

REDEFINING PRECISION IN SURFACE FINISHING



Lapping/Polishing/Job Order Production/Service

Single-wheel lapping and polishing machines

Precision Processing

PETER WOLTERS

System Solutions in Perfection –
Highest Precision for all Materials and Branches

Into the Future with PETER WOLTERS

PETER WOLTERS is a worldwide leading supplier of high precision machine tools and systems for fine grinding, lapping and polishing of flat work pieces. The PETER WOLTERS product range is completed by grinding and deburring finishing systems specially developed for grinding, high-precision deburring and additional surface optimisation of fine-ground and punched work pieces.

As a technological key player and driving innovative force, we are sought after wherever the highest demands on *surface quality, parallelism, flatness and precision* must be met economically. "Made by PETER WOLTERS" has long since become a renowned seal of approval on our international markets.

Single-wheel machine
3R-1200



Two-wheel fine grinding machine
AC 1000-F



Tailor made solutions for all applications

Our systems are suitable for virtually unlimited applications, from metal, semiconductor, ceramic, plastic or glass industries. PETER WOLTERS systems can be adopted for nearly all materials. As a result you can fine-grind, lap, hone or polish:

- **Semiconductors:** Semiconductors: Silicon, silicon carbide, germanium, gallium-arsenide, gallium-nitride, lithium niobate, lithium tantalate (i.e. wafer, rigid discs, SOI-carriers)
- **Metals:** Steel, sinter metals, hard metals, brass, bronze, aluminum and cast iron (i.e. parts for diesel injection systems, hydraulic pumps, precision bearings, slitter knives, carbide tips)
- **Glass – Quartz – Sapphire:** (i.e. Sensors, condenser lenses, integrator plates, color cubes, photo-masks, optical glasses and filters, oscillators)
- **Ceramics:** Aluminum oxides, silicon nitrides, silicon carbide, piezo-ceramics, aluminum nitride, zirconium (i.e. valve parts, seals, high performance bearings, ceramic tips)
- **Special Materials:** Silicon, carbon, plastics, ferrite and magnetic materials (i.e. seals, valve and pump parts, electronic components)

Job Order Production in Perfection :

Economic, Flexible and of Highest Precision –
Lapping, Grinding and Polishing by the Specialist

Who could process your work pieces better than PETER WOLTERS? We can rely on unrivalled **experience** and **know-how** from a great number of industrial sectors, from made-to-order and series production, from small shops as well as large international enterprises. This constitutes expert knowledge we incorporate into our service solutions and products tailored to our customers' needs.

No matter whether you are from the metalworking, the electronics, the ceramics, the plastics or the glass industry. We carry out high quality lapping, honing, deburring and polishing work for you on **single and two wheel machines**.



We're here to help you:

- Development of series processes/production of sample parts/reduction of production peaks/bridging of delivery times
- Process documentation: Application and test reports, process data recording (PDR)
- Documentation of measured values, measuring protocols: Thickness tolerance, flatness, surface, parallelism, edge rounding, digital microscopy
- Statistical evaluations: Machine capability, process capability



PETER WOLTERS First Class Service Sets Standards

Providing first class support, we offer our customers tailored service solutions and products – throughout the entire life of the machine for the highest machine availability and productivity. All of this is supported by our worldwide network of highly qualified technicians and service specialists.

Supply of Consumables and Spare Parts

We provide CBN and diamond fine-grinding wheels, grinding spindles and quills, lapping, honing and polishing wheels, work piece carriers, lapping and polishing compounds, deburring tools, polishing pads, and complete spare parts programs.



Maintenance / Repair / Application Engineering

From repairing a single machine to complete support: Our tailor-made inspection, maintenance and full service packages including our worldwide service network and the **RangeCare®** online support system to ensure optimum care for and availability of your machines.

Training

PETER WOLTERS offers a comprehensive range of individual training modules and on-demand training for users; either in our training center or on site at the customer's location.

PETER WOLTERS Grinding Center

As the leading specialist for high-precision processing, we can undertake the finishing of your work pieces, for example in the production of pilot parts for pre-production evaluation at your customer, as support during peak-period demand, or for the production of prototypes: fine grinding, thru-feed grinding, deburring, cleaning, measuring, and packaging.

The product line of ...

3R-380:

Tabletop machine for smaller work pieces and small series of individual parts. The 3R-380 is also available with a stand as option.

3R-380



3R-600



Technical Data

Machine Type	3R-380	3R-600	3R-900 4R-900	3R-1200 4R-1200
Number of dressing rings	3	3	3 4	3 4
Wheel diameter (mm)	381	610	914	1200
Dressing ring diameter Outside / inside (mm)	181 / 146	286 / 248	420 / 368 365 / 306	545 / 480 500 / 435
Drive (kW)	0.75	2.2	5.5	7.5
Variable speed (rpm)	0–80	0–60	0–40	0–31
Operating voltage	400V, 50Hz, 3Ph	400V, 50Hz, 3Ph	400V, 50Hz, 3Ph	400V, 50Hz, 3Ph
Special voltage	Upon request	Upon request	Upon request	Upon request
Lapping medium tank (l)	3.5	15	15	50
Dimensions (H x W x D) mm With lift	500 x 620 x 800 1320 x 620 x 1000	1000 x 950 x 1230 1500 x 950 x 1330	1000 x 1400 x 1600 2100 x 1400 x 1820	1000 x 1750 x 1750 2500 x 1750 x 2100
Weight with / without pneumatics lift (kg)	140 / 240	470 / 600	950 / 1200	2200 / 2650
Lapping wheel cooling	—	x	x	x
Stand	x	—	—	—

Machine types 3R-1500, 4R-1500, 3R-1800, 4R-1800, 3R-2150, 4R-2150, 3R-2500, 4R-2500 and 3R-3650 for large workpieces or greater throughputs by request

... PETER WOLTERS single-wheel machines

3R-600 to 3R-1200:

Units 3R-600 to 3R-1200 are machines for the series production of medium to large work pieces. With the digital control and monitoring electronics, consistent series production but also manual production of single parts is possible.

Depending on the application, PETER WOLTERS offers units 3R-600 to 3R-1200 with optional *pneumatic load device and cooled working wheel*.



SÜTRON: The microprocessor-based control system with user interface on a digital display

The user interface of the SÜTRON control system on a digital display offers easy setup of machine parameters for consistent machining processes. Manual programming is always possible, which adds to the flexibility of the system.

Permanent error control is ensured because all components are intelligently networked and nominal data can be stored beforehand. Pneumatic load device and motor monitor, for example, are directly linked to the network. An error message with analysis is issued in case of a malfunction.



Flat Machining for Finest Surfaces

	Flat grinding	Fine grinding Two-wheel	Lapping Single wheel	Polishing Single-wheel
Obtainable finish ($\mu\text{m}/R_{\text{max}}$)	2–10	0.5	0.1–0.4	0.05–0.1
Obtainable flatness ($\mu\text{m}/100\text{ mm}$)	5–10	<1	0.3–1.0	0.3–1.0
Obtainable parallelism ($\mu\text{m}/100\text{ mm}$)	10–20	<1	1–2	1–2
Materials to be processed:				
● ● ● Well suited	● ● ●	● ● ●	● ● ●	● ● ●
● ● Suited	● ● ●	● ● ●	● ● ●	● ● ●
● Unsuitd	● ●	● ● ●	● ● ●	● ● ●
Surface finish:				
● ● ● High gloss	●	●	● ●	● ● ●
● ● Matt				
● Scores				
Removal efficiency:				
● Very low	● ● ● ●	● ● ●	● ●	●
● Low				
● Medium				
● High				
Processing in several planes:				
● ● ● Possible	● ● ●	●	●	●
● ● Conditionally possible				
● Impossible				
Concave/convex processing possible:	●	● ●	● ● ●	● ● ●
Work piece affected by temperature	●			
Warp-free clamping of work pieces possible		●	●	●
Device required for non-circular work pieces		●	●	●

Lapping and Polishing Agents

High quality operating media are required to obtain high quality surfaces. Our delivery range is adapted to the market requirements and comprises:

Lapping fluids

- Low-viscosity lapping fluid for use with fine and extra fine lapping powders
- Lapping fluid with high pressure absorption capacity for use with medium and coarse lapping powders
- Water based lapping fluid concentrate for roughing lapping and for creating flat reference surfaces

Lapping powder

- Silicon carbide lapping powder for all materials except carbide, ceramics, etc.
- Boron carbide lapping powder for hard materials
- Special types such as corundum and natural products by request
- Aluminium oxide for processing glass, plastics and other materials

Lapping powders available in all grit sizes. In fine graduations we guarantee a consistent quality.



Polishing agents

For high-gloss polishing we offer polishing oils with high wetting ability as carrier fluids for diamond powder and other polishing agents. There are four differently structured series for the most diversified polishing applications. We offer a product for every application. There is a great number of grit ranges within each of the series.

Diamond polishing agents are also available as suspension and as paste. A specially developed mixing and spraying device ensures the polishing media are used economically.

We also offer cold cleaners and suitable appliances for cleaning lapped and polished surfaces.

Please contact us for an individual quotation.

Flatness checking of lapped and polished surfaces

Interference tester and flatness measuring plates for flatness checking of lapped surfaces

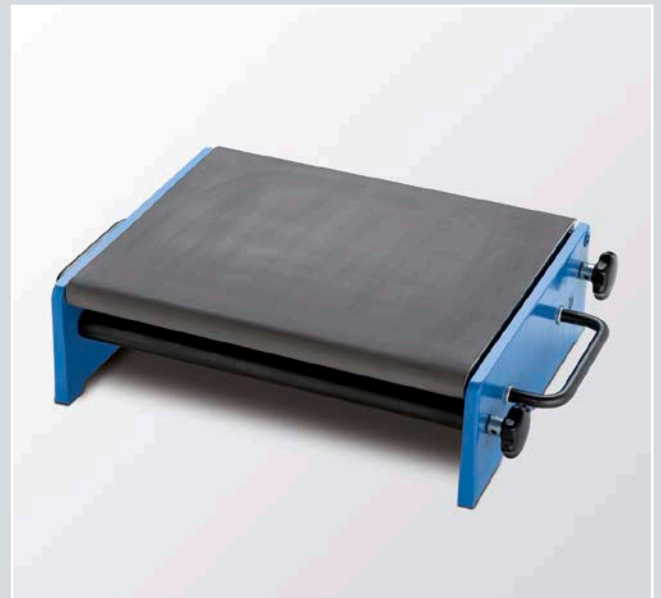
Checking the flatness of lapped surfaces is easily and quickly performed using the interference measuring method.

An optical flat is placed on the surface to be checked that reflects the monochromatic light projected by the test device in a refracted way. Depending on the degree of flatness of the lapped surface, more or less curved interference lines will appear whose deviation from a straight line indicates how flat the surface is.

Our optical flats are available with a precision of 0.03μ in diameters of 50–300 mm. The base material is quartz glass since this material is not prone to thermal change and is extremely wear proof.

Polishing table

As a rule, lapped surfaces have a matt grey finish. Briefly stripping the workpiece on the polishing table gives the surface a light-reflective finish. This ensures the prerequisites for flatness checking according to the interference method are met.



Interference image examples

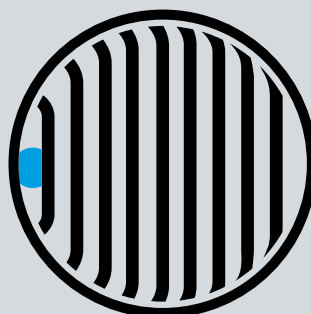
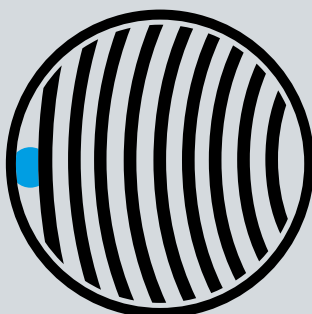
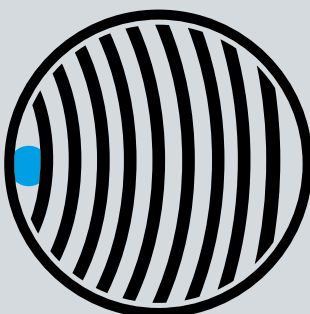
The interference lines indicate a convex work piece.

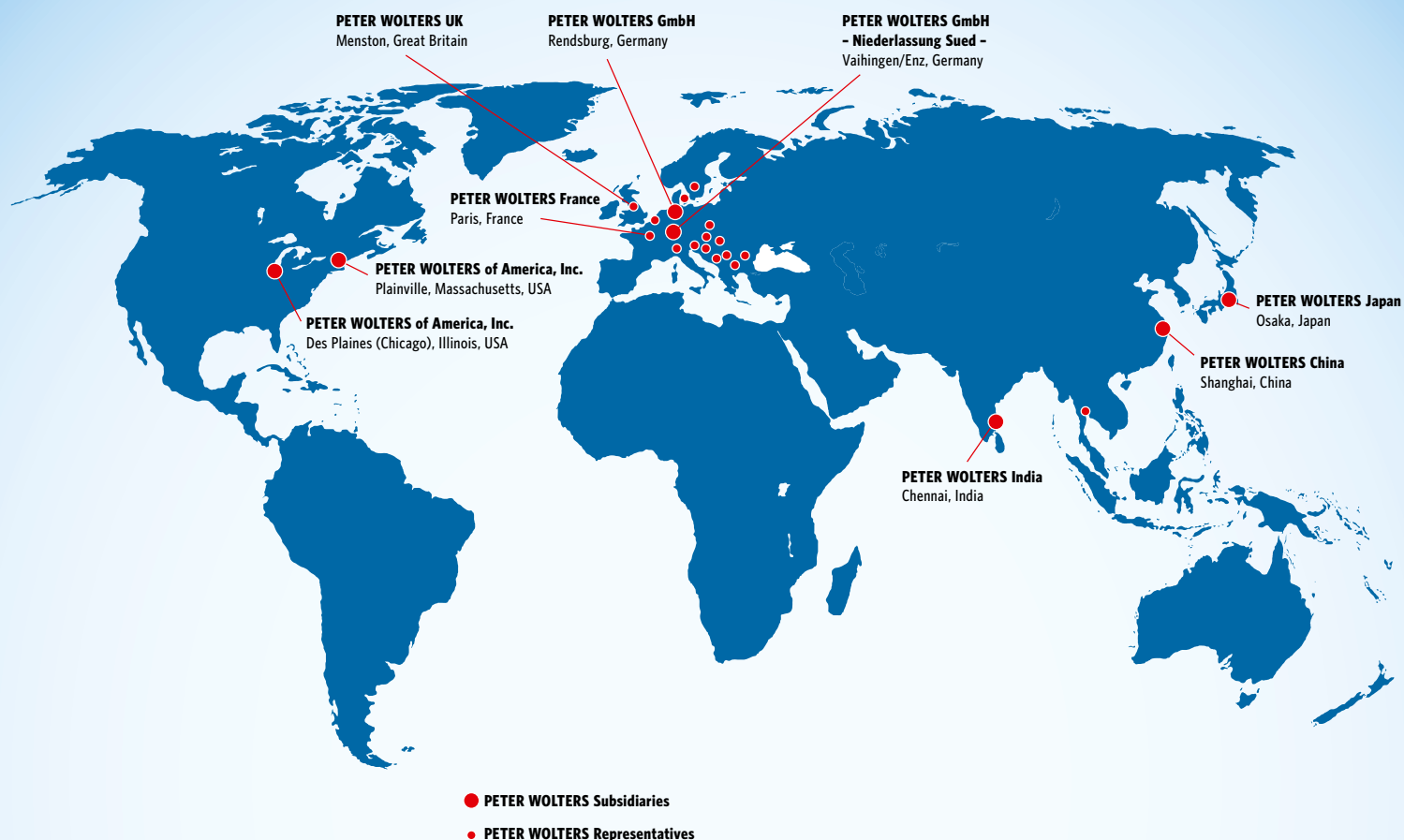
The interference lines indicate a concave work piece.

The interference lines are straight but drop towards the outer edge. The part is flat but the edge drops.

The interference lines indicate that the part is flat and without dropping edges.

 = contact point





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