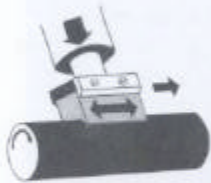


Pneumatically Operated Superfinishing Attachments SG 50 and SG 75



Principle of Operation

A fine grit superfinishing stone, preformed to the radius of the part to be superfinished, is pneumatically pressed against the rotating component. During the superfinishing operation, the stone oscillates parallel to the axis of the component at a high speed driven by a pneumatic power unit.

Particles of fine abrasive and material (swarf) produced by the process are flushed away by a continuous flow of filtered rinsing fluid.

Achievements

High surface finish up to $CLA = 0.8 \mu''$
($Ra = 0.02 \mu m$)

Roundness improved 50–80%

High percentage contact area to 0.1 = 90-95%

Chatter marks, feed spirals etc. from pre-machining operations are removed

Recommended Stock Removal for Economical Operation

Ground parts

approx. 0.005–0.01 mm on diameter

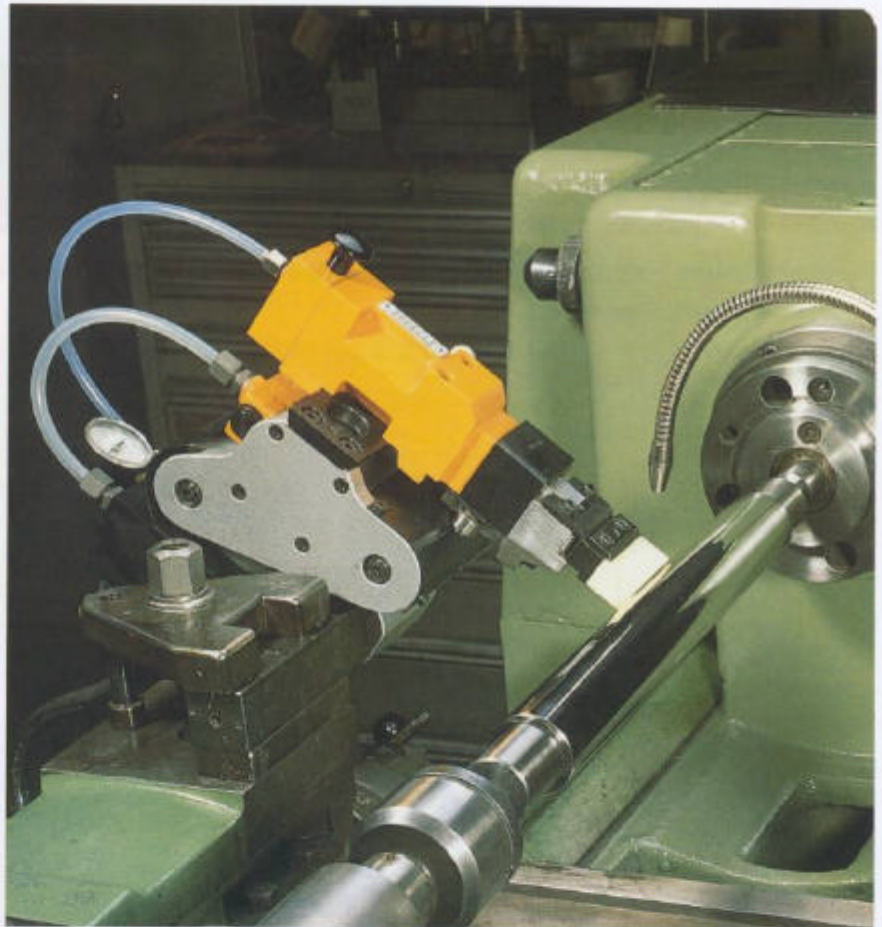
Fine turned parts

approx. 0.015–0.02 mm on diameter

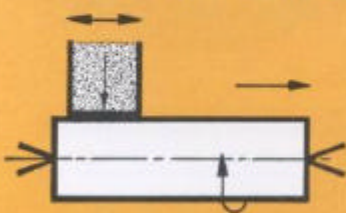
Rough turned parts

approx. 0.1 mm on diameter

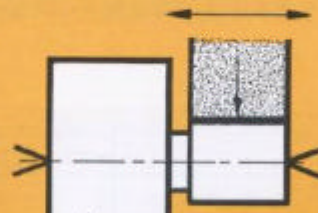
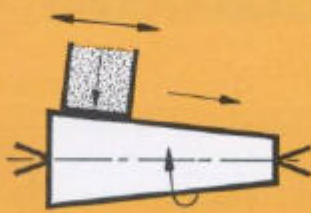
As a general guide, stock removal should be 3 to 4 times the surface roughness of the previous operation.



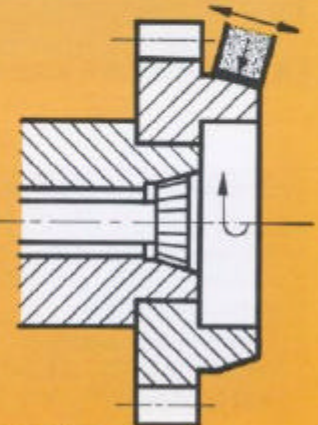
Operation methods:



longitudinal operation
(long components)



plunge-cut operation
(short components
undercut $\cong 1.5 \text{ mm}$)



Component clamping:

between centres or in chucks, preferably same clamping method as used in premachining operation.

Application SG 50

Ground or fine turned components

Working range: up to 75 $\varnothing \times$ 500 mm long or
125 $\varnothing \times$ 300 mm long

The working range will only be restricted by the capacity of the machine tool on which the attachment is used. For larger components and higher quantities our attachment SG 75 would be more economical.

Examples of components that can be superfinished:

Bearing shafts, piston rods, rolls, contact area of seals.
Raceways of cylindrical rollers and needles on gear shafts and spindles.

Application SG 75

Ground or turned components with rough surface or generally large components.

Working range will only be restricted by the capacity of the machine tool on which the attachment is used. This high powered unit will permit high stone pressures and consequently high stock removal rates. 2 large stone guides SF 50 can be applied simultaneously and short machining times can be achieved.

Examples of components that can be superfinished:

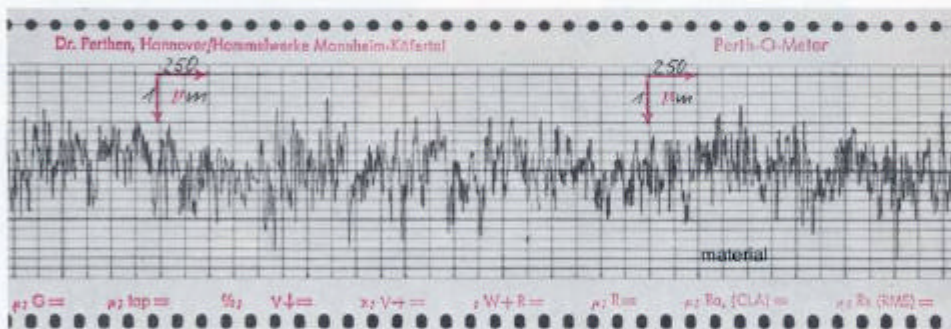
Large piston rods and gudgeon pins for heavy diesel engines, bearing shafts of generators or of gear wheels, cold rolls for sheetmetal, aluminium foils, rolls for paper industry.

Design Features

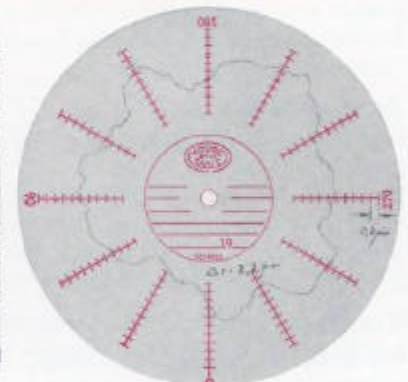
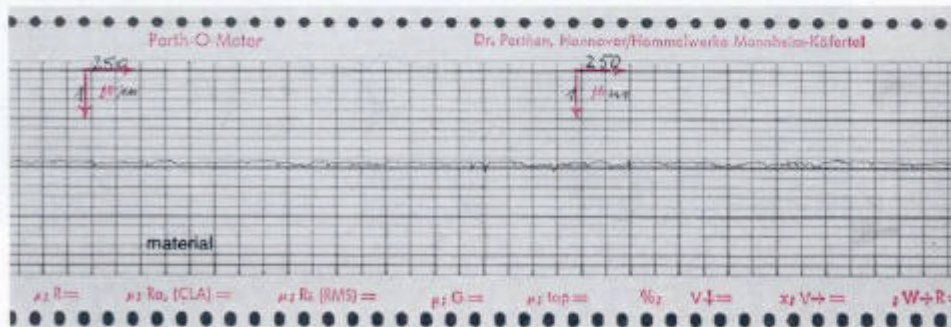
- Oscillation movement and stone pressure performed pneumatically.
- High number of oscillations – balanced oscillating system.
- Oscillation stroke and pressure to superfinishing stone are independently adjustable.
- Oscillating parts are guided in preloaded ball bearings.
- The piston rod of the stone guide is rigidly guided by 2 pre-loaded roller bearings.
- Wear resistant guide bushes.
- The attachment can be used in any position and is readily moved and adjusted on its mounting holder.
- Setting up time is short, similar to clamping a turning tool onto a lathe.

Machining Examples – Type SG 50

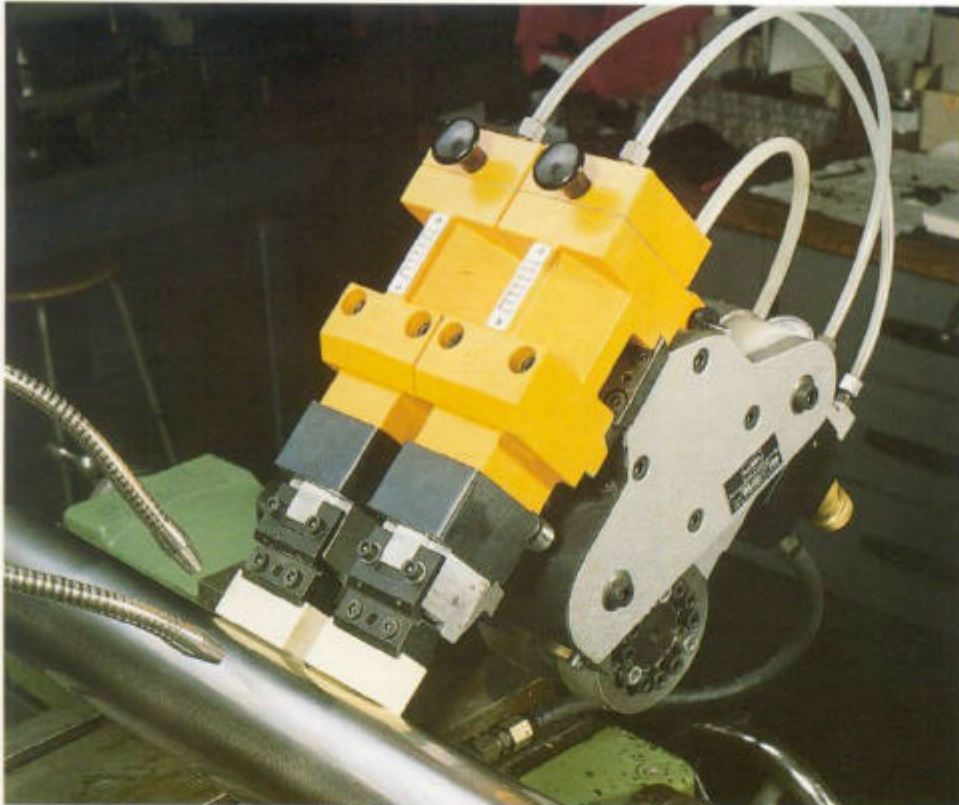
before superfinishing



after superfinishing

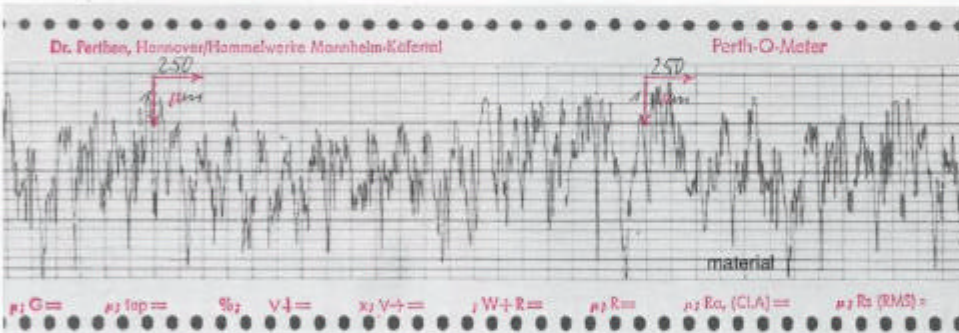


		Surface CLA (μ'')	Roughness Ra (μm)	Roundness R-r (μm)	Stock Removal (on dia. μm)	Machining Time sec.
Plunge-cut operation bearing shaft 35 $\varnothing \times$ 36 mm hardness 60 HRC	Before	22	0.55	2.2	6 to 8	20
	After	1.6	0.04	0.3		
Longitudinal operation piston rod 25 $\varnothing \times$ 300 mm soft or hard	Before	24	0.6	—	6 to 8	110
	After	1.2	0.03	—		

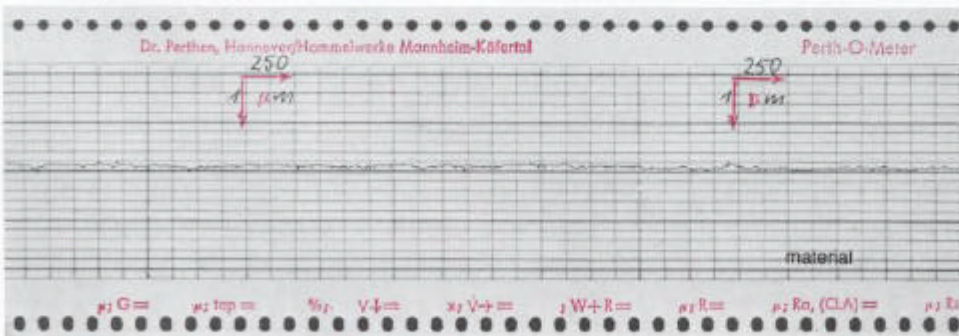


Chrome Steel Roll
 500 mm dia. × 1500 mm long
 (Area – 23500 cm²)
 Hardness 90° Shore

Machining Examples – Type SG 75
 before superfinishing



after superfinishing



Examples of approximate times.

1. **Pre-machining Condition:**
 Ground: – Surface finish
 CLA < 4 μ" resp. Ra < 0.1 μm
 Superfinishing using diamond
 dust – approximate time
 = 1 minute/100 cm² or
 4.0 hours total time.

2. **Pre-machining Condition:**
 Ground: Surface finish
 CLA = 8–16 μ" and
 Ra = 0.2–0.4 μm resp.
 Superfinished in stages and
 using stones of progressively
 smaller grit sizes at each
 stage.
 Approximate time
 = 1.7 minutes/100 cm² or
 approx. 6–8 hours total time.

After superfinishing:
 CLA ≤ 0.8 μ" and
 Ra ≤ 0.02 μm (mirror-finish)
 resp.

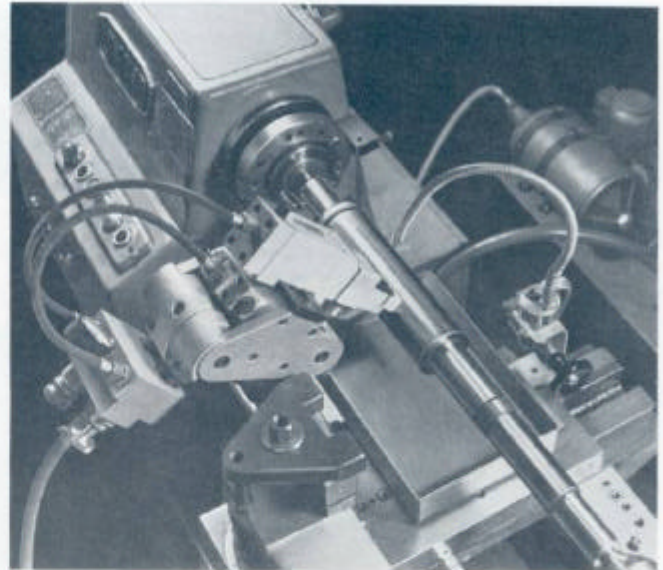
		Surface CLA (μ")	Roughness Ra (μm)	Percentage Contact Area	Stock Removal (on dia. μm)	Machining Time min.
Piston rod 100 Ø × 1500 mm soft or hardened	Before	24	0.6	–	7 to 9	30
	After	1.6	0.04	–		
Returned bearing shaft 600 Ø × 250 mm, steel 80 kp/mm ²	Before	240	6	tp 0.3=3%	90	30
	After	8	0.2	tp 0.1=20%		

Circumferential speeds of components for SG 50 and SG 75

	Approximate speeds for lathes	
	Circumferential speed m/min	Feed mm/rev
Rough finishing	8–12	2–5
Final finishing		
unhardened	8–12	1–4
hardened	25–50	0.5–1

Superfinishing Equipment

Superfinishing attachment, filtration unit, feed system for rinsing fluid.



Technical Data:

Number of oscillations (strokes per min.):

Oscillation stroke:

Stone guides:

Air pressure:

Air consumption:

Attachment mounting holder:

Special designs for machining of cones and faces

Weight:

Filtration unit for rinsing fluid:

SG 50

2300–2800/min

2–4.5 mm

1 piece SF 35
piston area 10 cm²
stroke 35 mm

4 bar (60 PSI)

7–11 Nm³/h

Standard
GH 50.0

15 kg with 1 SF 35

See data sheet IB 105

SG 75

2000–2300/min

2–5 mm

1 or 2 pieces SF 50
piston area 20 cm²
stroke 35 mm
or 2–3 pieces SF 35

4 bar (60 PSI)

14–18 Nm³/h

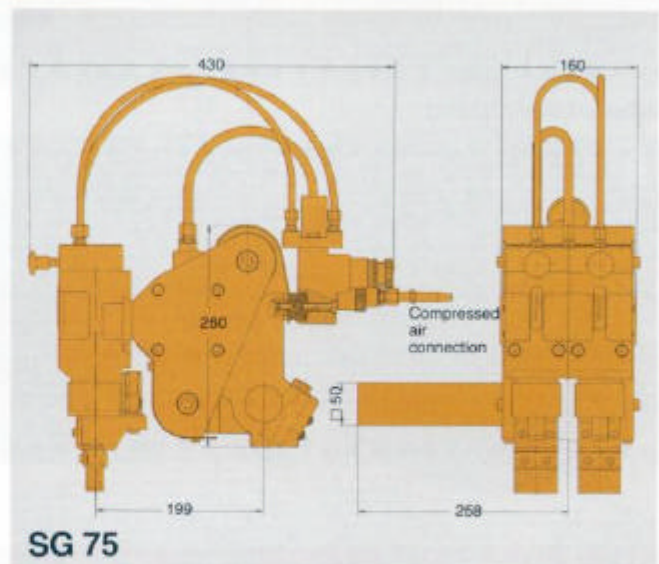
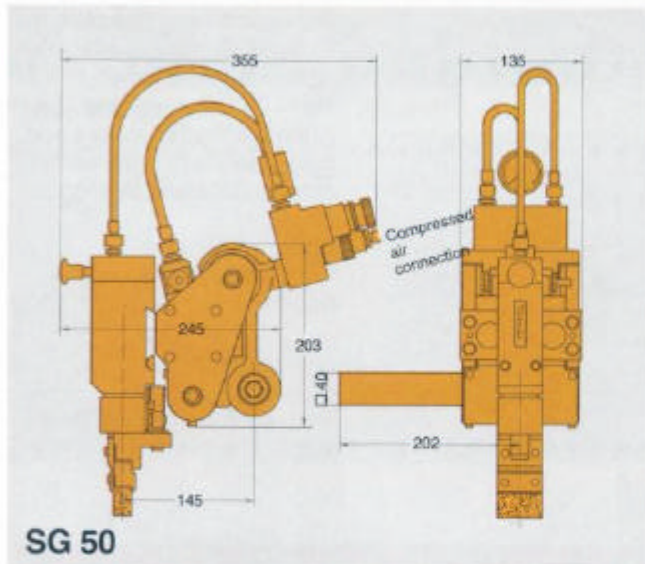
Standard
GH 75.0

25 kg with 1 SF 50

28 kg with 2 SF 50

28 kg with 3 SF 35

See data sheet IB 105



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