



HIGH EFFICIENT MANUFACTURING OF PULLEYS IN VERTICAL DESIGN

LEIFELD METAL SPINNING AG

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- ▶ 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.**



VERTICAL PFC SERIES

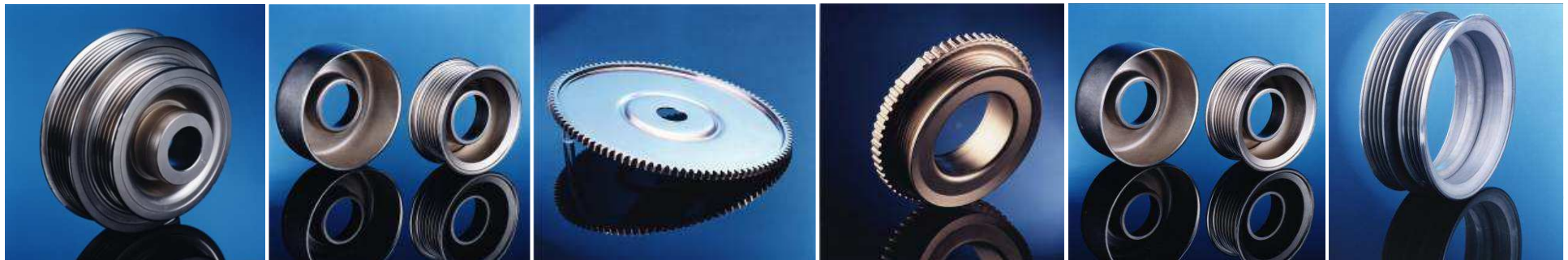
Highly Efficient Manufacturing of Drive Units

PRODUCTS

- ▶ Toothed belt disk
- ▶ Poly-V belt pulleys
- ▶ Starter rims

APPLICATIONS

- ▶ Trucks
- ▶ Passenger Cars
- ▶ Construction machinery
- ▶ Agricultural machinery
- ▶ Utility vehicles



APPLICATION EXAMPLES

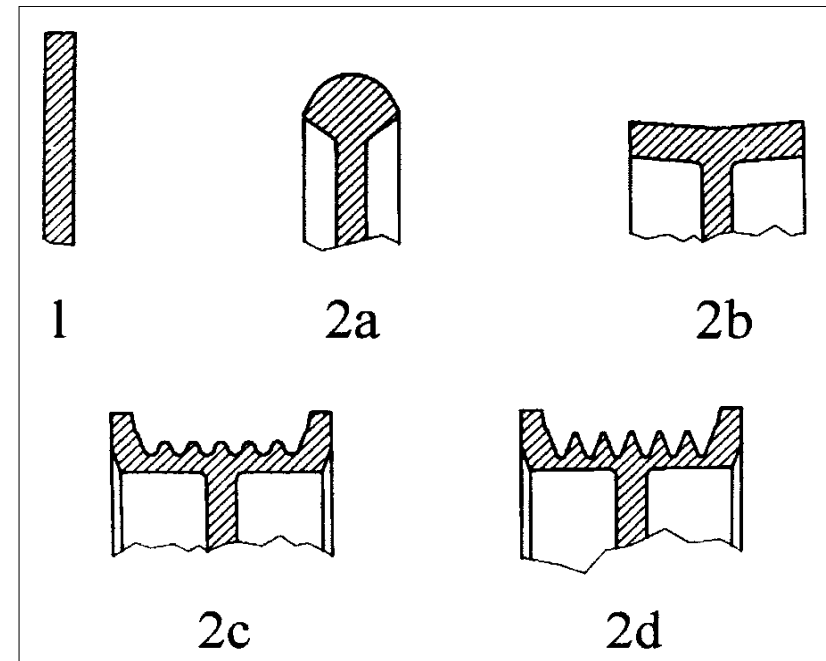
Poly-V-Pulley Produced by Collapsing

BENEFITS

- ▶ Manufacturing from one piece
- ▶ High surface quality
- ▶ High precision in run-out

MANUFACTURING PROCESS

- ▶ Starting from a flat disc blank for compressing symmetrical pulley
- ▶ Preform: Blank
- ▶ Material: Steel, Mild-Steel



APPLICATION EXAMPLES

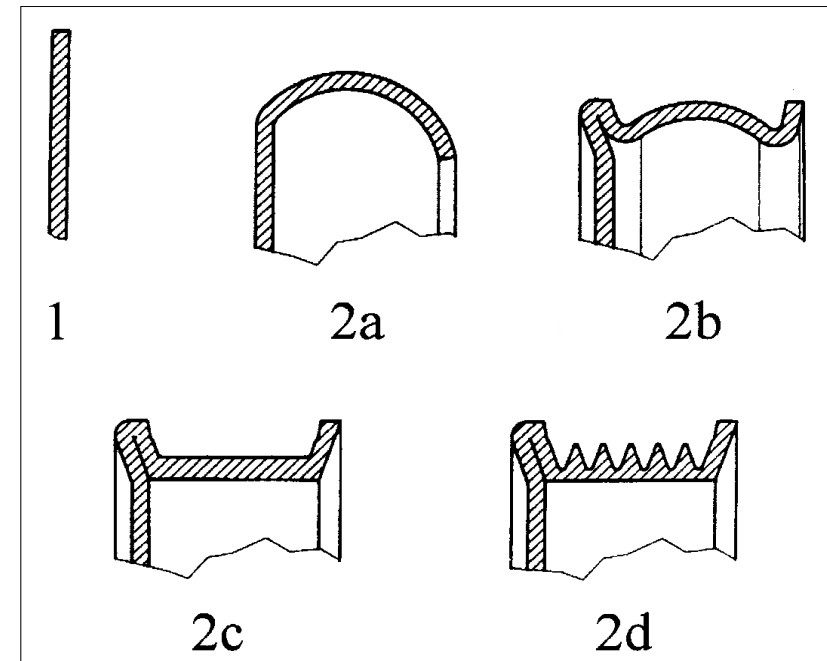
Poly-V-Pulley Produced by Curling

BENEFITS

- ▶ Manufacturing from one piece
- ▶ High surface quality
- ▶ High precision in run-out

MANUFACTURING PROCESS

- ▶ Starting from a flat disc blank for 'curling' a non-symmetrical pulley
- ▶ Preform: Blank
- ▶ Material: Steel, Mild-Steel



APPLICATION EXAMPLES

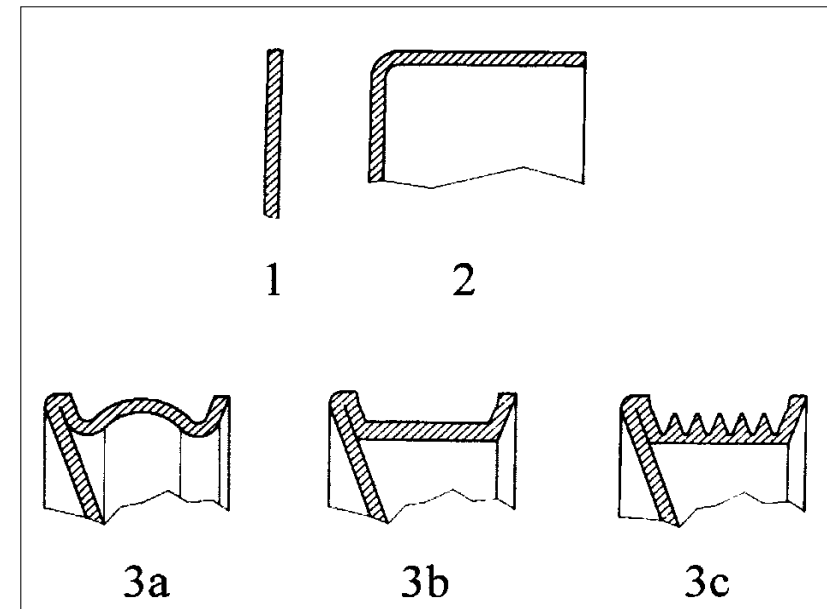
Poly-V-Pulley Produced from a Cup

BENEFITS

- ▶ Manufacturing from one piece
- ▶ Shortest cycle times
- ▶ High surface quality
- ▶ High precision in run-out

MANUFACTURING PROCESS

- ▶ A combination of deep-drawing and profiling process
- ▶ Reform: Cylindrical Cup
- ▶ Material: Steel, Mild-Steel



APPLICATION EXAMPLES

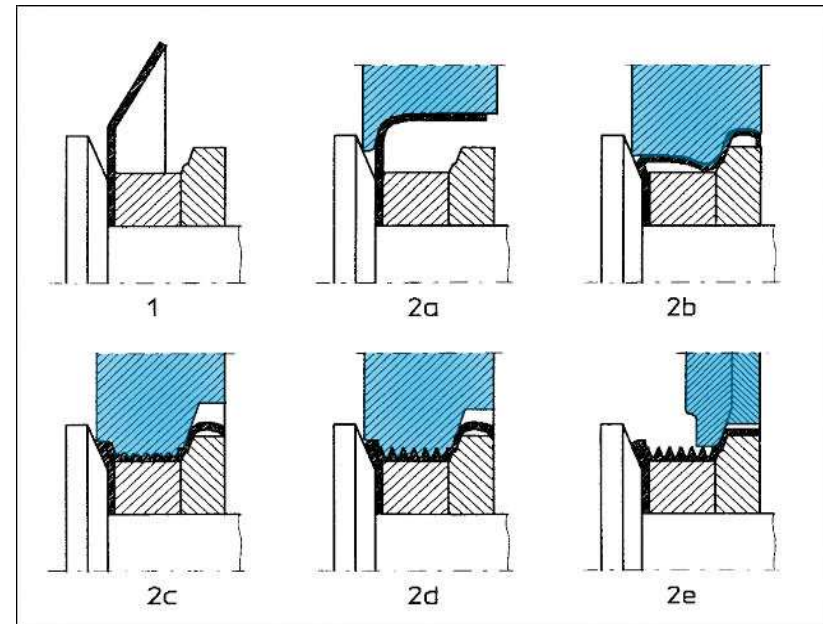
Poly-V-Pulley with Integrated Sensor Wheel

BENEFITS

- ▶ Manufacturing from one piece
- ▶ High precision in run-out
- ▶ Perfect concentricity between poly-V area and sensor wheel

MANUFACTURING PROCESS

- ▶ Combination of profiling process and tothing in one clamping
- ▶ Preform: Blank
- ▶ Material: Steel, Mild-Steel



COMPETITIVE ADVANTAGE IN DRIVE ENGINEERING

Leifeld – a Pioneer in Profiling Technology

HISTORY OF DEVELOPMENT

Beginning of the seventies: First trials of a vertical edge processing machine for profiling:
The **VRM** followed by the **VK 1** in the beginning of the eighties



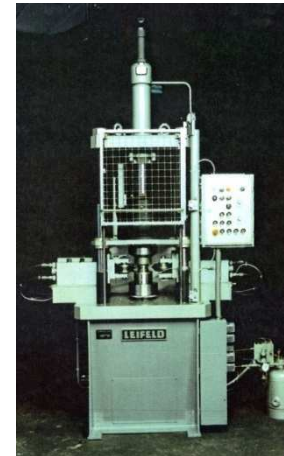
Late Eighties: Profiling machine with a turret:
HK 60



Late Nineties: Newly developed horizontal
PFC 1T



2011: New vertical high-performance
PFC-Concept and a second generation HK 60

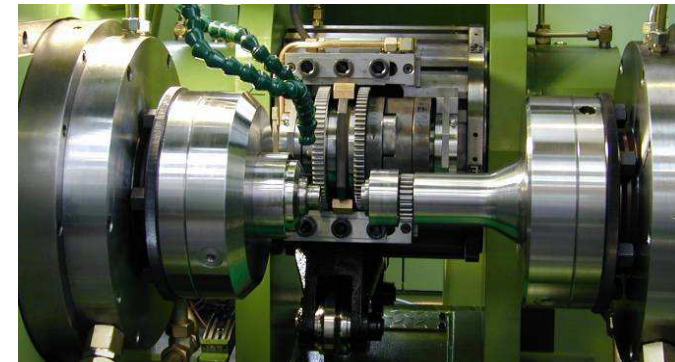
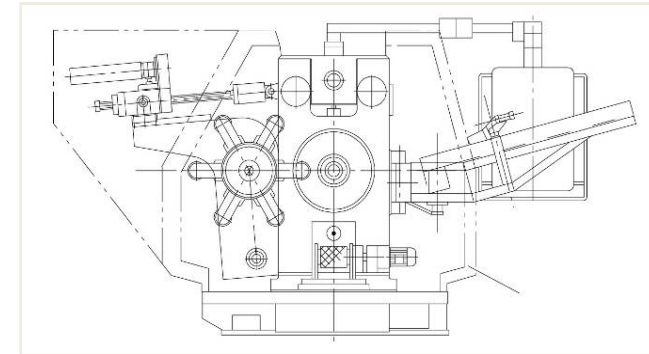


LEIFELD HISTORY OF PROFILING

Machine HK 60 CNC and PFC 316 1 T

HISTORY

- ▶ Horizontal (H) Profiling Machine for manufacturer of pulleys
- ▶ Equipped with 6 station tool turret for profiling rollers
- ▶ Main and tailstock spindle driven by frequency controlled and maintenance free 37kW AC motors
- ▶ Full automatic part loading and unloading integrated
- ▶ Option for online diagnostic system



MACHINE HK 60 CNC

Profiling with Power and Precision

BENEFITS

- ▶ More than 50 machines world wide in service
- ▶ Extremely long life time, improved by many satisfied customers
- ▶ Maximum flexibility
- ▶ Short cycle times
- ▶ Free access to work area
- ▶ Fast an easy tool change
- ▶ Integrated raw-part loading system
- ▶ Integrated workpiece unload



VERTICAL PFC SERIES

Highly Efficient Manufacturing of Drive Units

PERFORMANCE FEATURES

- ▶ Manufacturing of high precision drive units
- ▶ Flexible part processing in one clamping
- ▶ High equipment availability, energy-efficient manufacturing
- ▶ Flexible integration in existing production processes
- ▶ Substitution of devices
- ▶ Programming using display menu
- ▶ Easy access to working area



VERTICAL PFC SERIES

Highly Efficient Manufacturing of Drive Units

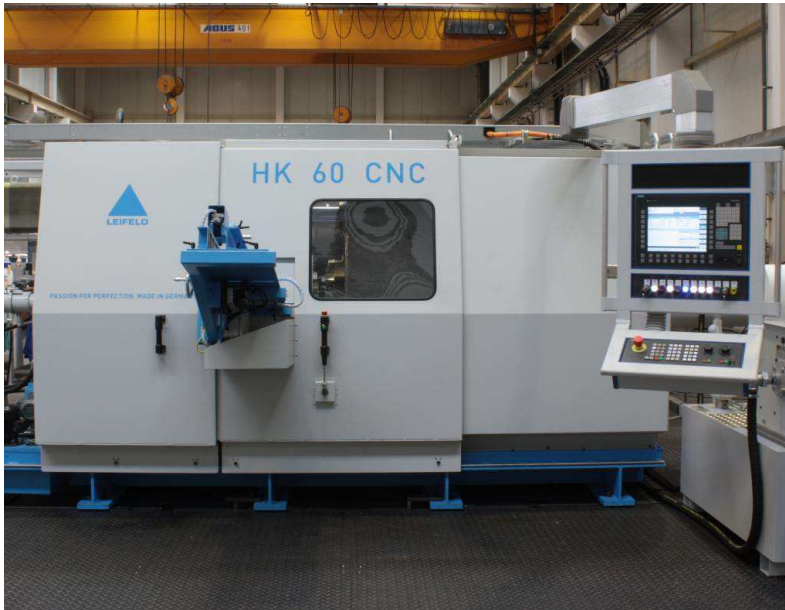
BENEFITS

- ▶ Only short cycle time loss as rollers are transported in pairs and individually
- ▶ Radial and rotational movement of rollers by servo-controlled CNC axis
- ▶ Main and tailstock spindle driven by master-slave coupled AC drives with very powerful 51 kW each (2x51 kW)
- ▶ Raw part loading by integrated high speed and CNC-controlled loading system from front side



COMPARISON OF MACHINES

HK 60 vs. PFC



HIGHLY EFFICIENT PRODUCTION OF DRIVE COMPONENTS

Comparison of the Differnet Machine Series

	HK 60	Vertical PFC Series	Vertical PFC VA...
Concept	Reliable and cost-effective	Brand-new and flexible	Brand-new and flexible
Tool Changer	1 Turret	2 x 135 ° Tool turret	1 x 135 ° Tool turret + 1 x Special Support
Number of Rollers max.	6 Rollers	2 x 4 = 8 Rollers	(1 x 4) + (1 x 1) = 5 Rollers
Application Range Rollers	Successively deployable	Simultaneously deployable	Simultaneously deployable
Outer Diameter max.	250 mm	320 mm	320 mm
Radial Force max.	200 kN	200 kN	200 kN
Tailstock Drive	37 kW	51 kW	51 kW
Main Spindle Drive	37 kW	51 kW	51 kW

YOUR CONTACT TO LEIFELD METAL SPINNING AG



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