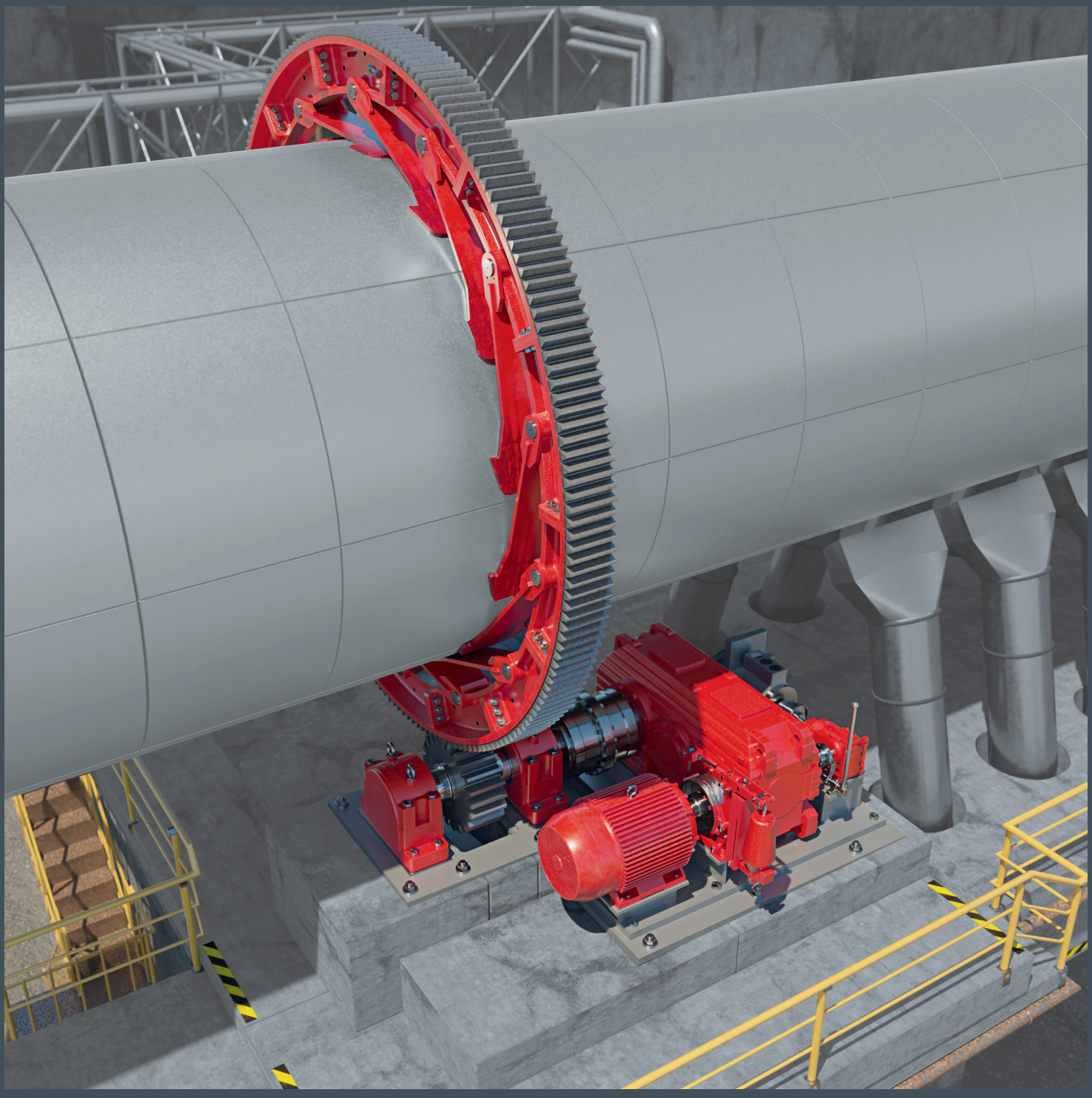
SEW EURODRIVE

Segmented Girth Gears

Drive Solutions for mills, kilns, dryers, coolers
and other rotary drums using segmented girth gears



Driving Australia



industry s



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since 1982

Revolutionising girth gear design one segment at a time

Segmented girth gears are used to drive large rotating systems such as ball mills, rotary kilns, dryers, calciners, drum pulpers, drum screens, and other heavy-duty industrial equipment. Installed around the circumference of the driven equipment, they transfer torque from the drive system to the rotating cylinder.

SEW-EURODRIVE has developed a segmented girth gear concept that combines advanced materials engineering, optimised manufacturing, and flexible installation methods to deliver superior performance, simplified logistics, and reduced lifecycle costs.

Since the early 2000s, SEW-EURODRIVE has been supplying this advanced technology with well over 1,000 installations worldwide.

High performance solutions for large rotating systems



The SEW-EURODRIVE Advantage

Unlike conventional girth gears, which are manufactured in two to four large sections, SEW-EURODRIVE segmented girth gears are made up of multiple interchangeable segments. This innovative approach simplifies the manufacturing and logistics process, and makes installation and maintenance easier while enabling more efficient future expansion.

Traditional girth gears often require large casting moulds, extensive heat treatment facilities, oversized machining equipment, and complex transportation arrangements. These constraints can compromise casting quality, increase manufacturing costs, and complicate maintenance. SEW-EURODRIVE‘s segmented design overcomes these limitations through compact, interchangeable gear segments typically measuring around two metres in length.

Key Benefits

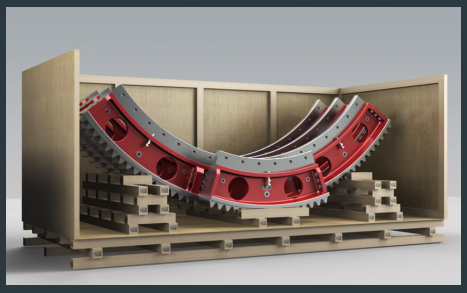
Easy Casting

- Optimised feeder design and heat sink technology ensure consistent, high-quality castings
- Smaller segments improve casting integrity and reduce manufacturing risk
- Only a single segment pattern is required, reducing tooling and pattern costs



Practical Handling & Transport

- Compact components are easily handled in manufacturing facilities and at customer sites
- Transportation can be performed using standard shipping containers without special logistics requirements
- Global shipment becomes more practical and economical



Improved Quality Assurance

- Smaller castings simplify inspection and quality control
- Defective blanks can be rejected without affecting a complete gear ring
- Eliminates the need for additional welding or oversized castings



Easy Segment Replacement

- Individual damaged segments can be replaced without dismantling the entire girth gear
- Reduces maintenance costs, downtime, and spare parts inventory requirements

Reduced Weight

- Optimised design and high-strength ADI material allow lighter gear construction than conventional solutions
- Easier installation and handling
- Can be installed in small rooms and restricted spaces because of smaller lifts

Extended Service Life

- High wear resistance and excellent contact fatigue properties
- With proper loading, lubrication and sizing, component wear is minimised

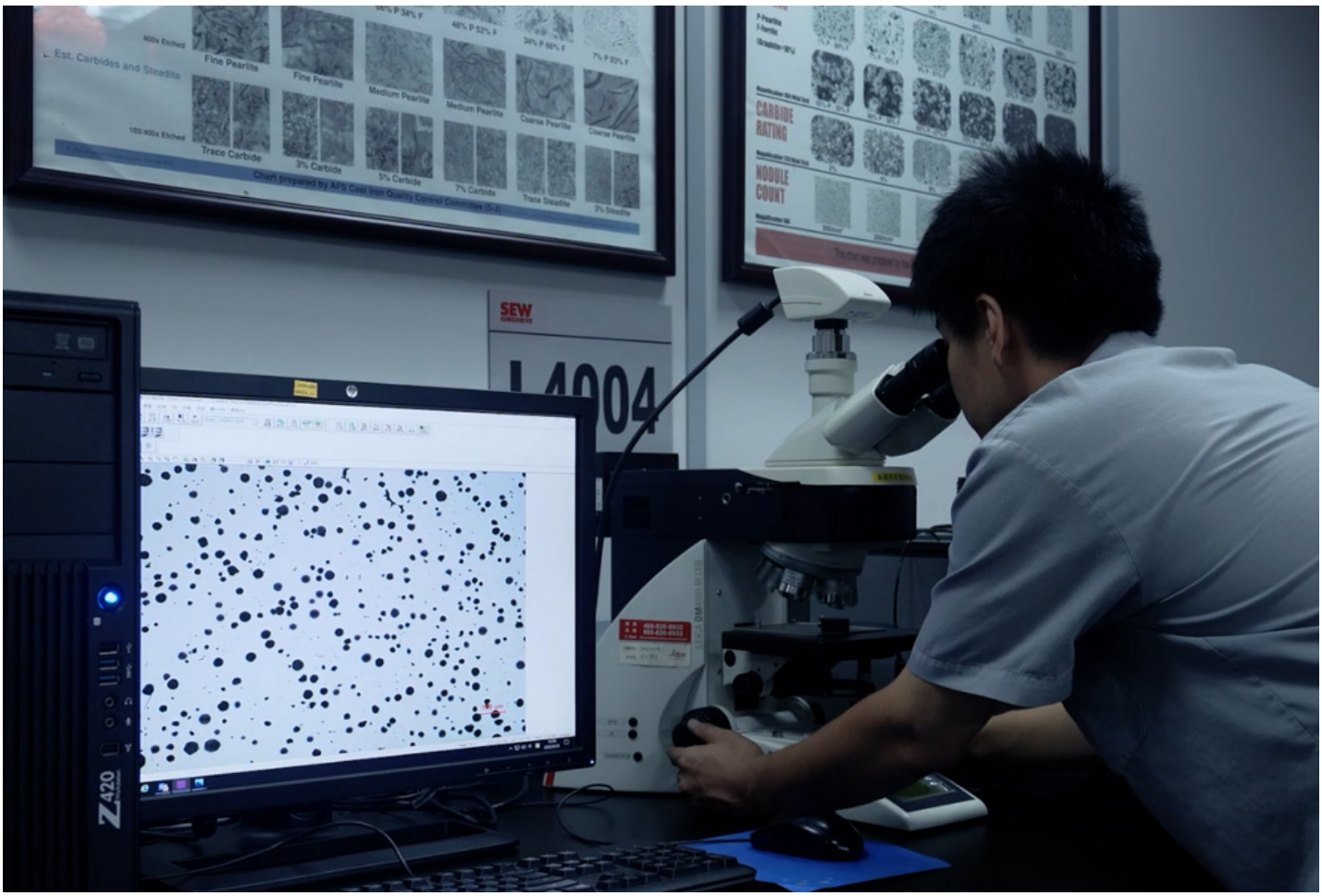
Short Delivery Times

- Smaller segments allow faster manufacturing and machining
- Reduced production lead times compared to traditional large-section gears
- Reduced transit time as segments can fit into standard containers

Material Technology: Austempered Ductile Iron (ADI)

SEW-EURODRIVE manufactures segmented girth gears exclusively from Austempered Ductile Iron (ADI), a high-strength cast iron produced through specialised alloying and isothermal heat treatment processes.

ADI has been successfully used for gearing applications for over three decades and offers mechanical properties that are not achievable with conventional cast iron materials.



ADI Advantages

Material Characteristics

- Minimum tensile strength: 1,000 N/mm^2
- Minimum elongation: 5%
- Exceptional contact fatigue strength
- High durability under cyclic loading
- Excellent wear resistance
- Superior strength-to-weight ratio

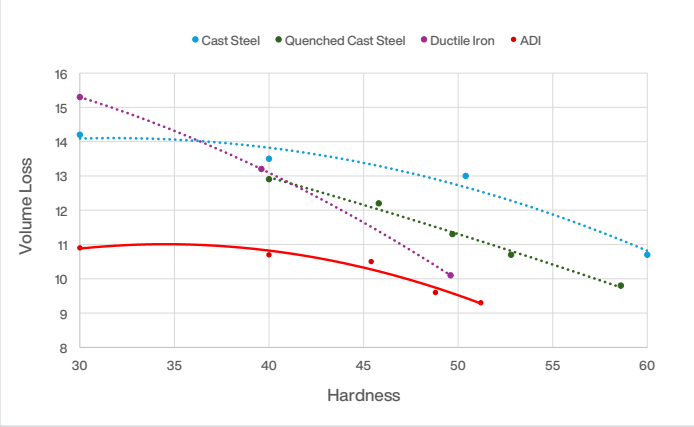
The cold work-hardening characteristics of ADI provide:

- Greater contact fatigue resistance
- Improved load carrying capacity
- Enhanced durability
- Reduced gear weight
- Lower lifecycle costs

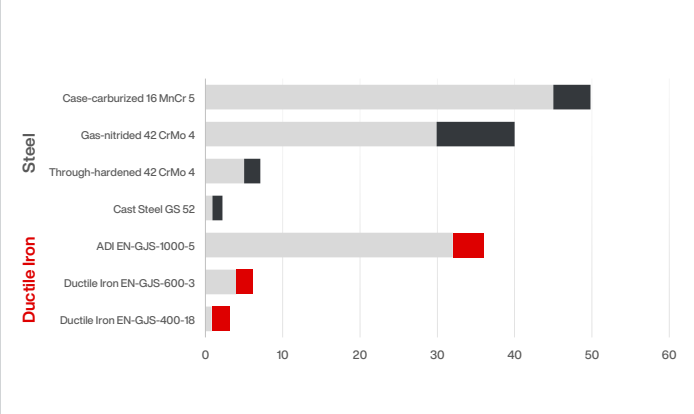
Relevant Standards

- ISO 17804: Ausferritic Spheroidal Graphite Cast Irons
- AGMA 939-A07: Austempered Ductile Irons for Gears

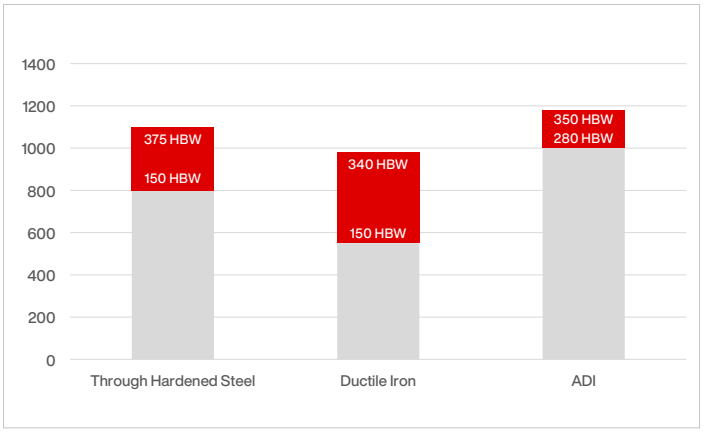
Volume Loss [%]



Contact Fatigue Strength k_D [N/mm^2]



Tensile Strength [N/mm^2]



Precision & Performance

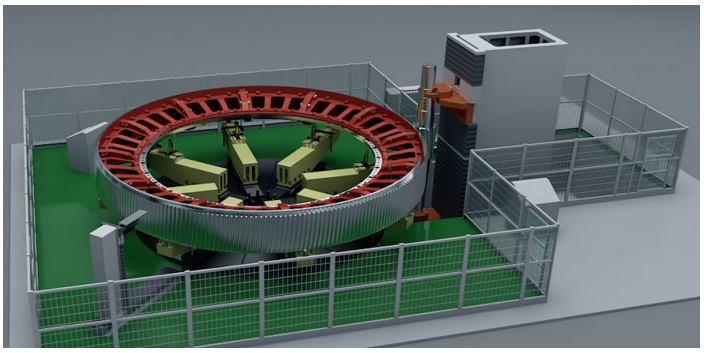
A common concern with multi-segment gear rings is maintaining tooth spacing and alignment across segment joints. SEW-EURODRIVE segmented girth gears are manufactured to ISO 8 pitch accuracy with AGMA 9 pitch accuracy equivalent.

This high manufacturing precision minimises:

- Vibration
- Dynamic loading
- Noise generation
- Uneven tooth wear

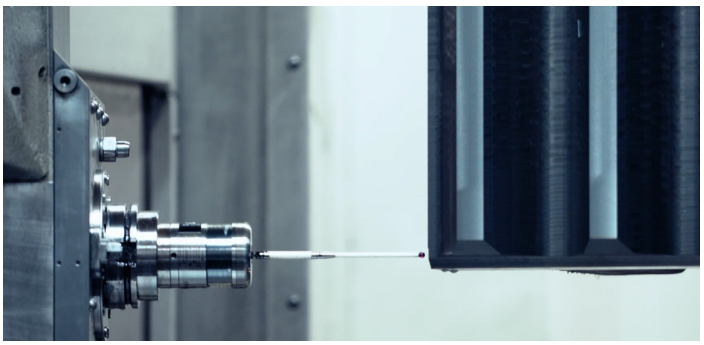
The result is smooth, reliable operation throughout the life of the gear.

Girth gear and pinion testing jig

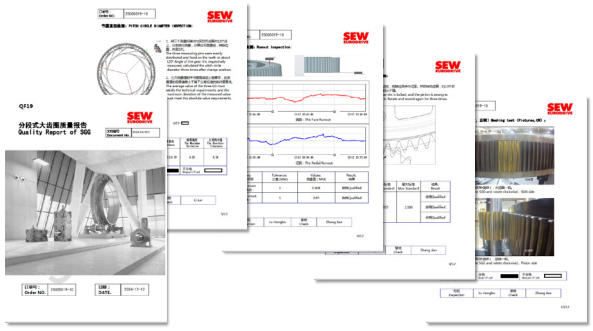




CMM Dimensional inspection



Manufacturing report with run testing



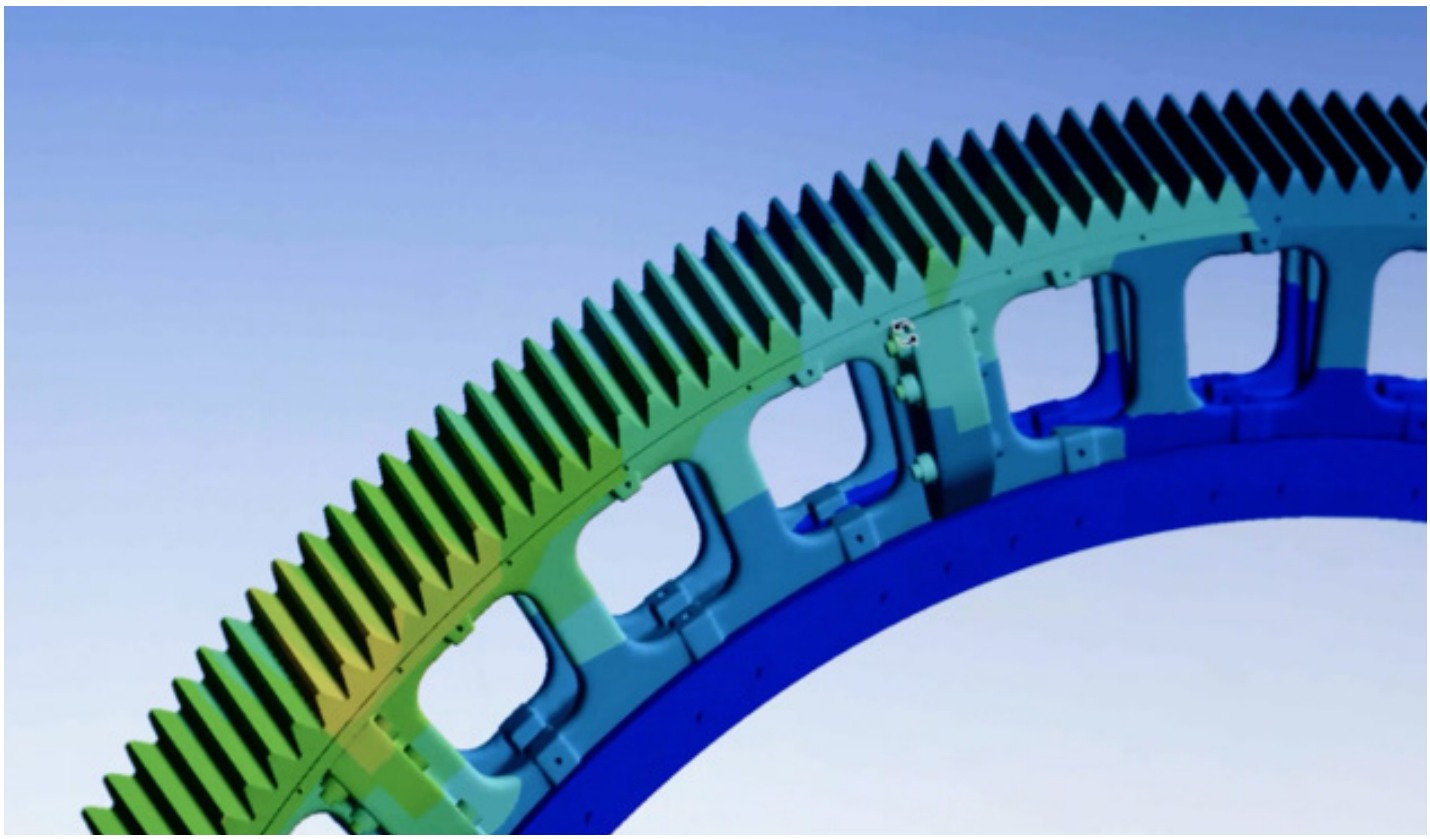
Engineering optimisation through FEM Analysis

Before production, we perform comprehensive Finite Element Method (FEM) simulations to optimise each girth gear design.

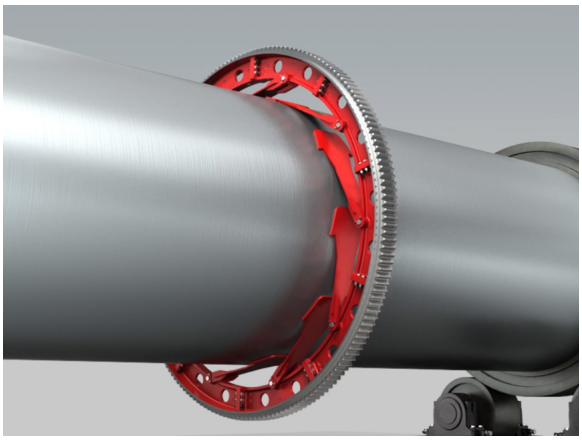
FEM Analysis Evaluates:

- Stress distribution
- Structural deformation
- Power-to-weight ratio
- Segment joint behaviour
- Gap formation
- Bolt connection integrity
- Overall structural integrity

This engineering process ensures the final design is optimised for both performance and cost-effectiveness.



Connection systems for various applications



Spring-Plate Connection

Designed specifically for:

- Rotary kilns
- High-temperature drum applications

Benefits

- Accommodates thermal expansion
- Maintains gear alignment during operation
- Reduces thermally induced stresses
- Helps preserve installation accuracy over time

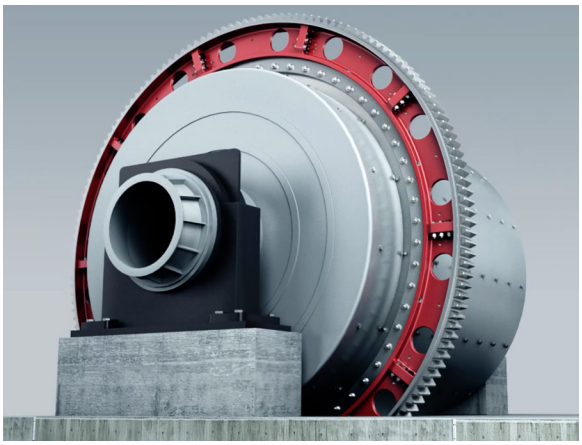
Flange Connection

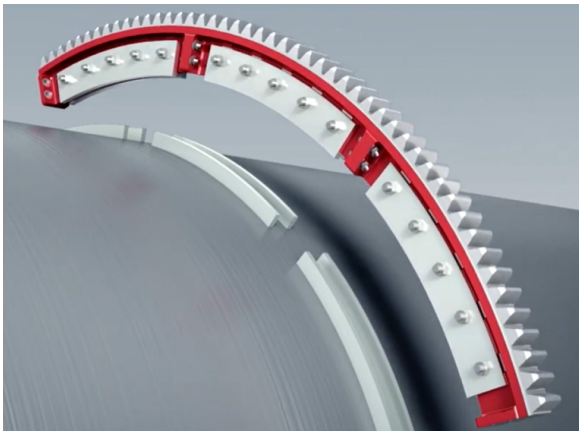
Suitable for:

- Mill applications
- Standard operating temperatures
- New equipment installations

Benefits

- Robust mechanical attachment
- Precise positioning
- Proven reliability for heavy-duty operation





Welding Flange Connection

Used when:

- Equipment lacks existing mounting flanges
- Retrofit projects are required
- Fast-track modernisation projects are planned

Benefits

- Simplifies reconstruction projects
- Allows installation on existing drums
- Reduces project downtime

Gear Configurations

Spur Girth Gears

Recommended for:

- Most standard industrial applications
- General-purpose rotary equipment

Benefits:

- Simplicity
- Cost-effectiveness
- Proven reliability
- No thrust loads on equipment

Helical Girth Gears

Recommended for:

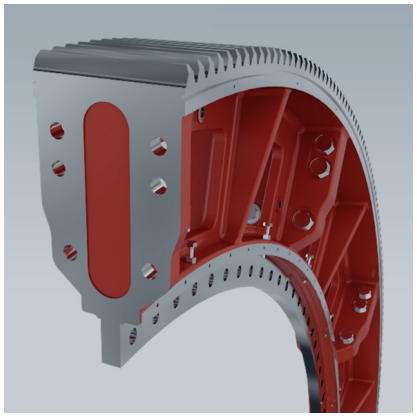
- Large mining mills
- High-load applications

Benefits:

- Increased load-carrying capability
- Smoother power transmission
- Improved load sharing
- Higher contact ratios

Structural Configurations

We supply various spoke structures depending on operational requirements.



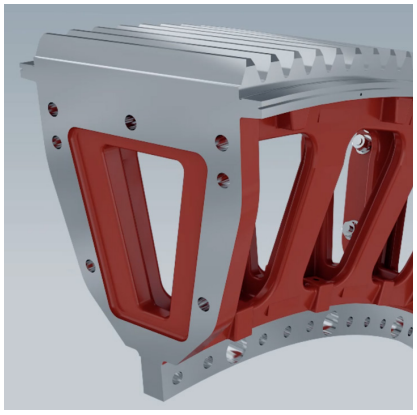
T-Section Design

Suited for:

- Medium-duty mills
- Standard operating loads

Benefits

- Efficient design
- Optimised weight
- Cost-effective construction



Y-Section Design

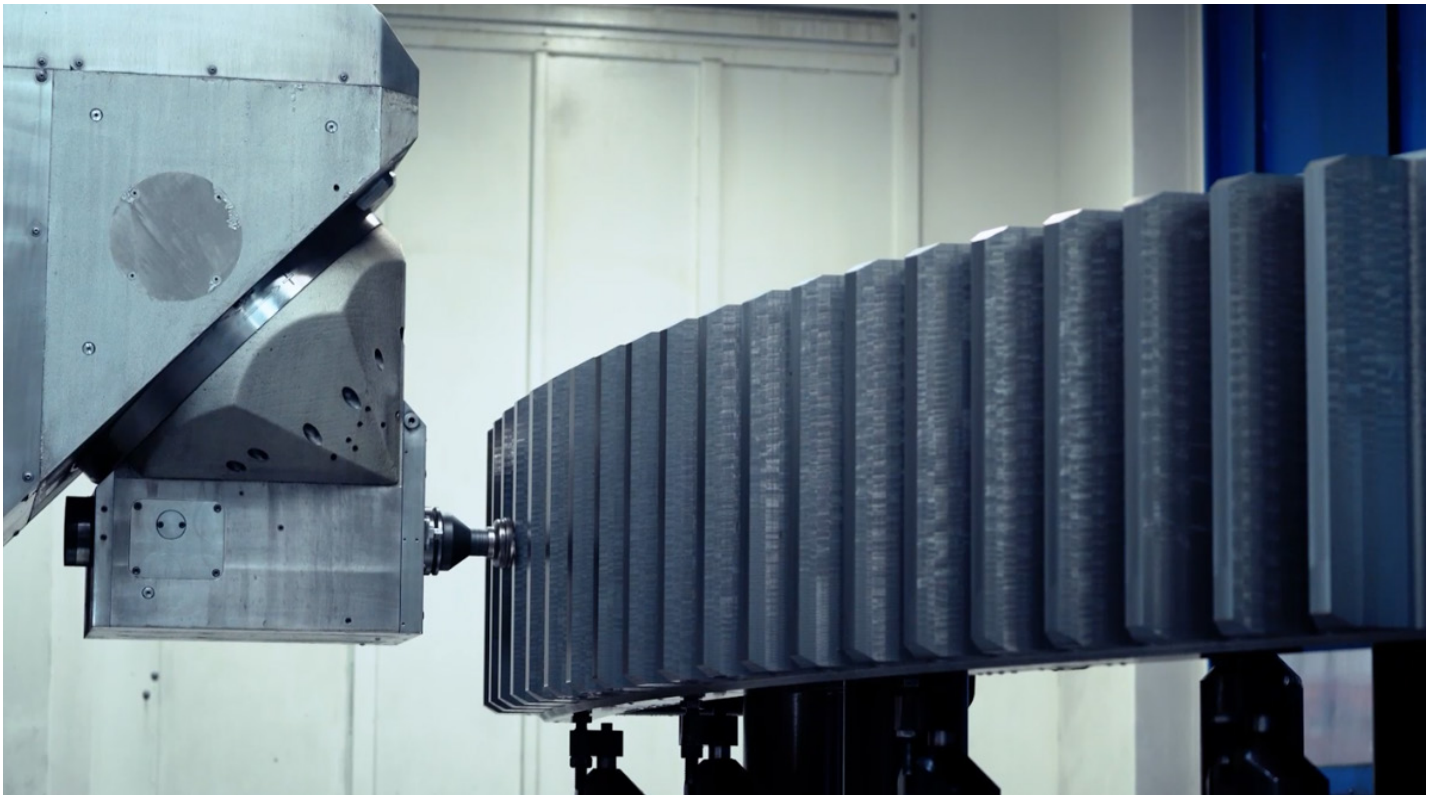
Double-spoke plate construction suited for:

- Heavy-duty grinding mills
- Extreme service conditions

Benefits

- Increased stiffness
- Greater structural stability
- Higher load capacity

Technical Information



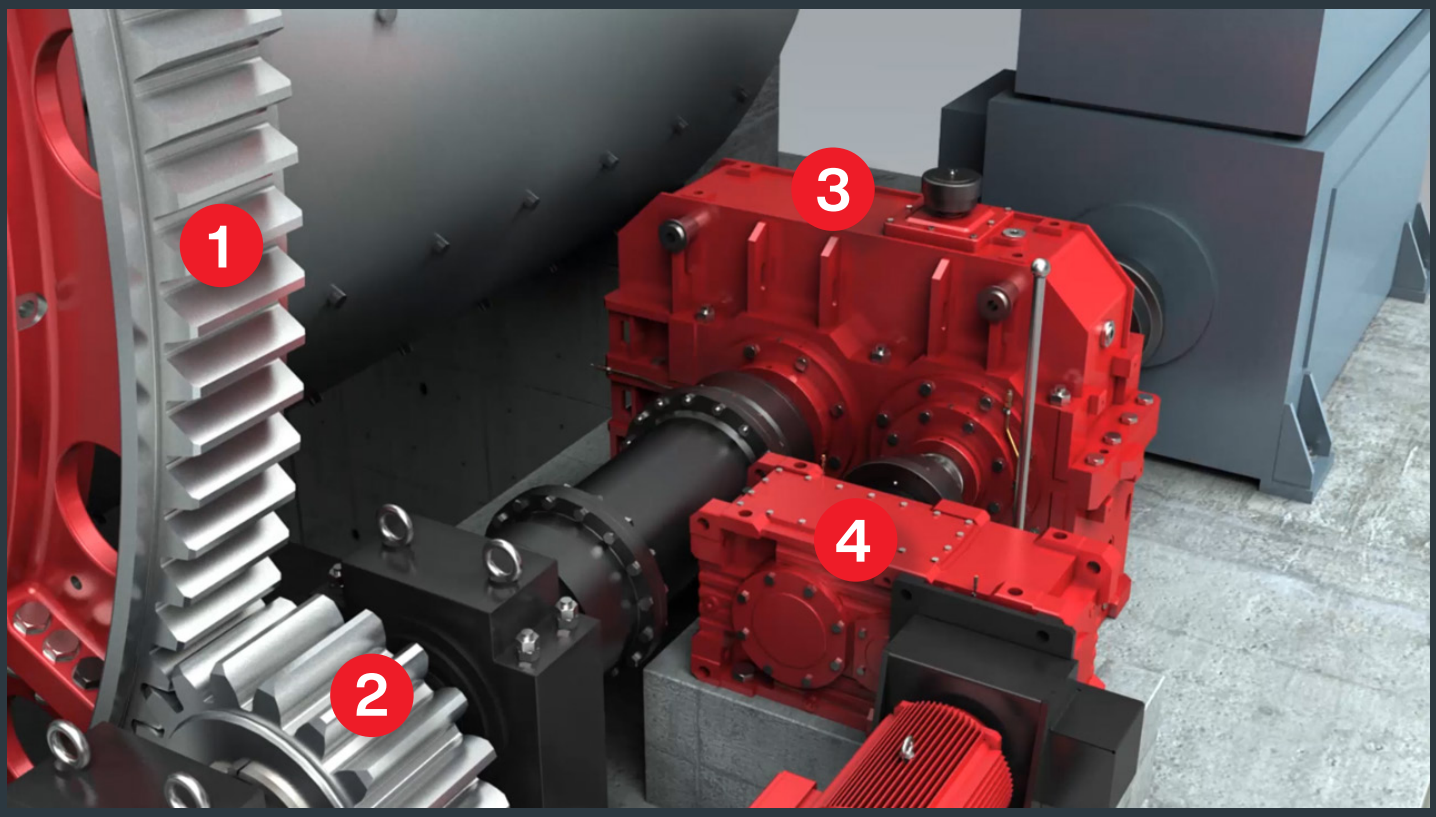
Technical Data

Parameter:	Value
Maximum pitch diameter	Approx. 16m (larger diameters available upon request)
Maximum face width	1050mm
Maximum power per pinion	9000kW
Maximum pitch line velocity	6m/s
Standard gear modules	20, 25, 30, 40, 45, 50 (Other modules on request)
Calculation standard	ISO 6336 (AGMA available on request)
Single element length	2.0 to 2.8m

Common Application Sizes

Application	Mill	Rotary Kiln
Power	Up to approx. 18 MW	Up to approx. 1MW
Diameter	Up to approx. 16m	Up to 9m
Installation	Flange	Leaf spring
Speed of rotation	High (10...20min^{-1})	Low (1...2min^{-1})

Complete Drive Solutions



Access complete, integrated drive packages including:

1. Segmented girth gear
2. Drive pinion
3. Main gear unit
4. Maintenance drive

- Mounting springs
- Mounting flanges
- Motors
- Pedestal bearings (if required)
- Auxiliary drives
- Lubrication systems
- Foundation & base frames
- Couplings
- Protective covers
- Condition monitoring
- Installation services
- Commissioning & start-up support

Multiple drive arrangements can be utilised to distribute torque around the circumference of large equipment, enabling:

- Higher total power transmission
- Use of smaller, more efficient drive units
- Improved system efficiency
- Increased operational flexibility
- Added redundancy
- Reduced cost of spares

Industries & Applications



Industries

- → Mining
- → Cement
- → Chemicals
- → Energy
- → Steel
- → Environmental
- → Processing
- → Pulp and Paper

Applications

- → Ball Mills
- → Grinding Mills
- → Rotary Kilns
- → Rotary Dryers
- → Calciners
- → Drum Breakers
- → Drum Pulpers
- → Drum Screens
- → Other large rotary processing equipment

Local Service, Global Support

Our team of specialists work with machine designers, EPC contractors, OEMs, and end users to identify the most technically and economically effective drive solution for every application.

Worldwide engineering and service support includes:

- → Application consulting
- → System selection
- → Engineering design
- → Delivery
- → Installation
- → Start-up & Commissioning
- → Maintenance Support





Company Background

The SEW-EURODRIVE group is a global designer and developer of mechatronic transmission systems and motor control electronics, headquartered in Bruchsal, Germany. Its broad spectrum of integrated solutions includes geared motors and gear units, high torque industrial gear units, high-efficiency motors, electronic frequency inverters and servo drive systems, decentralised drive systems, plus engineered solutions and technical support/training.

The Australian division of SEW-EURODRIVE is headquartered in Melbourne and is supported by a network of sales and service facilities in Sydney, Brisbane, Mackay, Perth, Adelaide and Newcastle. The company's customer base includes large-scale corporations and smaller entrepreneurial enterprises across Australia.

Technical Enquiries
SEW-EURODRIVE Pty Ltd
27 Beverage Drive
(PO Box 59)
Tullamarine, VIC 3043
Phone: (03) 9933 1000
general.mail@sew-eurodrive.com.au

Service and Support
Emergency Contact
Phone: 1300 363 432

Media Enquiries
SEW-EURODRIVE Pty Ltd
27 Beverage Drive
(PO Box 59)
Tullamarine, VIC 3043
Phone: (03) 9933 1000
marketing.au@sew-eurodrive.com.au

Marketing Department
Phone: (03) 9933 1000
marketing.au@sew-eurodrive.com.au

SEW-EURODRIVE Pty Ltd
27 Beverage Drive
(PO Box 59)
Tullamarine, VIC 3043
Phone: (03) 9933 1000
general.mail@sew-eurodrive.com.au