

4 Lapping

Lapping is a machining process to **smooth surfaces** whilst maintaining close tolerances and flatness.

An abrasive embedded in a lubricant is used for lapping. In contrast to grinding where the abrasive is anchored to the backing material lapping works with a moving (rolling) grain.

DIN 8589 divides lapping into two groups:

- Lapping with lapping paste
- Lapping with lapping liquid



Lapping with lapping paste

Lapping plates / lapping spindles of grey iron are used for lapping.

Lapping pastes can be applied to the sealing face or lapping plate / lapping spindle constantly as required.

After lapping, sealing face and lapping plate must be degreased and cleaned to 100 %.

Lapping with lapping liquid

Selection of the correct lapping agent

- Aluminium oxide Al_2O_3
For machining semiconductor materials (e.g. silicone and germanium), light alloys and non-ferrous metals, coal, plastics, soft steel, cast iron, etc.
- Silicon carbide SiC
For the machining of grey iron, steel (soft, hardened, alloyed), stellite, ceramics, glass, plastics, titanium, carbide, etc.
- Boron carbide B_4C
For the machining of carbide, ceramics, etc.

Grain size

Guideline values for achievable roughnesses depending on the lapping powder are shown in the table on the following page. If the same lapping grain is used, hard materials have better surface characteristics than soft materials.

Lapping agent

The machining tasks are determined not only by the type of lapping powder, but also by the mixing ratio of grain to carrier.

The carrier is usually a lapping oil or a water-based agent. EFCO recommends lapping oil as carrier.

One criterion for the quality of a lapping agent (grain + carrier) is, amongst other things, its miscibility (no agglomeration, no early separation).

5 Grinding- and lapping recommendation

Recommended grinding and lapping compound Material to be machined, Valves to be machined	GSS (cubic boron nitride) B252	Silicon carbide (SiC) On paper self-adhesive P80, P280, P500	special fused aluminium oxide (Al ₂ O ₃) on paper self-adhesive P80, P280, P500	special fused aluminium oxide (Al ₂ O ₃) on folio self-adhesive P80, P280, P500, P1000	Semi-fused aluminium oxide (Al ₂ O ₃) on cloth P100, P280	zircon aluminium abrasive (ZrO ₂ + Al ₂ O ₃) on cloth self-adhesive P80	EFCOSIT (Al ₂ O ₃) corundum hollow balls on cloth self-adhesive P120	EFCOBOR (lapping paste) P80, P120, P220, P400, P800, P1000, P1200, P1500
Ordinary steel, unalloyed and alloyed (unexpired))	-	0	+	+	+	+	0	0
Iron / cast iron	0	+	+	+	+	+	0	+
Bronze, red bronze, brass	-	0	+	+	+	+	0	0
Cobalt hard-facing (Stellite)	++	+	+	+	0	+	0	+
Nickel hard-facing	++	+	+	+	0	+	0	+
Tempered steel, tool steel over 45 HRC, high-speed steel	++	+	+	+	0	+	0	+
Chrome- and chrome-nickel steel (rust-resistant steel) heat resistant nickel-alloy	-	0	+	+	0	+	+	0
Safety valves (for highest precision and even surfaces)	-	0	0	+	0	0	-	+
Hot valves (for the use with high temperatures)	++	-	-	-	0	0	0	0
Strong timber	++	+	0	0	0	0	0	0

++ = optimal
 + = particularly suitable
 0 = partially suitable
 - = non suitable

18 Boron carbide lapping paste TYPE: BOR-



- Oil-soluble lapping paste of boron carbide

Grain size	Type		
80	BOR-0080-0,1	BOR-0080-0,5	BOR-0080-1
120	BOR-0120-0,1	BOR-0120-0,5	BOR-0120-1
220	BOR-0220-0,1	BOR-0220-0,5	BOR-0220-1
400	BOR-0400-0,1	BOR-0400-0,5	BOR-0400-1
800	BOR-0800-0,1	BOR-0800-0,5	BOR-0800-1
1000	BOR-1000-0,1	BOR-1000-0,5	BOR-1000-1
1200	BOR-1200-0,1	BOR-1200-0,5	BOR-1200-1
1500	BOR-1500-0,1	BOR-1500-0,5	BOR-1500-1

Packaging unit: 0,1 kg, 0,5 kg, 1 kg

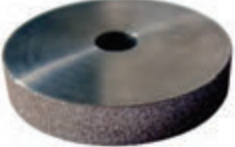
Ordering example:

Lapping paste of boron carbide / grain P220 / 0,5kg

➔ **BOR-0220-0,5**

21 GSS – grinding tool with metallic binding TYPE: GSS-

Standard grain: B252 (Other grains available on request)

 GSS-grinding spindles (SP1) for SL-15 / SL-2 / Valva-15 / SM	Outer- Ø (mm)	1 Set (6 pieces) Type
	30	GSS-SP1-030-B252-S
	50	GSS-SP1-050-B252-S
	80	GSS-SP1-080-B252-S
	120	GSS-SP1-120-B252-S
 GSS-grinding spindles (SP2) for SL-3 / Valva-3  GSS-grinding spindles (SP3) for SLA / HSL / HSS	Outer- Ø (mm)	1 Set (6 pieces) Type
	80	GSS-SP2-080-B252-S
	120	GSS-SP2-120-B252-S
	40	GSS-SP3-040-B252-S
	50	GSS-SP3-050-B252-S
	60	GSS-SP3-060-B252-S
	70	GSS-SP3-070-B252-S
	80	GSS-SP3-080-B252-S
	90	GSS-SP3-090-B252-S
	100	GSS-SP3-100-B252-S
	120	GSS-SP3-120-B252-S
 GSS- grinding cup (ST) for VSA / TD / TDF / Grinding unit	Outer- Ø (mm)	Type
	25 (mounting hole Ø10)	◆ GSS-ST-B10-025-B252
	50 (mounting hole Ø10)	◆ GSS-ST-B10-050-B252
	60 (mounting hole Ø20)	◆ GSS-ST-B20-060-B252
 GSS- grinding wheel for bores (SRB) for VSA / TD / TDF / Grinding unit	Outer- Ø (mm)	Type
	55 (mounting hole Ø10)	◆ GSS-SRB-B10-055-B252
	60 (mounting hole Ø20)	◆ GSS-SRB-B20-060-B252

◆ = Not available from stock