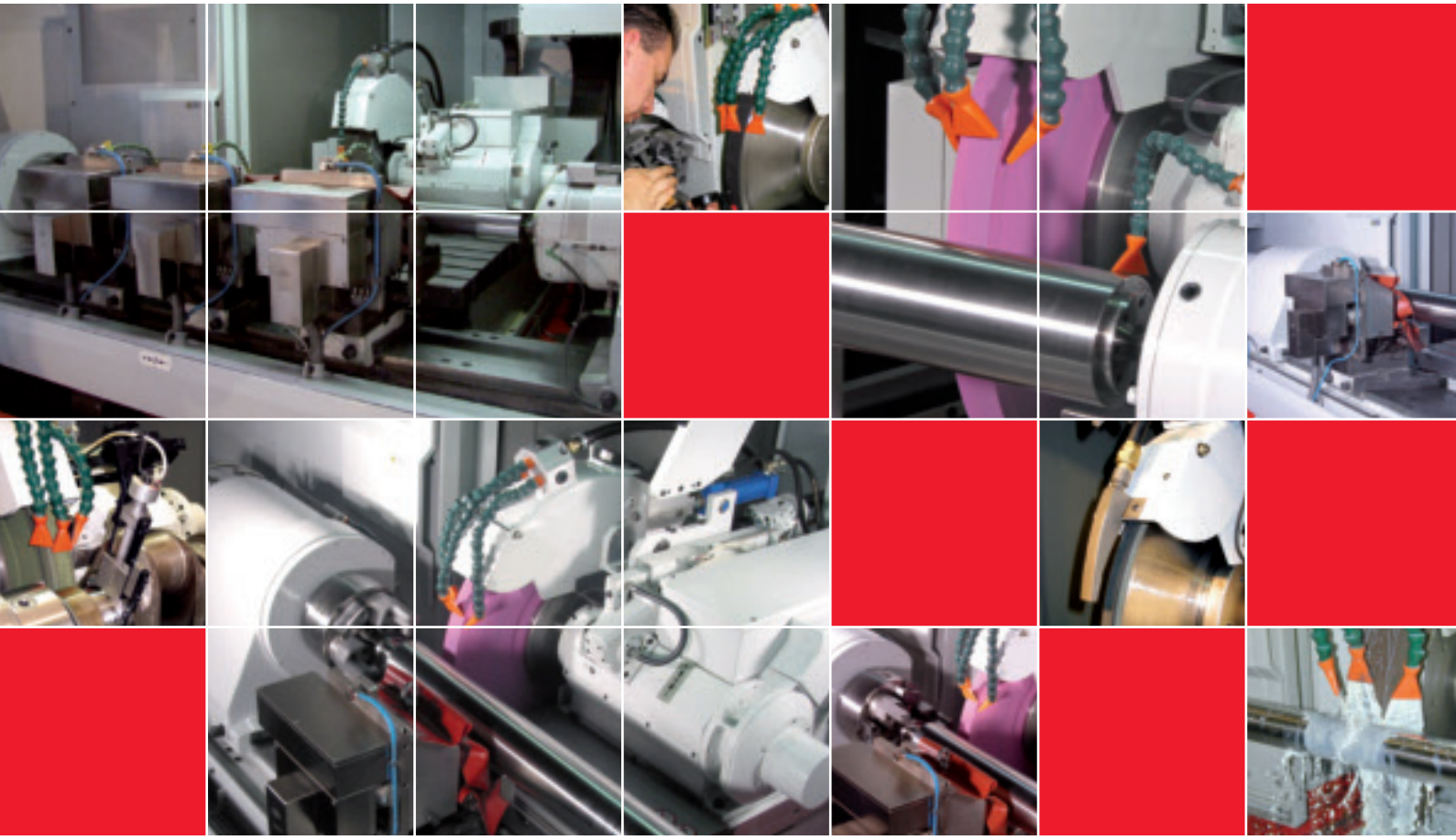
Lynx 2500

CNC roll grinder



A company of
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Technologies

BERCO S.p.A.




Berco

Moving Your Business Ahead

80 YEARS OF LEADERSHIP IN GRINDING

Berco has been designing and building high-quality grinders for over 80 years.
Their main characteristics are precision and reliability, characteristics that have satisfied more than 7000 customers all over the world.
Berco grinders are the natural choice for anyone looking for quality and productivity in the reconditioning and series production of rolls.
It is the high quality of the components manufactured day after day, together with the great quality of the grinders produced, that Berco has managed to gain a leading position in the grinding market.

GETTING THE BEST OUT OF YOUR GRINDER

Since 1920 Berco has been continuosly innovating and improving the performance of its grinders. Excellent quality materials, the optimisation and control of every stage of the production processes and the use of some of the best available technologies in the world guarantee the functionality and durability of Berco grinders.
High precision and greater reliability, together with machining flexibility, make it possible to obtain excellent roll grinding performance at lower operating costs.
At Berco, we call this “best grinding value”.

QUALITY DOWN TO THE FINEST DETAIL

It all begins at the design stage. The use of solid modelling and finite element analysis, combined with state-of-the-art software and electronics, is the basis for the development of all Berco projects .
Quality control to rigorous VISION2000 standards, professionalism in machine assembly and the willingness to implement new technologies that increase performance, but without losing sight of the time-honoured tradition and experience accumulated by a leading company in almost a century of activity: these are all

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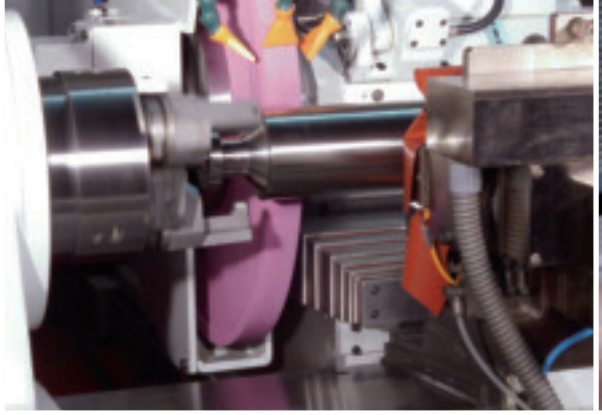
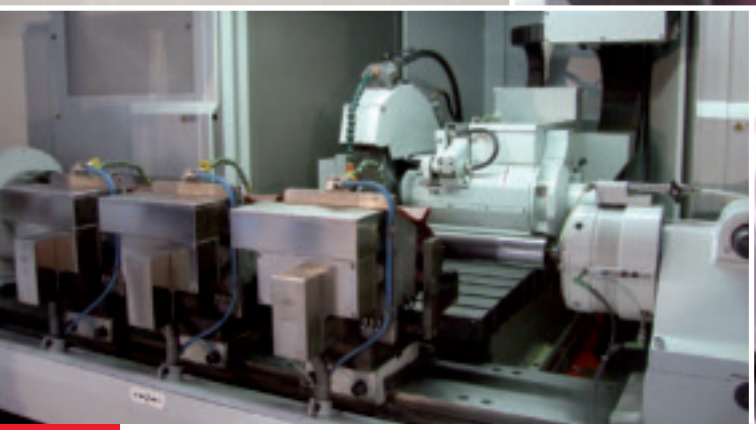
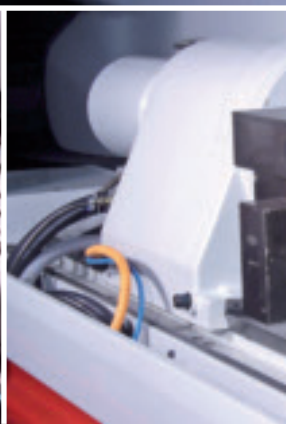
factors that combine to ensure that Berco machine tools will be capable of satisfying all your grinding needs for many years to come.
And it is all this that lies at the basis of the design and production of the Lynx 2500, a machine that is able to be both competitive and reliable in the complex global scenario of roll grinders.

A NEW GENERATION

Lynx 2500 is a new generation CNC roll grinder, devised to provide a simple, innovative and versatile answer to all roll reconditioning and series production needs. With production processes planned to the finest detail and the use of the very latest technology combined with the experience of specialist engineers who have been working for many years in this specific field, roll grinding has become simple, fast and reliable. With its high productivity and excellent value for money, the Lynx 2500 also ensures a fast and profitable return on the investment made.





AN INNOVATIVE MACHINE

Thanks to the numerical control and specific software, the Lynx 2500 is capable of both grinding cylindrical surface rolls and producing convex, polynomial, concave and conical-ended rolls, guaranteeing maximum grinding flexibility and the possibility of producing any kind of roll with great precision.
In particular, a series of features based on state-of-the-art technology guarantee the extremely high level of the products:

- The use of a LINEAR MOTION SYSTEM for the axis movement gives greater precision and incomparable rigidity, thanks to the elimination of clearance (that produces machining defects and reduces precision) and stick-slip, perennial problems in grinders with traditional transmission systems.
- The kind of excellent surface finish possible only with vibration-free grinding: for this reason Lynx 2500 grinders have DIRECT DRIVE motorised spindles on both the work and wheel heads, thus practically eliminating the vibration-related phenomena that jeopardise machining quality, so typical of belt-drive machine tools.
- An extremely flexible CNC allows the creation of programs based on the specific machining requirements of each workpiece, thus making it possible to cater for the needs of each individual customer.

VALUE ADDED IN EVERY PRODUCT

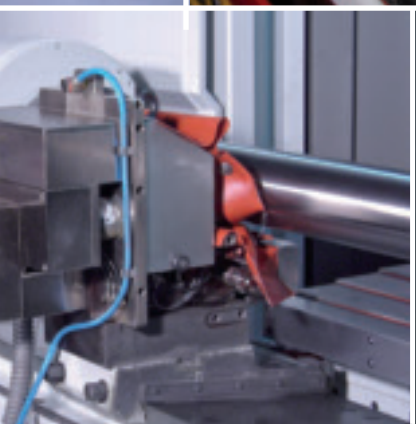
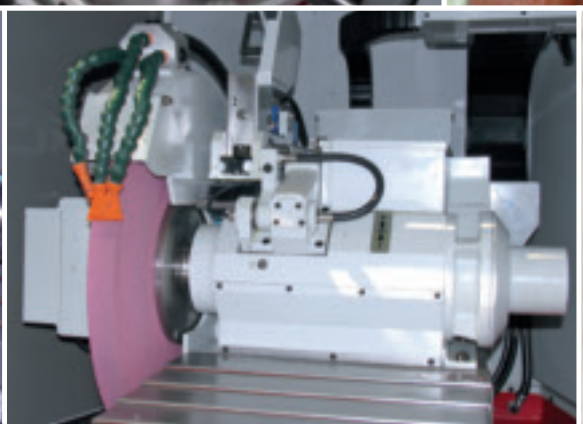
With its careful design and precision construction, the Lynx 2500 is able to machine rolls with production characteristics of total excellence, guaranteeing:

- excellent dimensional and form tolerances
- high precision roll contouring
- excellent surface finish
- great repeatability of results
- very tight machining tolerances
- better productivity and excellent value for money

Lynx 2500

CNC ROLL GRINDER



THE MOST FLEXIBLE SOLUTION FOR THE RECONDITIONING AND SERIES PRODUCTION OF ROLLS

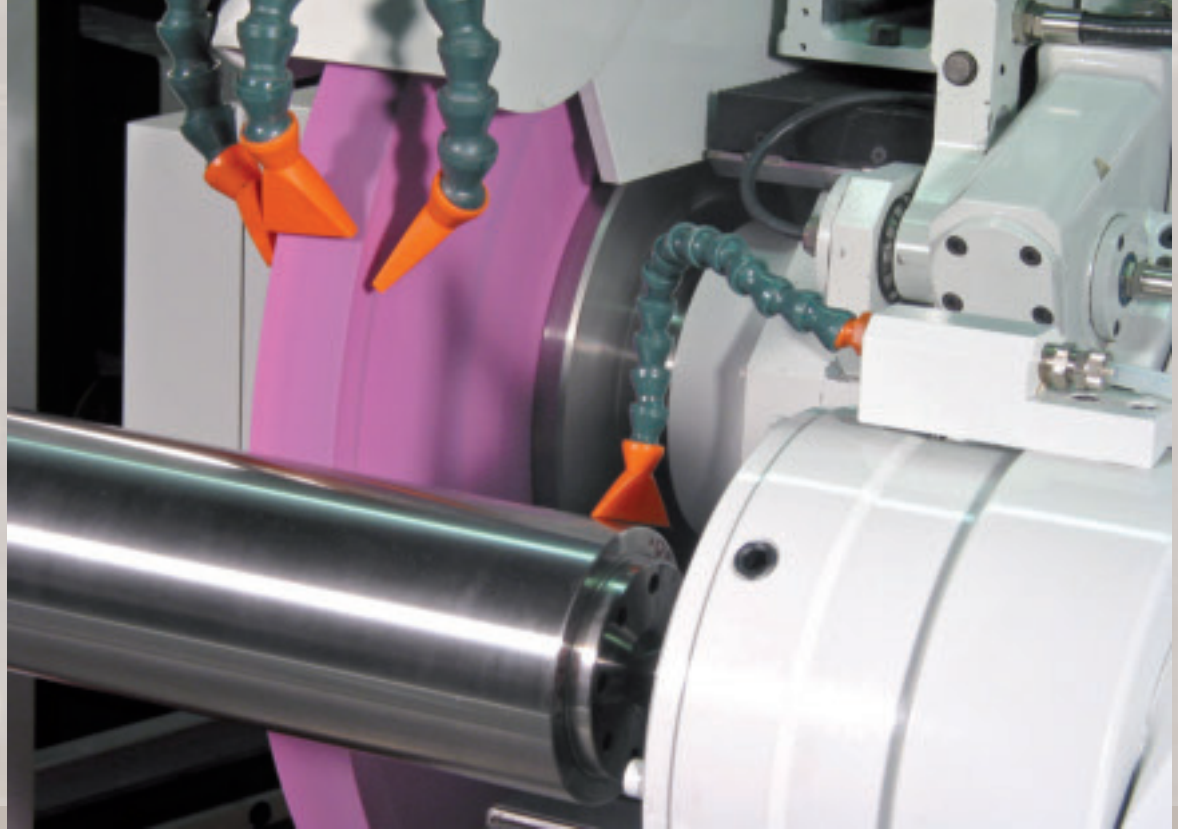
The Lynx 2500 is an extremely versatile and flexible roll grinding machine tool, thanks to the following incorporated solutions and technologies:

- highly intuitive operator-machine interface, extremely user friendly with descriptions of grinding cycle parameters
- easy control of grinding operations (no expert programmers required)
- extremely easy process changeover
- fast automatic setup
- easily integrable with external loading/unloading systems, gauging equipment, etc …

EXCELLENT PERFORMANCE/PRICE RATIO

A design style giving maximum priority to customer needs at all times has made it possible to create a machine tool that is extremely efficient from the cost point of view and yet which meets the demands of Berco's typically high quality standards. This approach has this made it possible to guarantee:

- extremely fast production times (single clamping)
- high cutting capacity
- high productivity
- more compact size
- minimised tooling costs
- lower investment: costs matched to the actual needs of the customer, who can decide to configure the machine tool to specific requirements



BASE

The Lynx 2500 was designed using sophisticated 3D modelling software and finite element analysis in order to maximise the rigidity of the cast iron base with high vibration damping capacity.

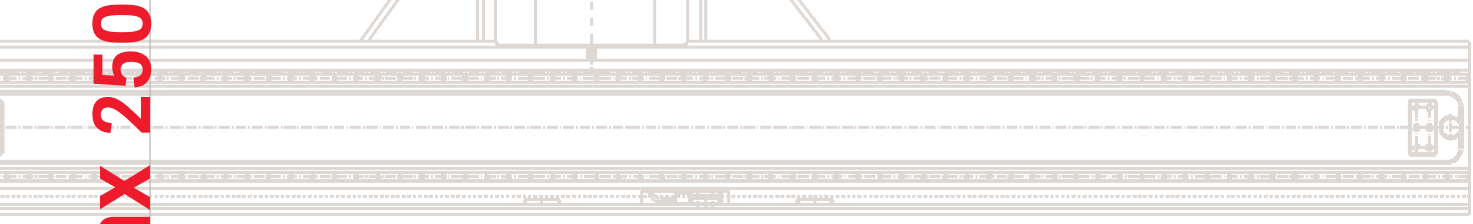
In order to guarantee greater roll machining precision, the Lynx 2500 incorporates:

- monolith cast iron base
- maximised vibration damping geometry
- highly sturdy, rigid framework
- base thermostat system ensuring high dimensional stability

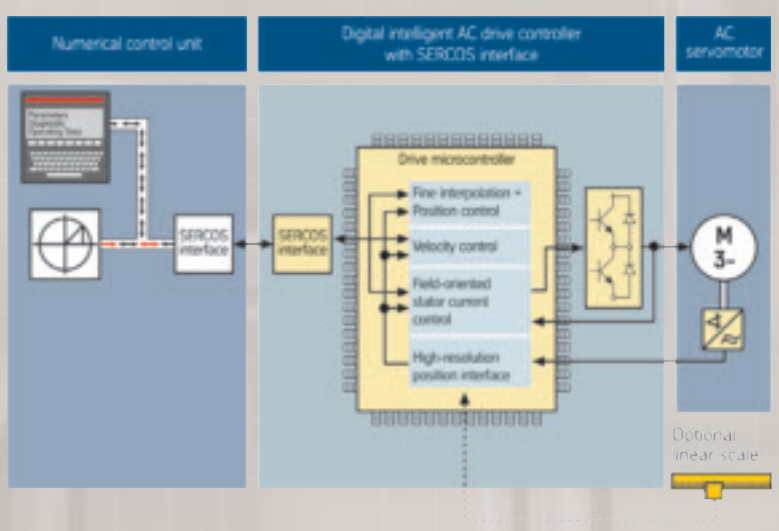
WHEELHEAD

The entire wheelhead structure has been conceived and designed to guarantee constant, reliable precision machining, with the following features:

- The Lynx 2500 has a direct drive wheelhead spindle, resulting in a more compact structure and greater dynamic rigidity thanks to the elimination of the transmission mechanisms featured in traditional designs.
- The Lynx 2500 has a fully automatic dynamic wheel balancing system and a vibration detection sensor. These features guarantee the best possible working conditions for the wheel at all times, thus ensuring greater accuracy in the finished item.
- The Lynx 2500 has a linear motion system for movement along the X axis. This gives improved precision and better transmission rigidity (linear direct drive), thanks to the elimination of the transmission mechanisms of traditional drive systems.
- The Lynx 2500 uses fully digital drive technology and has a linear encoder positioning system, guaranteeing excellent synchronisation and fast, accurate positioning.



STATE-OF-THE-ART TECHNOLOGY



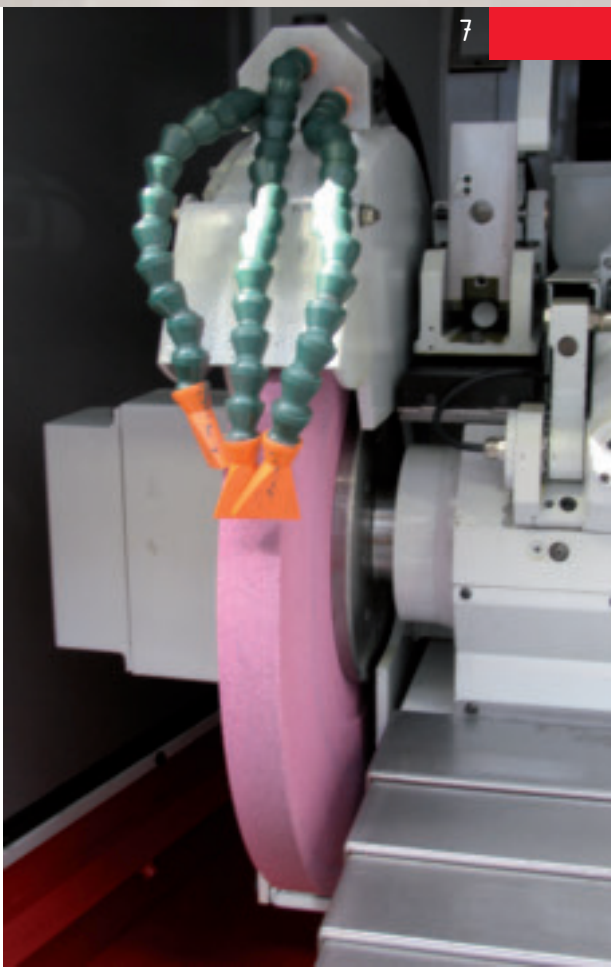
A numerical control and a Bosch-Rexroth servo system based on a SERCOS interface ensure a higher speed response and a high precision control of the wheel base feeding and spindle rotation and thus securing the perfect geometry of the ground components.

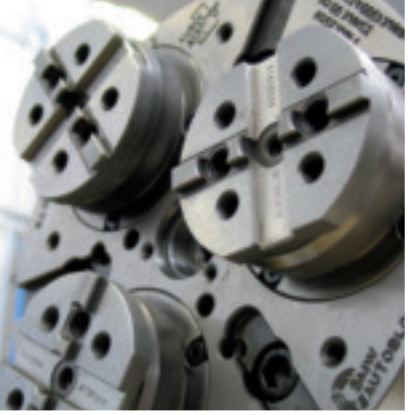
- The Lynx 2500 has liquid-cooled motorised spindles, guaranteeing excellent thermal behaviour..
- A linear encoder positioning system on the X axis guarantees a minimum command increment of as little as 0.1ìm

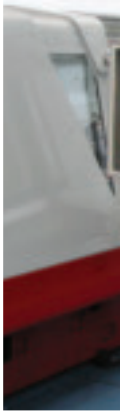
WHEELS

Depending on the surface to be ground and the kind of use, the Lynx 2500 can be tooled with different types of wheel, making it possible to match costs and performance to specific applications:

- conventional vitrified bond grinding wheels – surface speed up to 63 m/s – for grinding applications in which a higher material removal capacity is required.
- conventional “rubber” bond grinding wheels – surface speed up to 35m/s – for grinding rolls with the high quality surface finish (mirror finish) needed for stainless steel rolling mills.
- CBN grinding wheel – surface speed up to 120 m/s – for special customer application.








WORKHEAD

Like the wheelhead, the workhead has a series of technical features that ensure superior performance and guaranteed reliability.

- A perfect surface finish needs vibration-free grinding. For this reason the Lynx 2500 has a direct drive motorised spindle for rotating the workpiece. This technical solution gives structural compactness and high dynamic rigidity, thanks to the elimination of the mechanisms of traditional drive systems.
- Liquid-cooled motorised spindles guarantee excellent thermal behaviour..
- Spindles with manual and automatic clamping for all possible use requirements.

TAILSTOCK

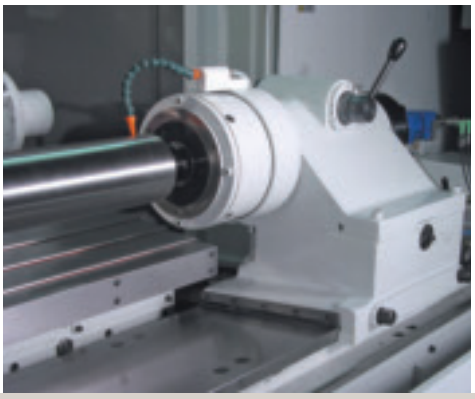
The tailstock too plays an essential part in the excellent performance of the Lynx 2500, featuring:

- optimum dimensioning and tightened clamping to the work-table, guaranteeing maximum rigidity
- the tailstock has a 50 mm stroke on the quill, making it possible to machine families of rolls without having to reposition.

WORK-TABLE

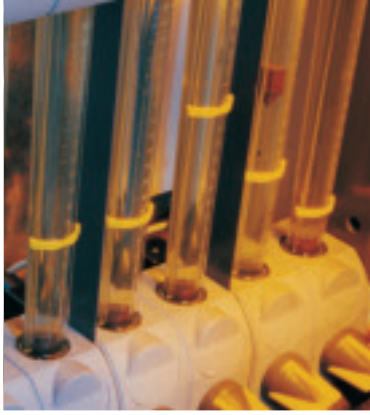
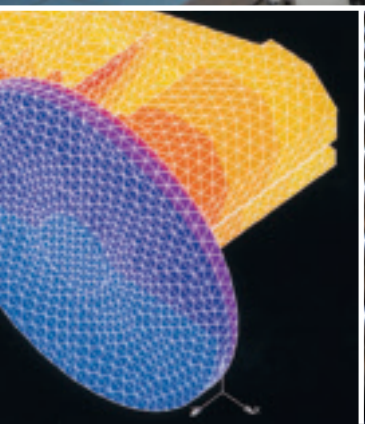
Innovative solutions were used in the design of the work-table too, including:

- Linear motion system for movement along the Z axis, giving excellent precision and greater transmission rigidity (LINEAR DIRECT DRIVE) thanks to the elimination of the

QUALITY DOWN TO THE SMALLEST DETAIL



mechanisms of traditional drive systems and the errors resulting from the clearance in the traditional mechanisms and the wear of the moving parts.

- Fully digital technology and a positioning system using linear encoders ensure excellent synchronisation characteristics, accurate positioning and rapid work-table movements.

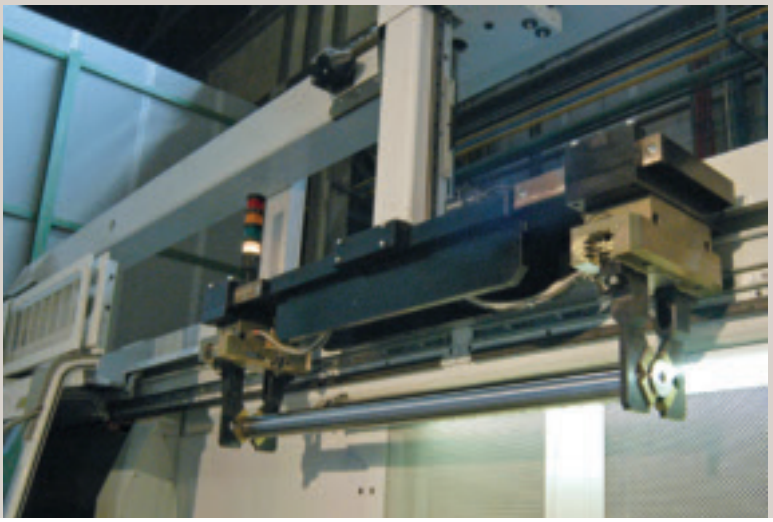
AUTOMATIC STEADY RESTS

The Lynx 2500 uses steady rests fitted with force transducers, which automatically keep a constant pressure on the workpiece pads, preventing it from bending with the thrust of the wheel. This system guarantees:

- a better surface finish
- constancy in grinding results
- the absence of shape errors from the bending of the roll
- reduced work times

CRACK DETECTION SENSOR

In order to ensure that the machined rolls are in an integral state and ready for use , a sensor can be fitted in the grinder to check for the presence of cracks in the roll. This eddy current sensor is able to detect surface cracks , allowing the continuous monitoring of the surface state of the roll, even during the actual grinding process, with the stopping of the process when a defect is discovered.



ROLL FORM GAUGE

A gauge can be installed in the Lynx 2500 that is capable of measuring both the dimensions and form of the roll. This gauge is extremely flexible and allows the measurement of any diameter within a set range, guaranteeing high precision within the entire measurement range.

The device can also be used for checking the roundness, linearity and crown before, during and after the grinding of the roll (in-process and post-process measurement).

LOADING/UNLOADING: IT'S NEVER BEEN SO EASY

To simplify and speed up the difficult tasks of loading and unloading the workpieces on and off the machine, the Lynx 2500 can be equipped with an automated loading/unloading system. This accessory, which is flexible and easily adaptable to the machine's specific working environment, can be of great help in increasing the performance of the Lynx 2500. The loading/unloading system can be designed and built to fit with the customer's specific operational needs.

CONTROL UNIT

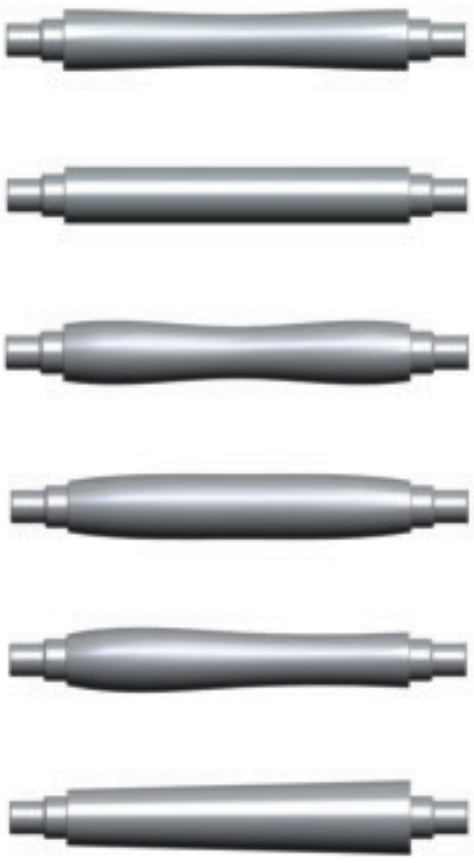
To make the best of the multiple features and innovations of the Lynx 2500, a simple, user-friendly control and programming unit is available for the grinder:

- easy, intuitive program input via keyboard or disk
- background program editing, guaranteeing higher productivity
- ergonomic, intuitive layout of controls allowing the efficient running of the machine
- the portable PCU terminal makes it easy to control the machine from right next to where the grinding takes place, working in total safety

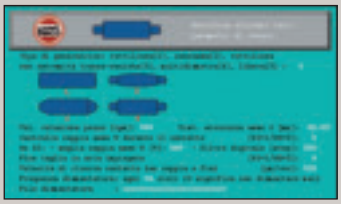
CONTROL AND OPERATION

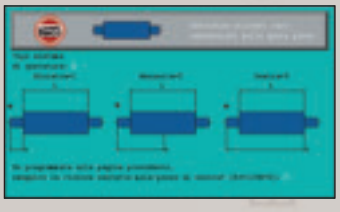
PROGRAMMING AND GRINDING CYCLES

Machining has never been so simple, accurate and flexible as with the CNC used by the Lynx 2500: the interpolation of the wheel axis (X) and work-table axis (Z) gives extreme grinding flexibility, making it possible to produce complex roll surfaces that would otherwise have been unattainable: the Lynx 2000's capacity for adaptation and machining flexibility, in fact, make it possible to grind not only cylindrical structures but also concave, convex and non-symmetrical structures with absolute precision, without having to revert to costly toolings, complex programs or tool changes. Furthermore, the man-machine interface is extremely intuitive and user-friendly, using parameter-based cycle descriptions and guaranteeing easy control of the grinding operations with no need for expert programmers.



Examples of roll surfaces obtainable using Lynx 2500





Interface for grinding data-input of rolls

SAFETY DEVICES

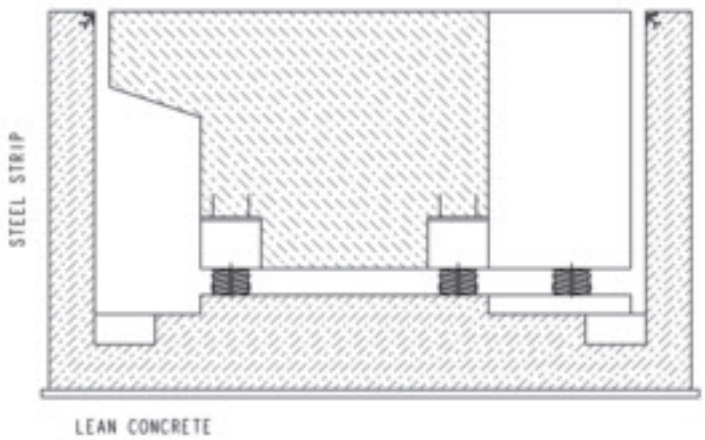
Nowadays, more than ever, the working environment around a machine tool has to be totally safe, both for the operator and for the machine itself, and machine tools have to be self-monitoring in order to avoid unnecessary and costly breakdowns. All the devices implemented on the Lynx 2500 have been conceived to avoid reducing the machine's potential and production capacity whilst at the same time guaranteeing maximum operating safety:

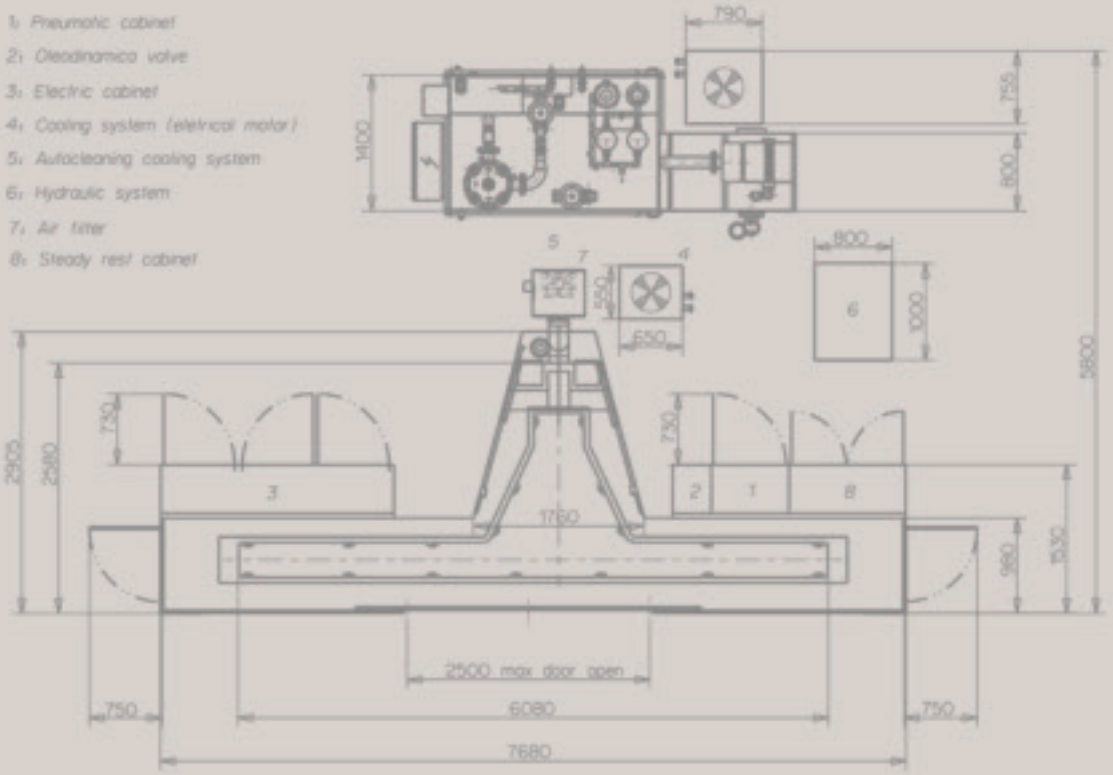
- An electronic touch detector that constantly monitors the level of contact between the grinding wheel and the workpiece and a grinding diamond dressing to reduce downtimes to a minimum. This instrument also has a safety detection function.
- The wheel spindle incorporates a load sensor that generates an overload situation if the load limits are exceeded and causes an emergency stop.
- Two sliding front doors completely enclose the machining zone during the grinding.
- During the loading/unloading operations (when the two front doors are open), two sliding panels automatically close off the work zone to protect the operator from the grinding wheel, which continues rotating.
- The Lynx 2500 has been designed in full compliance with the CE Standards and EMC Directives governing the construction of machine tools.

Cold-rolled-inox steel coils obtained using rolls ground by Lynx 2500

FOUNDATION

On customer request, the Lynx 2500 can be installed on suspended mass foundation (inertia block) specially designed to isolate the grinder from vibrations and interference from surrounding environment.





AFTER-SALES SERVICE

When you invest in a Berco grinder, a fast, skilled and efficient after-sales service is activated that stays with both investor and operators throughout the entire life of the machine tool. Qualified engineers are available to solve any problems that might arise and an efficient logistics system is able to trace replacement parts from anywhere in the world, with speed and precision.

MAINTENANCE

Berco is able to offer its customers all the tools necessary to keep their roll grinder working efficiently, thus lengthening its life and increasing its productivity.
For this purpose:

- Accurate and precise instruction manuals describing the functioning of the machine tool.
- The machine tool parts are easily accessible, making maintenance and/or replacements of all components easier.
- Berco sees maintenance as an important factor right from the machine tool's design stage, always trying to simplify maintenance jobs with intuitive procedures and, wherever possible, modular structures.

LEADERSHIP IN ENVIRONMENTAL DEVELOPMENT

Not only does Berco care for its customers, providing them with quality machine tools built with processes certified to the ISO9001 Standard since 1991 and to the Vision 2000 Standard since 2002, but it also cares about the environment.
Since January 2000, in fact, Berco has had ISO14001 certification and has been applying strict environmental care standards and procedures to the whole of its production process.
A precise strategy has been drawn up which is matched against preset targets on a day-by-day basis.

WE CARE

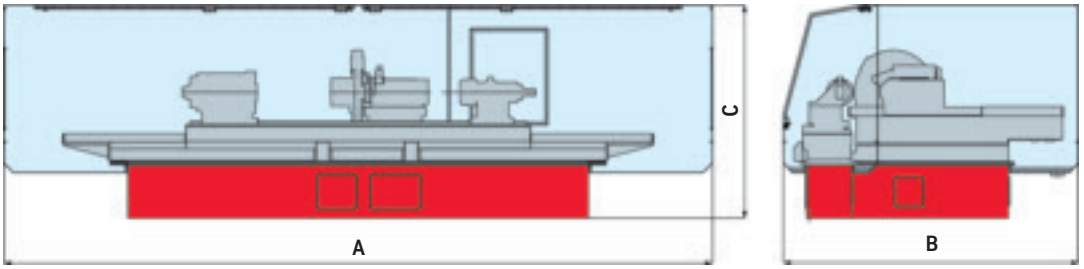


Fig. 1

MAIN CHARACTERISTICS

Max grindable diameter, cylindrical grinding	mm	300
Max rotating diameter on work-table	mm	300
Max grindable length	mm	2500
Max distance between centres	mm	2600
Max weight permitted on centres	kg	400 (*)
Height of centres on work-table	mm	270
Tailstock stroke	mm	50
Capacity of automatic steady rests	mm	45÷180
Diameter of spindles	mm	180/210

(*) 1000 kg with fixed steady rests (optional)

WHEEL HEAD (W AXIS)

Axis drive		INTEGRATED MOTOR SYSTEM
Motor power	kW	25
Wheel max surface speed	m/s	63
Wheel max diameter	mm	660
Wheel width	mm	20÷80
Automatic balancing system		Programmable

WHEEL HEAD (X AXIS)

Axis drive		LINEAR MOTOR SYSTEM
Stroke	mm	490
Max speed	mm/min	15000
Measuring device		Linear encoder
Min increment	mm	0.0001

WORK-TABLE (Z AXIS)

Axis drive		LINEAR MOTOR SYSTEM
Max speed	mm/min	15000
Measuring device		Linear encoder
Min increment	mm	0.0001

WORKHEAD (C AXIS)

Axis drive		INTEGRATED MOTOR SYSTEM
Torque	Nm	250
Spindle rotation speed	rpm	1 ÷ 1000
Measuring device		Encoder
Min increment	degrees	0.0001

ACCESSORIES

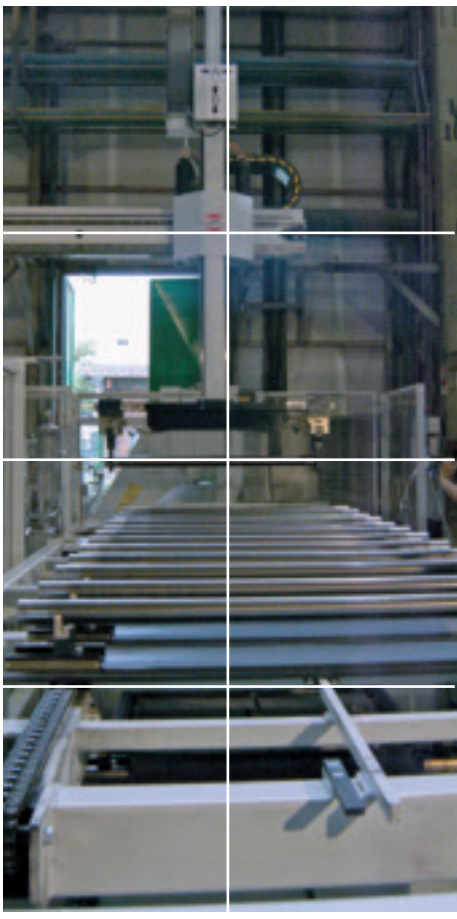
Gauge (dimensions and form)	In-process
Crack detection device	In-process
Filtration system	Self-cleaning, emulsified water

MACHINE WEIGHT AND DIMENSIONS

Length A (see fig.1)	mm	7680
Depth B (see fig.1)	mm	2580
Height C (see fig.1)	mm	2100
Weight	kg	20000

TECHNICAL SPECIFICATIONS

00609.WM202GB000



ISO 9001 Cert. n. 0029/4

ISO 14001 Cert. n. 0009A/2

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