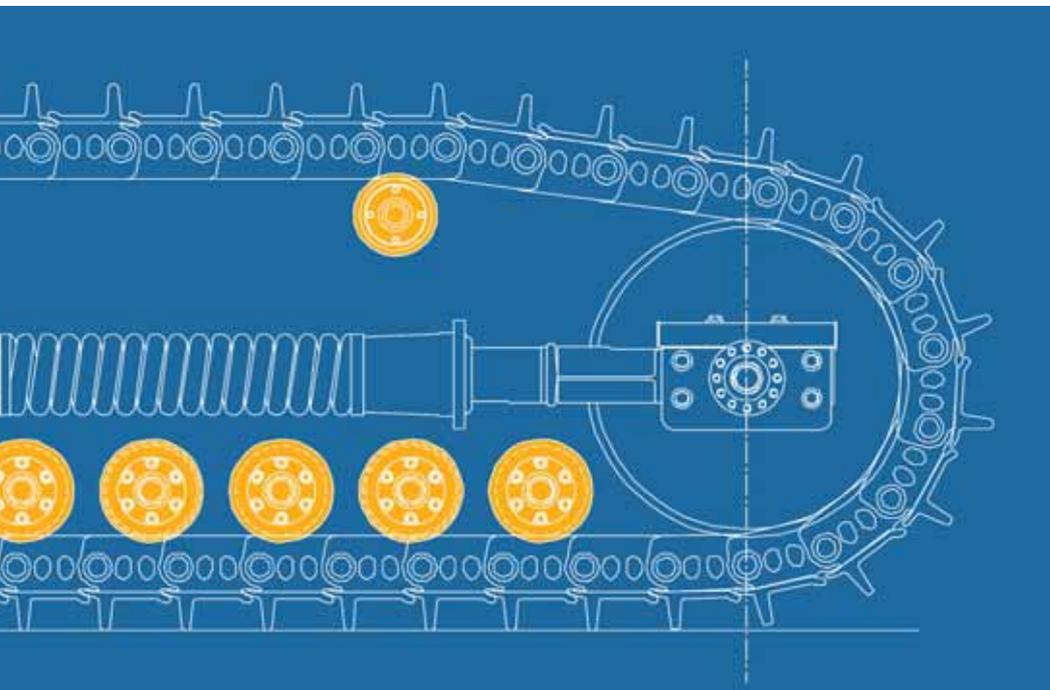


# Rollers

The Widest Choice



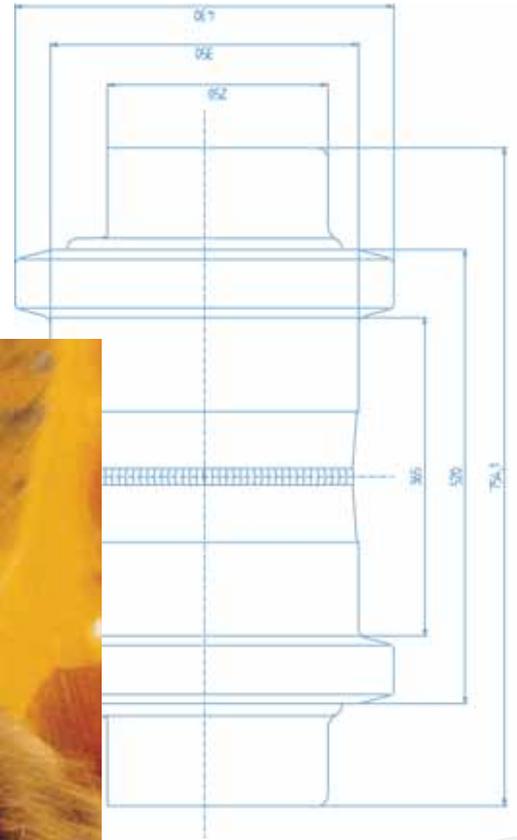
A Company of  
ThyssenKrupp

**BERCO** S.p.A.



# Berco

## Moving Your Business Ahead



### Leadership in Undercarriage

For about 90 years Berco's leadership and research has resulted in the greatest undercarriage value. Quality is the critical link that assures the maximum productivity of your machine. No one has invested more than Berco to assure dependable **High Quality Undercarriage**. Berco starts with the highest quality steel, then controls hardened depth along with other performance features. As a result Berco's undercarriage is second to none for extended wear life and value.



### Getting the Most from your Undercarriage

Since 1920 Berco has continued to innovate and improve undercarriage performance. High-quality materials and careful manufacturing processes ensure that Berco undercarriage components are reliable, durable and wear at a predictable rate. Longer life and controllable wear mean that you get **maximum undercarriage performance** at the **lowest operating cost**. At Berco we call it "**Best Undercarriage Value**"

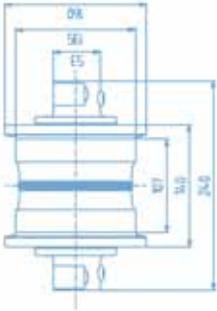


### Berco Process Control

Berco builds value & durability into every undercarriage component. Berco controls processes critical to durability and value, such as: design, raw material, heat treating, manufacturing and because **Berco has control over these processes**, our undercarriages wear at a predictable rate and can be managed as a system.

# Rollers

## The Widest Choice



### Berco Rollers

Designed and manufactured for longer life and lowest cost. Berco's *through hardening* or *differential quenching* processes increase wear life, provide superior structural support and resistance to deformation. Berco's exclusive seal groups help ensure lifetime lubrication for extended life and to reduce your costs. Berco offers the widest variety of rollers to meet your work environment requirements.

### Your Best Undercarriage Value

- Hot forged in two halves to obtain best internal grain flow
- Specific low alloyed boron steel for high hardenability
- *Differential quenching* or *through hardening* heat treatment of the roller shell guarantees a rail surface with a superior wear resistance (HRC > 50); optimum core and internal shell surface hardness for extreme resistance to shock and fatigue stresses caused by the most severe applications
- Induction hardening and super finishing of the shafts
- Large bearing and bushing area for high resistance to radial loads
- Sizeable oil capacity and perfect sealing
- Maintenance free, for longer life and perfect operation under any working condition
- Precise design and carefully manufactured for perfect alignment, perfect fit of bushings and final assembly of the components
- Easy re-shelling

### The Widest Choice

- Single Flange, Double Flange and Inner Flange rollers
- Ultra low temperature (-50°C) version available
- More than 1,500 different rollers, to match any chain or application
- For track-type machines ranging from 1 to 400 ton
- The choice of the leading OEMs

### Customer Satisfaction

Considering that more than 50% of your maintenance costs will go into maintaining the undercarriage, it is not surprising that Berco represents the best choice when the time comes for the replacement.

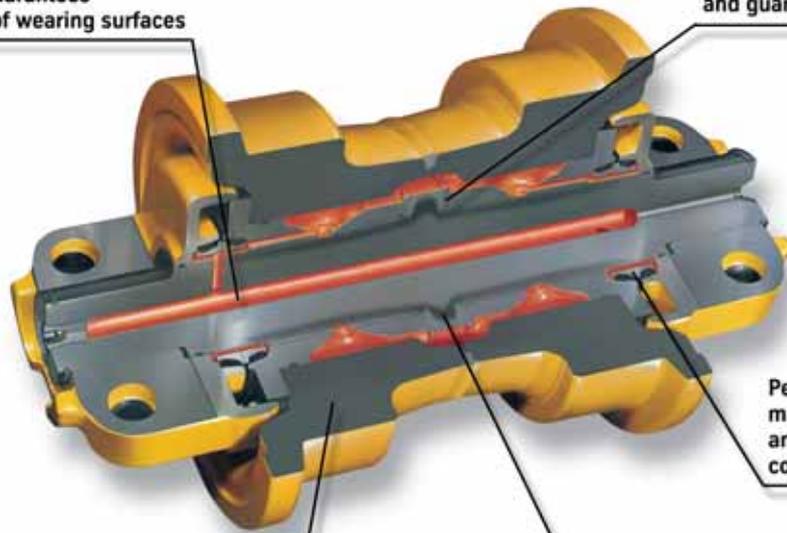
And the best choice is confirmed by the large number of **Satisfied Customers** that **Keep Choosing Berco**.

# Rollers

## Quality Components

Uniform & consistent internal lubrication. Optimum design of the clearances guarantees perfect lubrication of wearing surfaces

Bimetallic Bushings. A special steel shell prevent deformation and guarantee perfect press fit



Perfect Sealing. Accurate machining of the surfaces and lapped seal groups guarantee consistent and lifetime lubrication

Heat Treated Roller Shell. Correct heat treatment guarantees superior hardened depth and rail wear resistance, superior structural support and resistance to deformation

Heat Treated Shaft. High surface hardness and accurate finishing guarantee superior bushing life



### Hub

Made of cast iron, accurately machined guarantee correct fit and high resistance to radial loads.



### Shaft

Made of low alloyed forged steel, Berco shafts are accurately machined using a fully automated process. Surfaces in contact with bushings are induction hardened to guarantee adequate hardness (HRC > 55) and superfinished to guarantee long lasting bushings life.



### Bimetallic Bushing

The external steel shell prevents deformations and guarantees perfect fit to the seats. The high quality inner brass layer offers excellent antifriction properties for longer life



### Heavy Duty Seal Group

are fundamental for roller life, are obtained from high alloyed cast iron (or from forging of special alloyed steel) with hardness HRC > 63 and accurate superfinishing (lapping) of the contact surfaces. High quality rubber ring and exact design of the seats guarantee perfect sealing in all working conditions.



### Collar

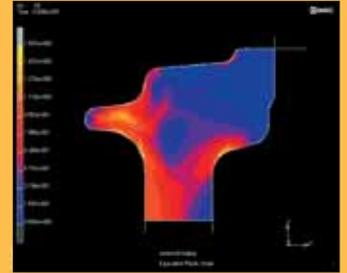
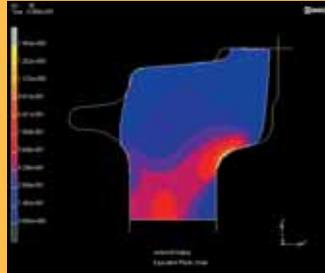
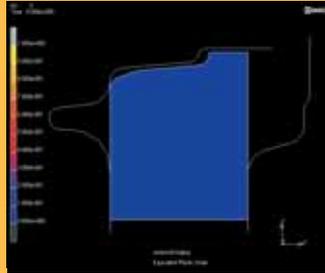
Made of high resistance nodular cast iron, Berco collars offer maximum strength and resistance to radial loads. Accurate machining and high quality control guarantee perfect fit with the other parts of the roller.



# Adding Value to Our Products

## Adding value to Your Business

FEM analysis of deformation during hot forging using "Marc" superplasticity software. This technology gives the possibility to identify in advance critical factors (material flow, material foldings, cracks and/or cavities, etc.) and to optimize the whole forging process (die and billet geometry, mechanical properties, etc.) in order to maximize the product quality.



## Making a Superior Product

It all begins in the design stage, Berco **Research & Development** engineers employ state of the art computer design. The use of 3D modeling and finite element analysis (FEM) allow us to design and evaluate a component before it is built.

Our **Rapid Prototyping** enables Berco's engineers to optimize a design before spending money in tooling.

Berco **Metallurgy Laboratory** employs advanced machines such as an electron microscope with microanalysis, a spectrophotometer, tribometers for wear tests, MTS presses for static and fatigue tests on materials and components.

**Photo-elasticity** and **strain gauge** techniques are commonly used for stress and fatigue analysis on individual and assembled components.

Stress analysis at **extreme temperatures** (-70°C ÷ 250°C) are also carried out.

**Reliability Test** on components (ex. rollers) are carried out to determine life and performance in a variety of field applications.

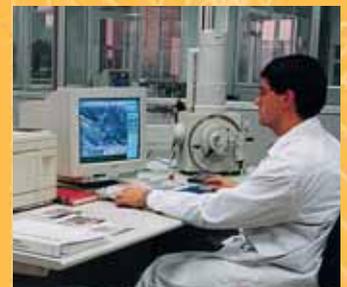
**Artificial Intelligence** and **Vision** techniques are currently being developed to automatically inspect 100% of components. This reduces defects (ex. after forging or heat treatment) attributable to manufacturing to almost zero.

Huge efforts are also devoted to the development of **New Materials** and improvement of the **Heat Treating Processes**, to guarantee longer product life and **Superior Products**.

Having supplied leading OEMs for decades, **Berco's Engineers** and product specialists can help you design and manufacture the right undercarriage, using high tech software, tools and expertise. Berco can also help you reduce development and engineering time, tooling expenses and facility costs. **Berco Adds Value** not only to our products but also to **Your Business**.



Rapid prototyping



Electron microscope with microanalysis



Stress analysis at extreme temperatures

# State of the Art Production

## State of the Art Components



Through hardening furnace



Automated welding station



▲ Shaft manufacturing line

▼ Shaft induction hardening



With a capacity of over **40,000 ton** of finished product the Berco Rollers Department manufactures more than **1,000,000 rollers** per year. From the central raw material warehouse the steel bars are transferred to one of the induction heating/hot shearing and hot forging stations where semi-shells are obtained. The two halves are then welded in one of the automatic welding centers. Heat treatment and mechanical machining complete the manufacturing of these components. In the Berco Shaft Department, forged shafts are loaded in the robot assisted manufacturing lines where they are machined in lathes, deep drilling machines and machining centers. Induction heat treatment and final grinding complete the fully automated operation. Online control at each stage of the process, guarantees the total quality of each component. Collars, hubs and seal groups are also manufactured in house and are assembled together with shells and shafts, to obtain the finished rollers. Painting completes the process while final inspections of the finished products guarantees the **Total Quality** of all components.

### Heat Treated to Treat You Even Better

Quality materials and state-of-art manufacturing are not enough to guarantee the quality of the finished products. That's why the heat treating of roller shells is carried out in a specific furnace where all process parameters (temperature gradients, time, quenching temperature, etc.) are constantly monitored online. Differential quenching and/or through hardening together with tempering guarantee excellent mechanical properties and perfect geometry for longer product life. Shafts are induction hardened and surface finished to guarantee excellent mechanical properties and longer bushings life.

### Automated Processes Automatic Quality

The entire production process is fully automated and computer controlled via Computer Manufacturing Technology system. This guarantees highly reliable processes and constant quality of the products

### The Right Product at The Right Time

A vast variety of raw materials and flexible manufacturing give the competitive advantage of short lead times while matching your specific need. That's what we also call **Customer Satisfaction.**

# We Care

## Leadership in Environmental Development

Not only do **we care** about our **customers** supplying quality products manufactured under **ISO 9001** certified processes, but also **we care** about the **Environment**.

Since Jan 2000 Berco is **ISO 14001** certified and has adopted **Environmental Procedures** throughout the entire manufacturing process. We have an **Environmental Strategy** and we continuously check on the progress made toward the set Objectives.

### Getting More out of Less.

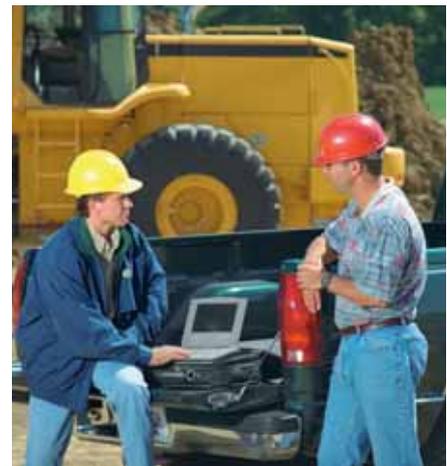
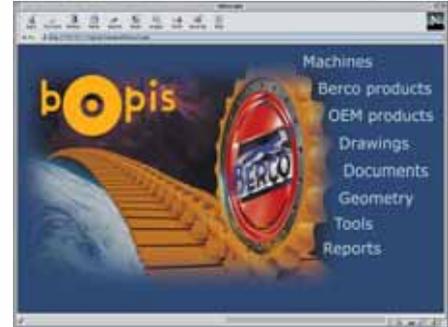
Reduction of energy consumption, improved use of materials and minimization of waste, allows for a lower impact on the environment. We have given preference to environmentally friendly transportation like trains and boats and we have begun redesigning our packaging in order to use recyclable materials. We have changed our painting processes and now use environmentally friendly water-based paint, with a reduction in the amount of pollutant emissions. We have adopted a closed loop cooling system that reuses the water from our heat treatment processes instead of emitting it into the environment.

## Customer Service

We have a large dealer network covering 70 countries in the world. They have been in business for decades, they know the business and they know it from their customers' point of view. They understand **customers' needs** and they know that their success is tied to their customers' successes.

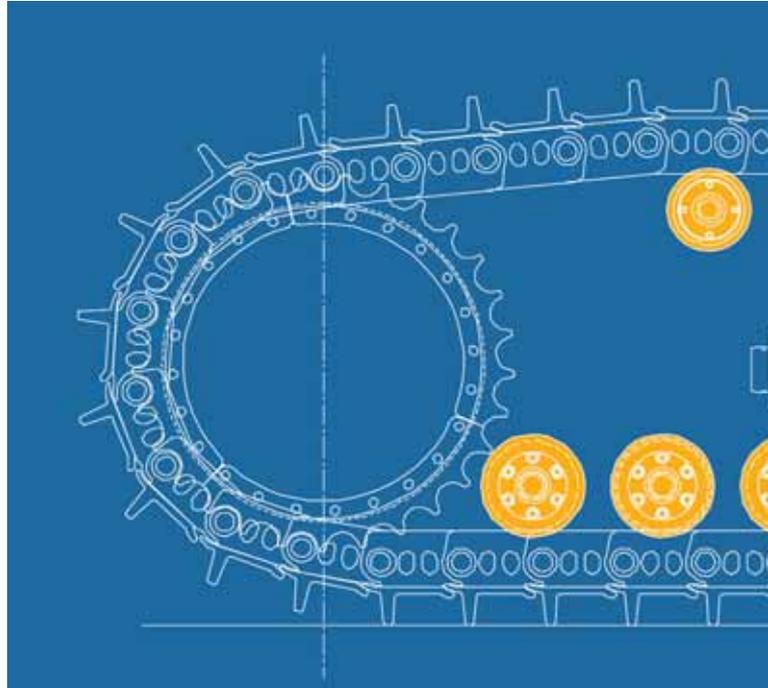
We **support** our dealers with our professional sales force. We train them, we provide them with the right marketing tools and advanced technological systems. We have developed a computer based integrated system **BOPIS** (Berco Online Product Information System) enabling a dealer technician to use a laptop computer from the field to consult our database and easily find the right answer.

**We back you, wherever you are.** We work with our dealers to establish a parts and service presence near you, in order to always have the right product at the right time in the right place. It is customer satisfaction that has built our **Berco Track Record**.



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All manufacturers's names, numbers, symbols and descriptions are used for reference purposes only.  
All parts listed are of Berco original production.  
The specifications and processes described in this brochure are subject to change without notice

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