	1786kNm	84,700
Roughing mill reduction gearbox	Steel rolling mill	France	15MW	2469kNm	120,000
Reduction gearbox	Aluminium rolling mill	India	4.5MW	443kNm	26,000
Reducer	Hot finishing mill	India	5.2MW	1242kNm	55,800

Rolling mill pinion stands

Durable | load handling capabilities | compact solution



David Browns range of pinion stands are engineered to optimise load handling capabilities within the restrictions of existing roll centre distances. For replacement units these can normally be designed to fit into the same space envelope and mounting positions as the existing units, often with significant increases in power handling capabilities using the latest materials, manufacturing and heat treatment technology. For new applications David Brown can optimise the gear and case design for long life and durability, giving the most compact solution.

Key features

- Modern design and manufacturing techniques
- High quality materials such as clean steel gear material and approved brand bearings
- Double helical gears, either though hardened or carburised depending on the application and duty
- Fabricated steel gearcases designed using Finite Element Analysis (FEA) to verify material selection, gear case deflections, and structural analysis
- Large inspection covers
- Levelling pads
- Eccentric high tensile forged steel bearing liners

Key benefits

- Robust gear and gearcase design optimised for the required duty
- High quality materials and construction give long and trouble free service
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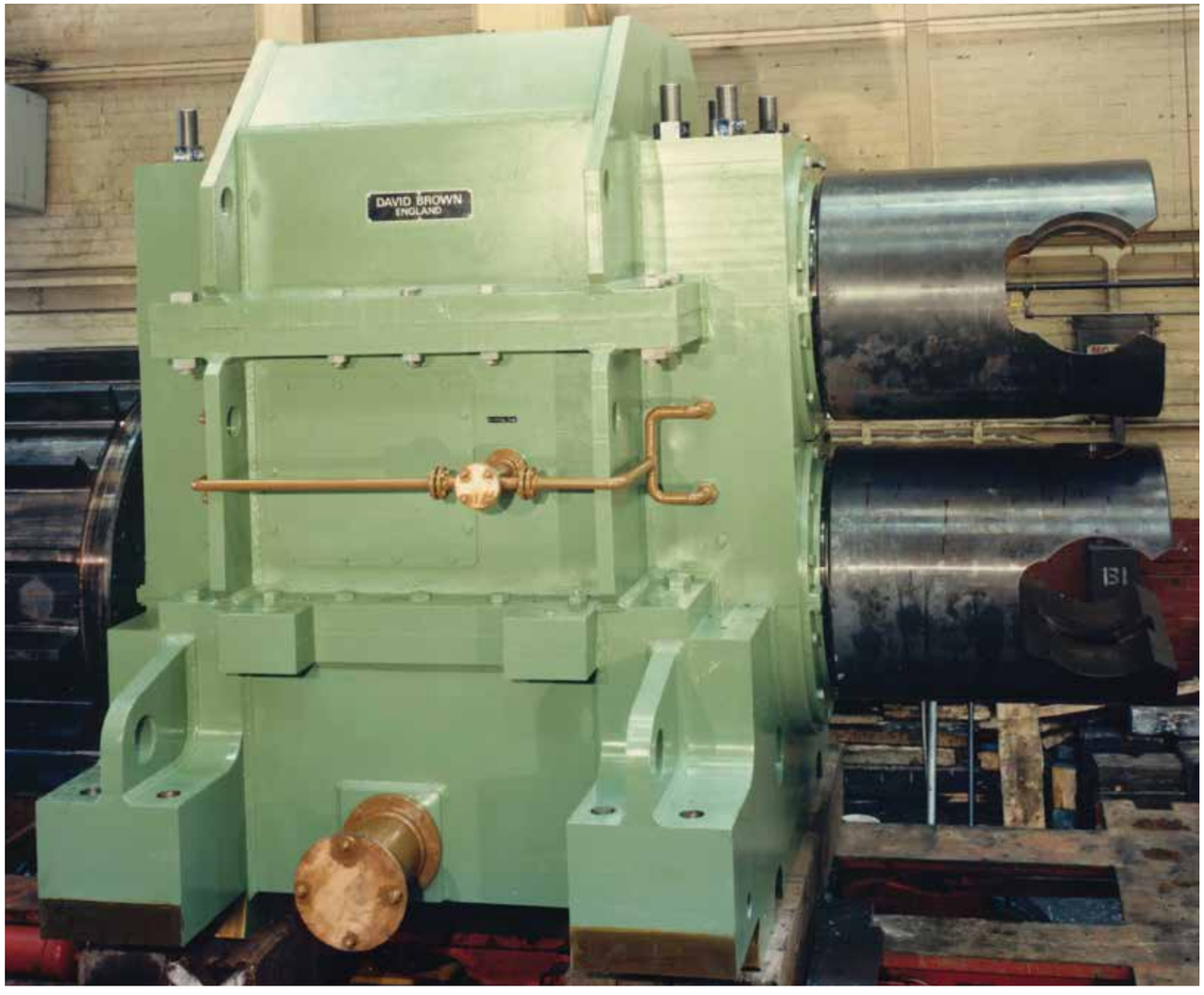
- Replacement units can often accommodate significant increases in power handling capabilities to significantly upgrade the capability of mills
- Ease of in service internal inspection
- Ease of level checking on site
- Ease of installation by enabling simple gear contact modifications

Rolling mill pinion stands

Durable | load handling capabilities | compact solution



Optional features and equipment

- Condition monitoring systems for bearing temperature, vibration, oil flow, and oil condition can be tailored to suit your requirements
- Ancillary equipment such as lubrication oil supply and cooling systems
- Base plates for ease of installation
- Input and output drive couplings
- Options to allow for independent roll drives

Reference list includes:

Description	Application	Location	Gearbox weight kg
Twin input / 2 speed / 2 high pinion stands	Aluminium rolling mill	China	45,700
Pinion stands	Aluminium rolling mill	India	35,700
F1-F3 pinion stands	Steel rolling mill	India	35,300
Pinion stands	Aluminium rolling mill	India	31,700
F5 pinion stands	Steel rolling mill	India	31,000
Pinion stands	Aluminium rolling mill	UK	21,900
Twin input 2 high pinion stands	Steel rolling mill	China	21,890
2 speed / 2 high pinion stands	Aluminium rolling mill	South Korea	15,500

Rolling mill combined reduction / pinion stands

Interchangeable options | cost effective | rapid solutions

The David Brown range of combined pinion stand / reducers matches the duties of the primary reduction stages with the output torque requirements of the rolling pinions, whilst minimising the component count and simplifying the design. A wide range of ratios is available, matching all stages of the rolling process to optimum motor speeds.

Combination units are available for both horizontal and vertical roll configurations. For existing installations, replacement units can be reconfigured to give greater powers, allowing increase in speed and or rolling torque, often fitting into the same space and in many cases with interchangeable mounting positions.

In many cases independently driven outputs can be incorporated into the same space envelope, further enhancing the capability of mills.

Key features

- David Brown can offer total design flexibility to tailor the gearbox to the application
- Compact footprint
- Choice of ratio
- Choice of handing

Key benefits

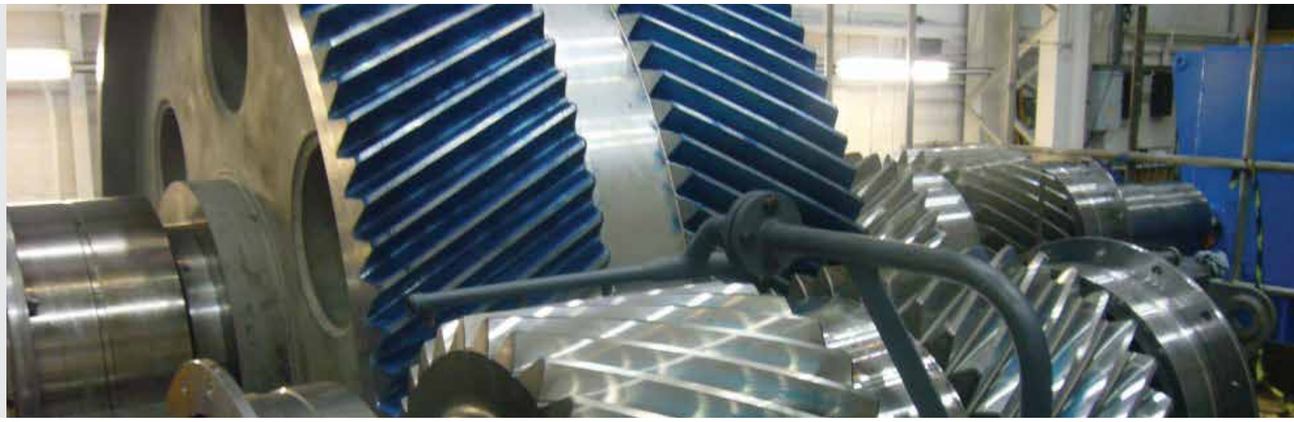
- Space saving compared to separate reducer and pinion stands
- Cost effective solution
- Flexible solution

Optional features and equipment

- Option of change speed mechanism giving the ability to select different ratios within the gearbox
- Condition monitoring systems for bearing temperature, vibration, oil flow, and oil condition can be tailored to suit your requirements
- Ancillary equipment such as lubrication oil supply and cooling systems
- Base plates for ease of installation
- Input and output drive couplings

Rolling mill combined reduction / pinion stands

Interchangeable options | cost effective | rapid solutions



Pinion stands and reduction units can be combined together into one unit, saving on gearbox costs and significantly reducing installation costs and space requirements. For high speed rolling lines such as foil mills, units can also include speed increasing gears, with controlled backlash.

Optional features and equipment

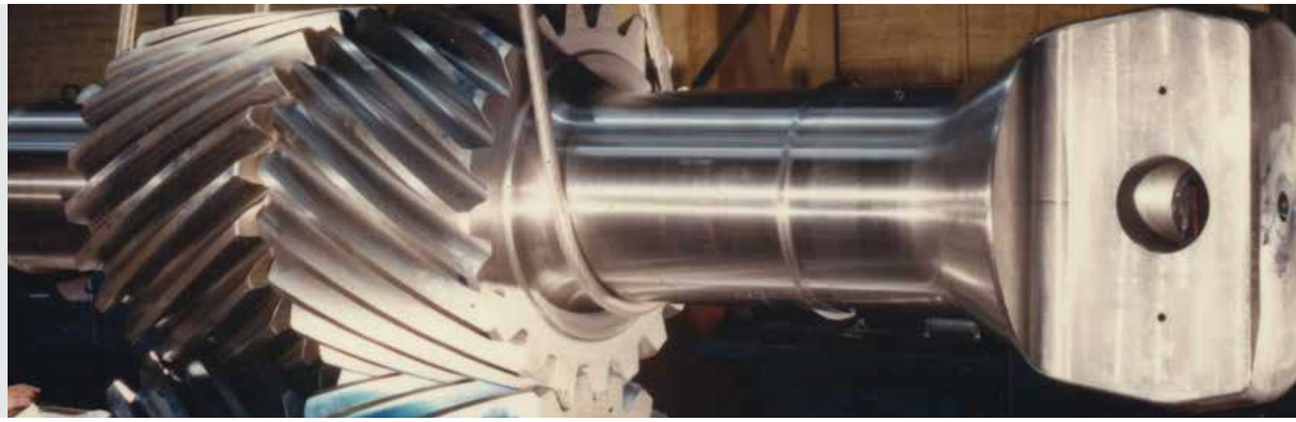
- Option of change speed mechanism giving the ability to select different ratios within the gearbox
- Condition monitoring systems for bearing temperature, vibration, oil flow, and oil condition can be tailored to suit your requirements
- Ancillary equipment such as lubrication oil supply and cooling systems
- Base plates for ease of installation
- Input and output drive couplings

Reference list includes:

Description	Application	Location	Gearbox weight kg
Twin input combined reduction and pinion stands	Titanium rolling mill	UK	102,000
Combined reduction and pinion stands	Aluminium rolling mill	India	80,000
Twin input combined reduction and pinion stand	Aluminium rolling mill	India	57,100
Qty 5 x combined reduction and pinion stands	Steel rolling mill	China	21,600
Qty 5 x combined reduction and pinion stands	Steel rolling mill	China	18,100
Combined reduction and 2 high pinion stands	Aluminium rolling mill	UK	17,000
Qty 5 x combined reduction and pinion stands	Steel rolling mill	China	14,400
Combined reduction and 3 high pinion stands	Titanium rolling mill	UK	11,000

Rolling mill pinions

Durable | flexible | high quality



Long and reputable experience in the design and manufacture of rolling mill drives and pinion stand units places David Brown in a unique position to engineer and manufacture replacement rolling mill pinions to build into existing installations. These can be supplied to existing designs or can be offered with upgraded features using the latest materials, manufacturing and heat treatment technology to increase the capability of your rolling mill. Our global experience and manufacturing capabilities mean we can supply pinions up to 1.5m diameter and 1.8m facewidth.

Key features

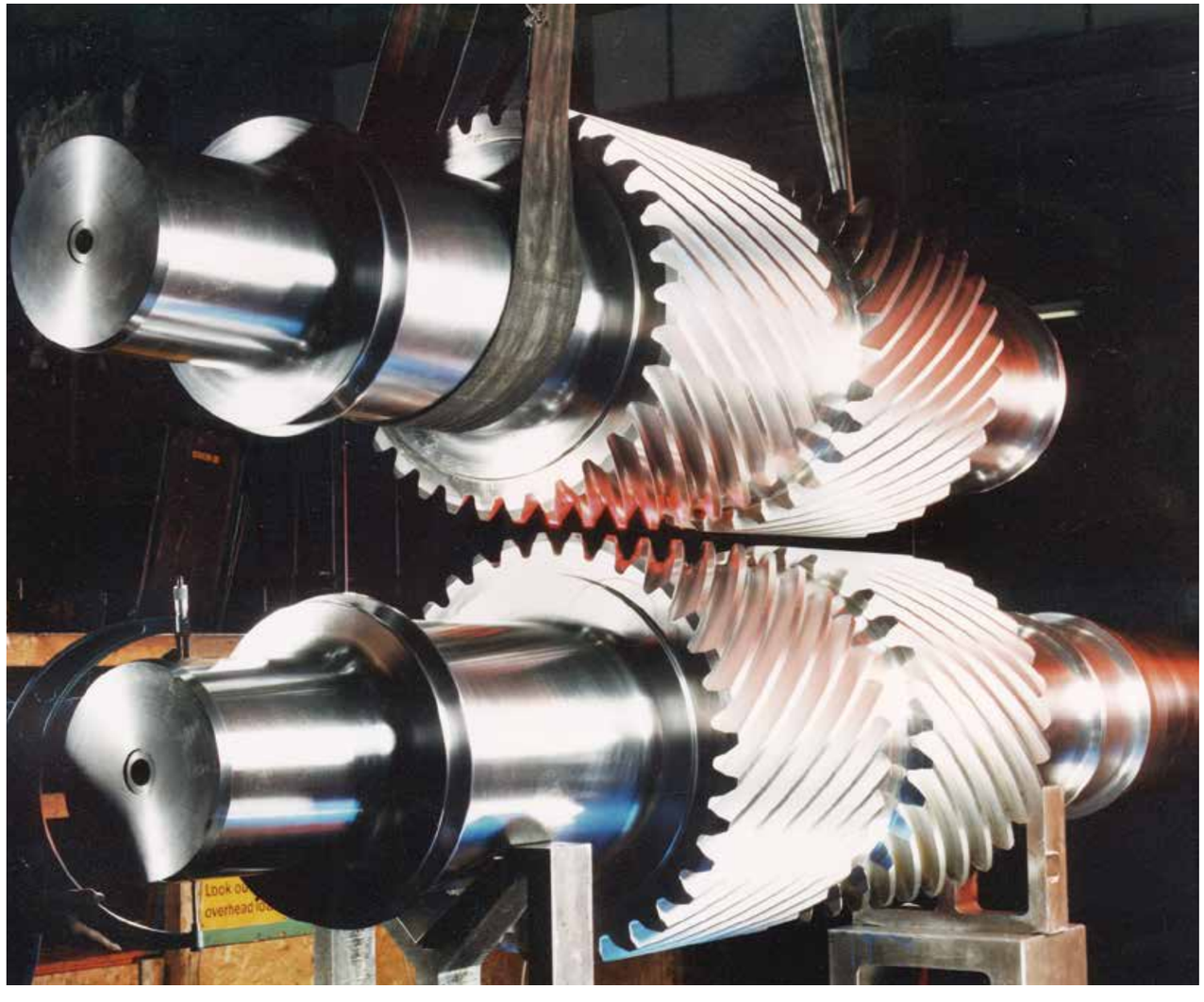
- Gears can be rated to any internationally recognised standard such as ISO, AGMA or DIN
- David Brown can offer total design flexibility to tailor the pinions to the application
- Pinions can be either though hardened or carburised depending on the application and duty
- For pinions being fitted in an existing gearcase David Brown are able to model the gearcase and perform a deflection analysis to ensure that the gearcase is compatible with an increase in duty, and if necessary modify the gear geometry to suit the gearcase

Key benefits

- High quality materials and construction give long and trouble free service
- Gears designed for the specific application and installation
- Upgraded features and ratings ensure long life and durability

Optional features and equipment

- Assistance with installation and commissioning



Coilers and uncoilers

Integrated solution | modern design | custom designed

David Brown has extensive experience in the design and manufacture of drives for coilers and uncoilers for new and existing applications.

The gearbox design can be customised to suit your choice of mandrel and manufacturing equipment. The mandrel can either be directly assembled with the gears and integrated into the gearbox, or connected through a hollow shaft, it can also be customised to suit all other aspects of your process.

Key features

- Flexible design options
- Modern design and manufacturing techniques
- High quality materials such as clean steel gear material and approved brand bearings
- Carburized gears
- Fabricated steel gearcases designed using Finite Element Analysis (FEA) to verify material selection, gear case deflections, and structural analysis
- Large inspection covers
- Levelling pads

Optional features and equipment

- Condition monitoring systems for bearing temperature, vibration, oil flow, and oil condition can be tailored to suit your requirements.
- Ancillary equipment such as lubrication oil supply and cooling systems.
- Base plates for ease of installation
- Input drive couplings
- Change speed options for production line flexibility

Key benefits

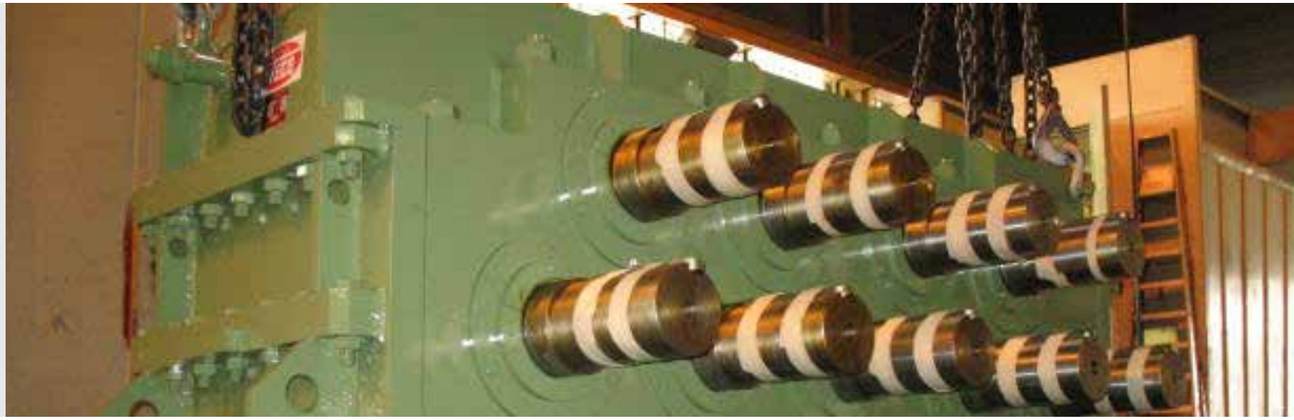
- Customised to suit your choice of mandrel and manufacturing equipment
- Robust gear and gearcase design optimised for the required duty
- High quality materials and construction give long and trouble free service
- Replacement units fit into the same space envelope and mounting positions as the existing units
- Ease of in service internal inspection
- Ease of level checking on site
- Ease of installation by enabling simple gear contact modifications.

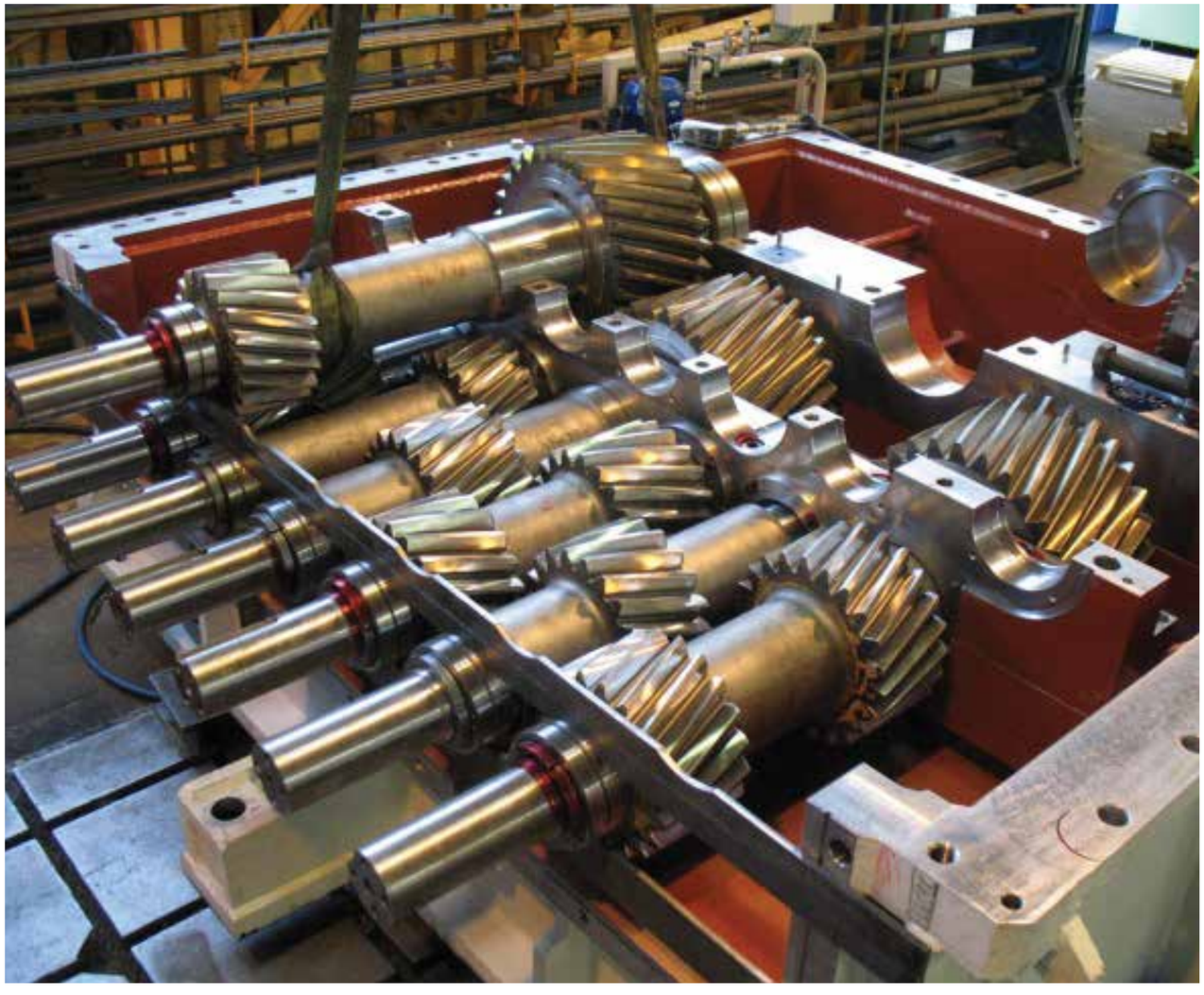
Reference list includes:

Customer	Country	Product
Tata Steel	UK	Coilers and uncoilers
Tata Steel	India	Recoiler
Columbus Steel	South Africa	Pickle line coilers and uncoilers
Hindalco	India	Cold mill coilers and uncoilers
Columbus Steel	South Africa	2 speed uncoilers
POSCO	South Korea	Uncoilers
PT Alumindo	Indonesia	Recoiler
Essar Steel	India	Slitter coilers and uncoilers
Trident Steel	South Africa	2 speed recoilers
Novelis	France	Coilers

Levellers

Long experience | robust design | wide range





Levellers

The range covers the widest range of output shaft options, supplying drives with up to 24 output shafts and ratio options to meet your process layout, including change speed options.

David Brown has extensive experience in the design and manufacture of drives for levellers for new and existing applications, designed to suit process loads specific to your application.

Key features

- Flexible design options
- High quality materials such as clean steel gear material and approved brand bearings
- Carburised and ground gears
- Fabricated steel gearcases designed using Finite Element Analysis (FEA) to verify material selection, gear case deflections, and structural analysis
- Large inspection covers
- Levelling pads

Key benefits

- Wide range of output shaft options
- Robust gear and gearcase design optimised for the required duty
- High quality materials and construction give long and trouble free service
- Replacement units can be designed into the same footprint and mounting positions of the existing units
- Ease of in service of internal inspection
- Ease of level checking on site

Optional features and equipment

- Condition monitoring systems for bearing temperature, vibration, oil flow, and oil condition can be tailored to suit your requirements.
- Ancillary equipment such as lubrication oil supply and cooling systems.
- Base plates for ease of installation
- Input and output drive couplings
- Change speed options for production line flexibility

Reference list includes:

Customer	Country	Number of Outputs
Ingemas	Spain	9
Industeel	France	13
Essar Steel	India	5
Walker Steel	UK	7
Essar Steel	India	17
Trident Steel	South Africa	3
Tata Steel	UK	3
Tata Steel	UK	9
Clecim	France	4
DMS	France	13

Other gearboxes and transmissions

David Brown goes to the very heart of the metals industry, providing tailored gear products and systems, inspection and maintenance with dedicated service and repair to all parts of the metals production industry.

The portfolio of David Brown ranges from universal standard units through to application specific gear units and customer specific solutions. Being an integral part of industry for more than 150 years, with a demonstrable track record, the name David Brown speaks for itself. A one stop shop for your metals industry requirements, the best-in-class solution provider

Standard industrial reducers

David Brown's range of industrial reducers offer single, double, triple and quadruple reduction options in both bevel and helical designs in excess of 1mNm. These can be used as the basis for many application designs for the metals industry, offering the advantages of standardisation of components and design principles.

Shear units

David Brown can offer application specific designs for the arduous duties required for shear applications in metals.

Continuous casting

David Brown offers drive units in worm, parallel and plantetary configurations for continuous casting machines

Couplings

David brown offers a wide range of couplings including gear and flexible element types for all applications in the metals industry

Edgers

Application specific designs for edge rolling and trimming are available

Roll screw down drives

We offer worm gearing solutions up to 1.4M centres for screw down adjustment of rolling stands using double enveloping worm gear technology for highest overload capacity.

Drop in replacements and upgrades

Honest | capable | indepth understanding

Long experience of the arduous duty experienced in the metals industry means David Brown has an in depth understanding of the specific problems encountered and is able to create engineering solutions to improve the capability and reliability of the gearboxes in service.

For existing installations such as pinion stands and reduction units, replacement units can be reconfigured to give greater powers, allowing increases in speed or rolling torque, whilst fitting into the same space and in many cases with interchangeable mounting positions.

If needed, independently driven output shafts can be incorporated into the same footprint, further enhancing the capability of rolling mills. In some cases it is possible to upgrade the existing unit by fitting new internal components into the existing gearcase. Replacement gears may have a higher capacity than the originals by a combination of design changes, use of more advanced manufacturing techniques, and superior materials. David Brown is able to perform an FEA on the existing gearcase to ensure it is suitable to accept a revised duty and if necessary modify replacement gears for optimised tooth contact under load.

Retrofit replacement gearboxes

David Browns rapid engineering capabilities mean we can offer "drop in replacement" gear units, for all brands of gearboxes. By ensuring total dimensional interchangeability of shaft sizes and positions, and commonality of holding down bolt positions, we can ensure the new gearbox can be installed without modifications to foundations and couplings and without the need to modify or re-position other critical equipment. This minimises the risk and time for re-installation of replacements for aging gearboxes, whatever the application.

Upgrading equipment and gearboxes

If your process needs additional capability David Brown can provide "drop in replacement" gear units with modern manufacturing techniques and improvements in materials and heat treatment technology. This means the replacement unit can be upgraded from the original design, without changing the space requirements or interfaces. With confidence David Brown can ensure units can be quickly changed over without alteration of the mountings, this can allow you to improve the productivity of your existing process, whilst ensuring equal or better reliability than the original product.

Overhaul / upgrade

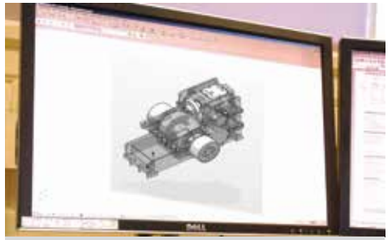
Even where gearboxes are overhauled by David Brown, our global experience means we can often offer upgraded capacity or reliability improvements to existing gearboxes, whether David Brown brand or any other manufactures product.

Service and repair
driven by David Brown

Assurance | reliability | availability

Global service centres repair and refurbish all gearbox types including worm, planetary, parallel, helical and spur gears. David Brown can repair any damaged gearbox, including the remanufacture of broken or pitted gears and shafts. We can repair any gear unit, in almost any condition, whatever the make or model.

David Brown is recognised as a metals gear specialist, with existing facilities operating close to its customers. We focus on building and maintaining long term relationships with all our key channel stakeholders, OEMs, engineering houses, prime maintenance contractors and metals operators.



Advice

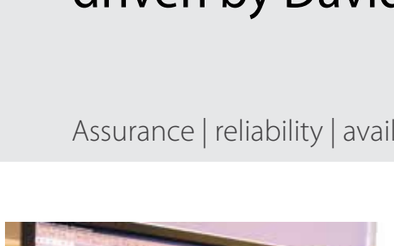
- Giving our customers sound technical advice with speedy repairs and upgrades
- Offering the best solution to fix your problem
- Maximise operational ability

Quotations

- Competitively priced at your specified lead time
- Honest and professional service

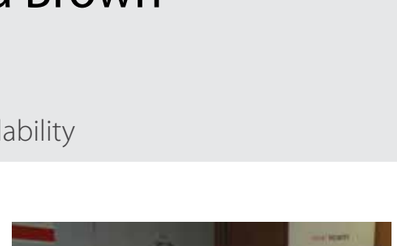
Project management

- Co-ordinated teams to offer repairs and redelivery of your gearbox and other associated products
- Pro-active to work around you
- Fully supported teams, backed by global networks and expertise



Site services

- Global fast response, with the best dedicated engineers
- In situ inspections
- Full asset management services
- Warrant parts and services to minimise downtime impact
- Gearbox repairs and upgrades

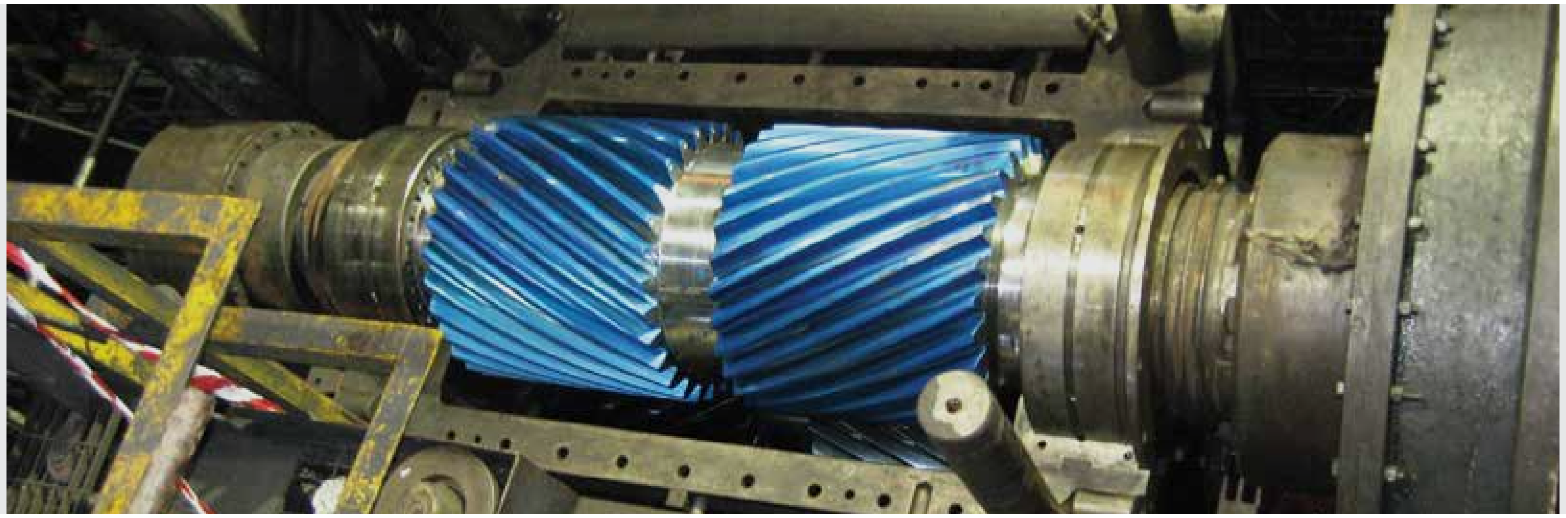


Spares

David Brown can offer spares for all David Brown products and manufacture any required parts for non David Brown gear units

Repairs

David Brown can offer repairs on or offsite on all makes and models of gearboxes and associated products



David Brown understands that fast response is key to any customer requiring service, repair support. Our dedicated service centre engineers offer support to ensure your gear system, whatever the make or model, is up and running optimising performance, and minimising downtime.

Whatever the make or model we can inspect, overhaul and repair your gearbox

David Brown has more than 150 years experience in supplying specialised gear units for metals applications, giving us worldwide references and a detailed knowledge of the specialised requirements of the metals industry.

Our product range includes the full range of custom engineered gearboxes for all applications including some of the largest rolling mill drives; these can be engineered to meet your new equipment specifications, or designed as drop in solutions to replace existing machinery, often with significant capacity and reliability upgrades.

Our services include on site and off site maintenance and repair services, both for David Brown and competitor gearboxes, including the capability to engineer out known problems and provide product upgrades.

3X THREE YEAR ASSURANCE

3X ASSURANCE
3X RELIABILITY
3X AVAILABILITY

Key features

- We offer a 3 year extended warranty package on gearboxes serviced, repaired and upgraded by David Brown
- Available at all David Brown service and manufacturing facilities world-wide
- We can repair, upgrade and maintain any type of gearbox for any industrial application

Services offered

- Full diagnostic and performance testing
- Inspection and maintenance with in-depth reporting
- Consulting failure analysis and strain gauging
- Repairs, overhauls and upgrades
- Retrofit replacement gearboxes
- On-site / offsite support
- Asset management
- Strategic spares management
- 3 year warranty package