

**TECHNICAL CHARACTERISTICS OF  
MACHINING WORK**

Item	Process	Material type	Max dimension of machining part
1	2	3	4
1	Turning on CNC lathes – complicated parts	Steel, light metals, non-ferrous metal alloys, plastics	Ø 110, L=750 Ø 730, L=200
2	Turning, boring, screw cutting on big dimension lathes	Steel, titanium alloy, light metals	Ø 630, L=2000 Ø 1200, L=3000
3	Turning, boring, screw cutting on conventional lathes	Steel, titanium alloy, light metals	Ø 320, L=1500
4	Turning on turret lathes	Steel, titanium alloy, non-ferrous metal, plastics	Ø 40, L=180
5	Turning on NC turret lathes	Steel, titanium alloy, non-ferrous metal, plastics	Ø 300, L=200
6	Turning on automatic lathes	Steel, titanium alloy, non-ferrous metal, plastics	Ø 40, L=100
7	Milling of large parts on 3-axis SN milling machine	Steel, titanium alloy, non-ferrous metal, plastics	Z1400x1200y7000 Z300x1700y1350
8	Milling on CNC milling machine (3 & 5-axis) 3-axis milling machines DMC-63V, DMC-103V 5-axis milling machine DMU-100T 3-axis milling machine FYJ-40RN FYM-63N MFI-6-10 MF-800	Steel, titanium alloy, light metals	Z550x2450y700 710x1050x650 z475x1280y475 z475x1280y475 z800x1500y550 z500x2450y770
9	Milling on NC sheet cutter TRUMATIC BFZ-3000	Al alloy sheets	≠15x1200x2700 ≠15x1200x6000
10	Milling on bridge type milling machines (large parts)	Steel, titanium alloy, light metals	1200x1200x8000
11	Milling on conventional milling machines - horizontal - vertical - universal - tooling	Steel, titanium alloy, light metals	200÷400x2000 800÷3000 250÷400x1900 270÷500x940
12	Engraving the inscriptions and marks	Steel, titanium alloy, non-ferrous metal	Bench Area 220x430
13	Chambering, boring and coordinate drilling - jig drilling machine, special, drill press - drill & milling machine	Steel, titanium alloy, light metals	Bench Area 110x700 1000x1100
14	Pull broaching (cylindrical & shape holes)	Steel, titanium alloy, light metals	Ø 10 ÷ Ø 100 , L=200
15	Honing (cylindrical holes)	Steel, titanium alloy, light metals	Ø 35 ÷ Ø 300 , L=1500 Ø 19 ÷ Ø 200 , L=1060
16	Tapping/ hole threading	Steel, non-ferrous metal	Metric & unified screw threads up to Ø 30
17.	Roll-threading	Steel, non-ferrous metal	Dia: Ø 3 ÷ 40 , L=125 Ø 10 ÷ 50 , L=180
18	Drilling, counter boring, countersinking - bench drill - pneumatic - multiradial drilling machine	Steel, light metals	Ø 15 Ø 55 Ø 55

Item	Process	Material type	Max dimension of machining part
1	2	3	4
19.	Chiselling of shaped holes and splined machine	Steel, light metals	Bench dia Ø 730
20	Jig grinder machine for holes and seatings	Steel, light metals	bench dimension 300x650 mm
21	Double disk grinder for surfaces, spindels, forks	Steel, light metals	200x630 Ø 100
21	Centreless grinder machine for rods	Steel, light metals	Ø 3 ÷ Ø 60 , L=500
22.	Internal grinding	Steel, non-ferrous metal	Ø 10 ÷ Ø 300 , L=800
24.	Profile grinding	Steel, titanium alloy, light metals	Ø 3 ÷ Ø 300 , L=1000
25.	Surface peening	Steel, titanium alloy, light metals	
	- wibrate coldwork i.a.w 901-72		150x300x1000
	- wibrogrinding i.a.w WIAM 949-69		100x300x2500
	- ball vibration method (Donaldson TORIT)		200x300x600
26.	Surface peening (shot peening) in acc. with BAC 5730 and NTA 72353 using PANGBORN equipment	Steel, titanium alloy, light metals	200x700x3250 mm

**TECHNICAL CHARACTERISTICS OF  
FLAT & FORM PROCESSES**

<b>Item</b>	<b>Name of machine</b>	<b>Material</b>	<b>Characteristic</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
1.	Sheet parts forming on hydraulic rubber press i.a.w. BAC 5300	Al alloy sheets	sheet thickness 0,6 to 2,0 mm dim. 870x1600 mm depth up to 150 mm
2.	Large parts forming on hydraulic tunnel press i.a.w. BAC 5300.	Al alloy sheets	dim 850x3455 mm depth of forming up to 240 mm forming pressure up to 700 at
3.	Sheets rolling /milling	Al alloy sheets	thickness 2,5x3500 mm long $R_{min}=100$ mm thickness 8x200 mm long $R_{min}=200$ mm
4.	Stretch pressing longitudinal and lateral i.a.w. BAC 5300	Al alloy sheets	Longitudinal dim 1000x7000 mm stress force 100 T Lateral: L=3000 mm stress force 360 T
5.	„DUALFORM” hydraulic pressing i.a.w BAC 5300	Steel alloys, Al alloys	205x610x760 mm
6.	Forming and multioperation stamping on eccentric hydraulic crank press i.a.w BAC 5300	Steel alloys, Al alloys	2450x1400 mm 1450x1300 mm
7.	Profile stretching i.a.w BAC 5300	Al alloys	1000 mm - 5000 mm
8.	Press braking i.a.w BAC 5300	Al alloy sheets Steel alloy sheets	$L \leq 5000$ $L \leq 2500$
9.	Skin forming (nose profile) on press brake i.a.w BAC 5300	Al alloy sheets	$L \leq 5000$
10.	Swelling in acc. with TU-640TL	Al-Cu alloy tubes	$\varnothing 1,4 \div \varnothing 8$
11	Forming of metal-teflon bushing use hydraulic press	Steel strip both side covered by Cu layer and one side with bronze granule coated with Teflon	$\neq 1,1; 1,6; 2,6$ $\varnothing 5 \div \varnothing 60$
12.	Milling of blanks, hole drilling on special NC milling machine Thromatic	Non-ferrous alloy sheets	1200x2900 nesting thickness 13
13.	Milling of blanks, hole drilling on special NC milling machine Pullmatic	Al alloy sheets Steel alloy sheets	Min 300x150 Max 1600x1500 + 3
14.	Trimming of flat surfaces, sheet edges, holes on NC Grinding & Master machine	AL alloy sheets	Max width B=1200
15.	Stamping, striking, forming of sheet with use of drop hammer	Al alloy sheets	1200x1100
16.	Stretch forming of cylindrical elements from press formed sheets on EXPANDOR special press	Al alloy sheets Steel sheets	$\varnothing 600 \div \varnothing 1500$
17	Assembly of rods, bars, push rods, strings with use of bonding, torsion, riveting and lapping methods	Metal materials	Without limits

**TECHNICAL CHARACTERISTICS OF  
TUBE AND PIPE FORMING AND AIRCRAFT SUBASSY**

<b>Item</b>	<b>Name of machine</b>	<b>Material</b>	<b>Characteristic</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
1	Forming and pipe bending manually and on tube bender i.a.w PI 6249, DIN 9004, NSA 4571, S08, S166, CSMP 012	Steels, Al alloys, Cu alloys, Ti alloys	Ø5 ÷ Ø 60 Length up to 3500
2	Hydraulic and fuel conduit manufacturing with leak proof test and pressure test in acc. with OST 1 000128	Steels, Al alloys, Cu alloys, Ti alloys	Ø5 ÷ Ø 60 Length up to 3500
3	Manufacturing of hose with hot upsetting of tube tips	High pressure conduit, strengthened and plastics	Ø100 ÷ 3500
4	Tank, hydraulic and fuel system leak tests		
5	Fuel tanks forming with pressure test		
6	Rubber absorber manufacturing i.a.w 720AN	Rubber cords	Ø8 ÷ Ø 16
7	Steel cable assembly i.a.w OST1 03824, OST1 03797, OST1 03796.	Steel cords	Ø1 ÷ Ø 9,5
8	Spring manufacturing	wire.50HF, 50HFA, 50HS, OTE VA, 65, 65G, IIA, BI	Ø 0,3 ÷ Ø 10

**TECHNICAL CHARACTERISTICS OF  
WELDING AND SPOT WELDING**

<b>Item</b>	<b>Proces</b>	<b>Material</b>	<b>Dimensions</b>
1	2	3	4
1.	Oxy-acetylene welding i.a.w PJ71-68, PN-L-01425, hard soldering/ brazing in acc. with PJ106-66, I-70/743401, BAEP 4535	steel sheets  steel sheets, Al alloys, Cu alloys	0,5 to 1,5 mm thickness
2.	Argon-arc welding in acc. with DIN 65118, PJ7579, ASN 43004, PN-L- 01425, BAEP 4521, CSMP 039	Low-alloy steel and stainless steel, Ni alloys, Al alloys	0,3 to 0,6 mm thickness
3.	Electrical welding using Slag-covered electrode in acc. with PJ77-77, PN-L-01425	Carbon steel, alloy steel	above 1,5 mm thickness
4.	Electrical welding in CO <sub>2</sub> atmosphere in acc. with PJ75-79, PN-L-01421	Low-carbon steel, alloy steel	above 1,0 mm thickness
5.	Arc welding in acc with PJ126-77, PN-L- 01427	titanium alloy	above 0,6 mm thickness
6.	Spot welding in acc. with PJ86-75, PN-L-01422	Low carbon steel and stainless steel, titanium alloy	
7.	Line welding in acc. with PN-L-01424	steel, Al-alloy	
8.	Oxy-acetylene welding in acc. with PSJ582-153	Al-alloy	0,6 to 1,5 mm thickness
9.	Tungsten inert gas welding TIG in acc with BS-3019, ASN 43005, PO113-66	Al-alloy	above 0,6 mm thickness
10.	Electrical argon-arc welding MIG in acc. with BS-3571	Al-alloy	above 1,5 mm thickness
11.	Spot welding in acc with PJ85-75, PN-L-01423, OPJ-130-68	Al-alloy	
12.	Zinc spraying	Carbon steel, stainless steel	
13.	Brazing i.a.w CSMP 009	Carbon steel	I,a,w furnace chamber free area

**TECHNICAL CHARACTERISTICS OF  
SURFACE TREATMENT**

Item	Name of process	Kind of material	Dimension of the parts (mm)
<b><i>SURFACE TREATMENT</i></b>			
1.	Chromic Acid Anodizing of AL alloys in acc. with BAC 5019, MIL-A-8625, NTA 73552	Al Alloy D16, PA7, 2017, 2024, 7075, 6081	3800x400x1800
2.	Alodizing of AL alloys in acc. with BAC 5719, MIL-C-5541, NTA 73751	Al Alloy D16, PA7, 2017, 2024, 7075, 6081, 5086	3800x800x2500
3.	Sulphuric acid Anodizing of Al alloys in acc. with WIAM 265-72	Al Alloy PA1, PA2, PA6, PA7, PA29, PA30, PA31, PA33, PA38	5800x500x2100
4.	Sulphuric acid anodizing in acc. with WIAM 636-71	Al Alloy PA1, PA2, PA6, PA7, PA29, PA30, PA31, PA33, PA38	1500x1200x1500
5.	Dimensional Pickling of Al alloys with factor 3:1 in acc. with PI.1.2.097-78	D16CZATV	3800x700x1600
6.	Cadmium cyaniding plating steel, copper and its alloys in acc with BAC 5701, NTA 72170	15-5PH, 17-7PH, 15CDV6, 30HGSA, 30HMAŽ	1600x550x600
7.	Chloroaurin Cadmium plating steel in acc. with 1046-75 WIAM	30HGSNA	1200x600x600
8.	Cyano-Zinc plating of steel, cooper and its alloys in acc. with PI.1.2.046-77	30HGSA, 20, 45	1800x700x600
9.	Cyano- cooper plating of steel i.a.w PI.1.2.046-77	30HGSA, 20, 45	1600x700x600
10.	Cyano-Silver plating copper alloy	Cu alloys	500x500x600
11.	Nickel plating in acc. with NTA 72162	15-5PH, 17-7PH	1100x700x600
12.	Hard chromuim plating in acc. with BAC 5709,	15-5HP, 30HMAŽ	900x600x600
13.	Tin plating in acc. with PI.1.2.046-77	Cu & Cu alloys	1200x700x600
14.	Phosphatizing in acc. with BAC 5810, NTA 73653	steel parts, Cd plating	1800x600x600
15.	Oxidizing in acc. with 428-75 WIAM	magnesium alloys	1000x700x600
16.	Stainless steel passivation in acc. with BAC 5625, NTA 72250	15-5PH, 17-7PH, 1H18N9T, 3H-13, 4H-13	700x600x500
17.	Priming and epoxy enamel painting in acc. with BAC 5736	2024, 7075	6150x4080x3570
18.	Priming and polyurethane enamel painting in acc. with BAC 5948,	2024, 7075, 6061-T1	6150x4080x3570
19.	Priming and polyurethane enamel painting in acc. with BAC 5882	7075-T (forging)	6150x4080x3570
20.	Greasing (EVERLUBE 620) i.a.w BAC5811	15-5PH	500x400x300 temp.250°C

**TECHNICAL CHARACTERISTICS OF  
HEAT TREATMENT- furnaces**

Item	Name of equipment	Type of process	Characteristic	Quantity
<b>HEAT TREATMENT</b>				
1.	RIOCHE FURNACE Type JVW-195	Al. alloys heat treatment (solution, annealing, ageing) in acc. with BAC 5602, NTA 71250, 904-67, MIL-H-6088	Working zone max: width - 1200 mm length - 2000 mm height - 1200 mm Working temp. - 107-580 °C Temp. tolerance - ± 6 °C Max charge - 100 kg	1
2.	GAUTSHI FURNACE Type CH-8274	Al. alloys heat treatment in acc. with BAC 5602, NTA 71250, 904-67, MIL-H-6866	Working zone max: width - 2000 mm length - 7000 mm height - 1500 mm Max temperature - 600 °C Temp. tolerance - ± 6 °C Max charge - 350 kg	1
3.	Shaft and chamber air furnace for hardening Type PEK-4, POK-74, PEG-915, PEG-920, PEC 90	Isothermal quenching and tempering, annealing, high-alloy steel in acc. with 1029-75, BAC 5619	dim 900x900x1200 mm Charge - 20-200 kg Temp. up to 1000 °C	5
4.	Salt furnace for hardening Type PGT-50/60, PET-35/50	Bright hardening and tempering high alloy steel (30HGSA) in acc. with 1029-75	dim: dia 500 mm, L=600 mm charge - 10 kg	2
5.	Electrical furnace for quenched and tempered Type PEG-700/3, DLR-4E, PEH-2, PEH-3	High temp. tempering, quenching and tempering constructional and high-alloy steel		5
6.	Electrical furnace for tempering Type DLS-4EM, Dry surface SEL-13	Low and high temp tempering all kind of steel		1
9.	Vacuum furnace Type RVFOQ-424, VTR-5	Hardening and tempering of high-alloy steel, stainless steel, titanium alloys in acc. with 685-76, OPI-364, BAC, BAEP, CSMP	dim 610x910x450 mm Temp. - 700-1350 °C Vacuum - 1x10 <sup>-3</sup> Tr Charge - 200 kg	2

**TECHNICAL CHARACTERISTICS OF  
HEAT TREATMENT- processes**

<b>Item</b>	<b>Name of process</b>	<b>Type of process</b>	<b>Characteristic</b>
1.	Annealing (normalizing, stress relief annealing) i.a.w 1029-75, BAC 5619	Steels, Cu alloys	900x900x1200
2.	Stress relief annealing i.a.w 1029-75	steels	400x1600x2000
3.	Vacuum annealing i.a.w 685-76, OPI-364	Steels, Ti alloys	610x910x450
4.	Hardening and tempering in air furnace i.a.w BAC 5617, BAC 5619, 1029-75	steels	Ø900x1000
5.	Hardening and tempering in salt bath furnace i.a.w 1029-75	steels	Ø500x600
6.	Hardening and tempering in vacuum furnace	steels	610x910x450
7.	Solution heat treatment i.a.w BAC 5602, NTA 71250, 904-67	Al alloys	1300x2000x7000 (Gautschi) 1200x1200x2000 (Ripoche)
8.	Ageing i.a.w BAC 5602, NTA 71250, 904-67	Al alloys	1300x2000x7000 (Gautschi) 1200x1200x2000 (Ripoche)
9.	Annealing i.a.w BAC 5602, NTA 71250, 904-67	Al alloys	1300x2000x7000 (Gautschi) 1200x1200x2000 (Ripoche)
10.	Sandblasting (cleaning) i.a.w BAC 5748, NTA 72352, I-68/762202, BAEP, CSMP	Steels, non-ferrous metals	2500x3000x4500 (PK) 700x500x500 (PS)
11.	Additional equipment: washing stand, press to straightening		