

**HIGH-PERFORMANCE
NECKING-IN
TECHNOLOGY**



LEIFELD METAL SPINNING AG

Long Term and Trustful Cooperation

- ▶ The confidentiality of our clients plans and data is most critical. Leifeld rigorously applies organizational separation of teams working for competitors as well as several other rules **to protect the confidentiality of all client information.**
- ▶ Similarly, our industry is very competitive and we regard our approaches and insights as proprietary. Therefore, we look to our clients **to protect Leifelds interests in our presentations, methodologies and techniques. Under no circumstances** should this material be shared with any third party, including competitors, **without the written consent of Leifeld Metal Spinning.**

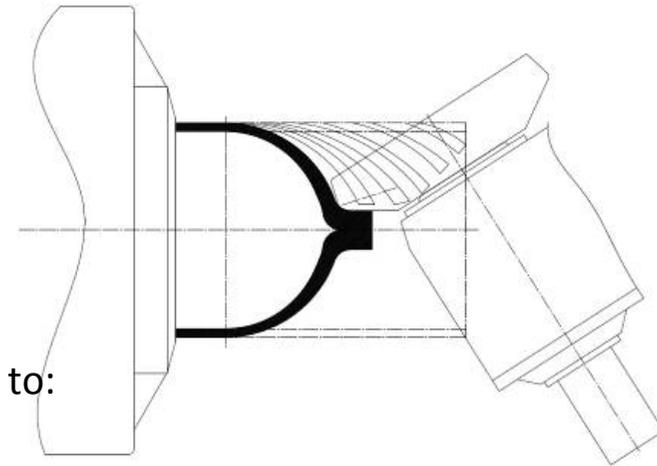


CHIPLESS SPINNING AND FLOW-FORMING TECHNOLOGY

Necking-In – Warm Working of Tube Ends

TECHNOLOGY

- ▶ Preform: Tube, preform
- ▶ The principle of necking-in:
 - ▶ Clamped preform with a jaw chuck
 - ▶ The working roller on the swinging rest works the ends of the rotating workpiece to:
 1. a gastight cylinder bottom or
 2. a bottleneck



HISTORY

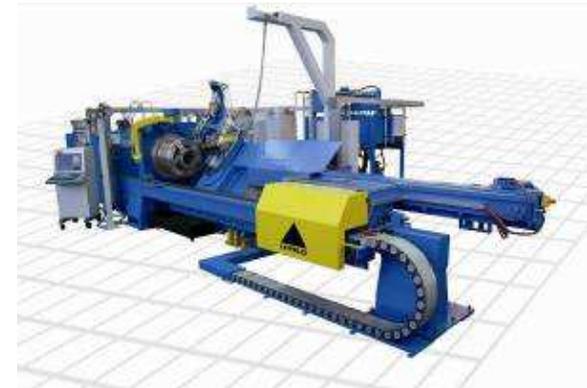
- ▶ Leifeld has pioneered, systematically advancing and perfecting necking-in with a swinging rest
- ▶ Origin in spinning technology

EN SERIES

The World's Most Sold Necking-in Machine

PERFORMANCE FEATURES

- ▶ Warm working on tube ends
- ▶ Necking-in of cylinder bottoms and necks
- ▶ Gastight cylinder bottoms
- ▶ Advanced CNC controls
- ▶ Coding with simulation
- ▶ Simple handling, short training times
- ▶ Selective wall thickening of critical areas
- ▶ Flexible adaptability to variations in workpiece size

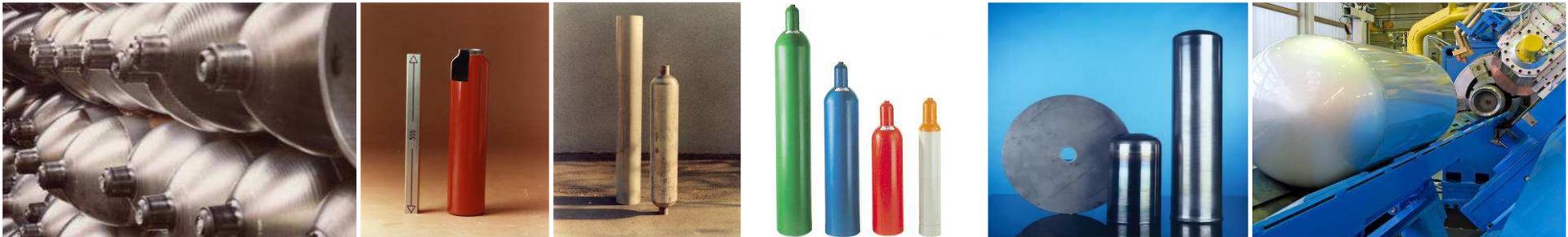


EN SERIES

The World's Most Sold Necking-in Machine

BENEFITS

- ▶ The world's most sold necking-in machine
 - ▶ 35 years know-how due to good and stable customer relationship and continual improvement processes
 - ▶ High investment protection
 - ▶ Robust machine design
- ▶ Cost-efficient manufacturing
- ▶ Production process reliability
- ▶ Short cycle times due to efficient loading and unloading time
- ▶ High freedom of material-flow design



EN SERIES

The World's Most Sold Necking-in Machine

BENEFITS

- ▶ Forming of flat tops results in high space utilization degree for CNG cylinders
- ▶ Fast acceleration of main spindle
- ▶ Short set-up times
- ▶ Long service life of machines
- ▶ Low maintenance costs
- ▶ High feed rates of forming axles guarantee short cycle times and highest quality



APPLICATIONS OF EN MACHINE

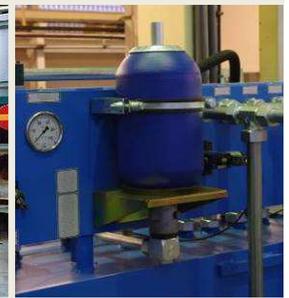
From Industrial Gas Vessels to Natural-Gas Cars

BRANCHES

- ▶ Automotive Industry
- ▶ Scuba Diving
- ▶ Engineering
- ▶ Gas industry
- ▶ Health industry
- ▶ Beverage industry

PRODUCTS

- ▶ CNG cylinders
- ▶ High-pressure gas cylinders
- ▶ Accumulators
- ▶ Transport and storage container
- ▶ Scuba gas cylinder
- ▶ CO² gas cylinder

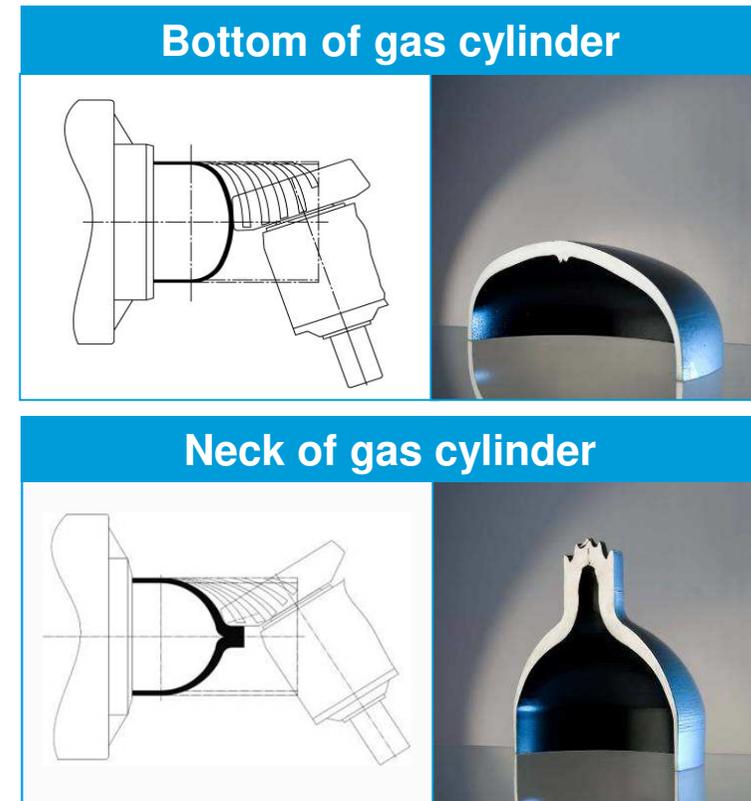


APPLICATIONS OF EN MACHINE

From Industrial Gas Vessels to Natural-Gas Cars

PRODUCTION PROCESS NECK AND BOTTOM OF A GAS CYLINDER

- ▶ Technology: Necking-in
- ▶ Preform: Tube
- ▶ Material: 30 Cr Mo 4
- ▶ Roller: 1 Necking-in roller



EN SERIES

At a Glance EN 200 – EN 700/600

	EN 200 (only Alu)	EN 300	EN 500	EN 600/400
Outer diameter (min)	75 mm	75 mm	100 mm	200 mm
Outer diameter (max)	204 mm	204 mm	275 mm	412 mm
Wall thickness of preform (max)	5 mm	6 mm	13 mm	15 mm
Wall thickness of preform (min)	-	-	2 mm	3 mm
Length of preform	1500 mm	1500 mm	2000 mm	3000 mm
Main spindle power	50 kW	70 kW	110 kW	132 kW
Hydraulic power	18,5 kW	45 kW	75 kW	90 kW

EN SERIES

At a Glance EN 200 – EN 700/600

	EN 600/440	EN 600/480	EN 700/600
Outer diameter (min)	230 mm	270 mm	380 mm
Outer diameter (max)	442 mm	480 mm	680 mm
Wall thickness of preform (max)	15 mm	19 mm	40 mm
Wall thickness of preform (min)	3 mm	3 mm	10 mm
Length of preform	3000 mm	3.300 mm	3.500 mm
Main spindle power	132 kW	132 kW	260 kW
Hydraulic power	100 kW	100 kW	160 kW

EN SERIES

EN 600/400 CNC



YOUR CONTACT TO LEIFELD METAL SPINNING AG



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