

SMNPO - ENGINEERING

MANUFACTURING CAPABILITIES

MACHINING & ASSEMBLY FACILITIES



MECHANICAL PROCESSING FACILITIES



Quantity of machinery – more than 1,500 units
including CNC & Multifunctional machining centers - 220.

78% of metal cutting machines are installed in 9 assembly shops with total area of 108,500 sq.m.

7 welding shops incorporate 40-60 machining units per each shop.

Company's machinery pool is characterized by high flexibility and can be easily adjusted
for mastering of the new products

TURNING LATHES

Turning lathes pool includes machines with height of centers from 160mm and center distance 750mm (model 16B16) up to 1,100mm / 14,000mm respectively (model 1602)



<i>Machine brief characteristics</i>	<i>model 1602</i>	<i>model TR 816</i>
MAX machining diameter above tool head, mm	1,100	560
Machining length at centers, mm	14,000	10,000
MAX mass in the centers, tn	50	10

<i>Machine brief characteristics</i>	<i>model TP400</i>	<i>model Leonard</i>	<i>model MDW</i>
MAX machining diameter above tool head, mm	4 000	700	880
Machining length at centers, mm	12 000	8 500	1 280
MAX mass in the centers, tn	80	18	1



TURNING - AND - BORING - MILLS

Fabrication facilities incorporate turning-and-boring mills with face plate diameter 1,200 mm – 6,300 mm.



<i>Machine brief characteristics</i>	<i>model 1563</i>
MAX diameter of the machined part, mm	6,300
MAX height of the machined part, mm	3,200
MAX weight of the machined part, tn	125

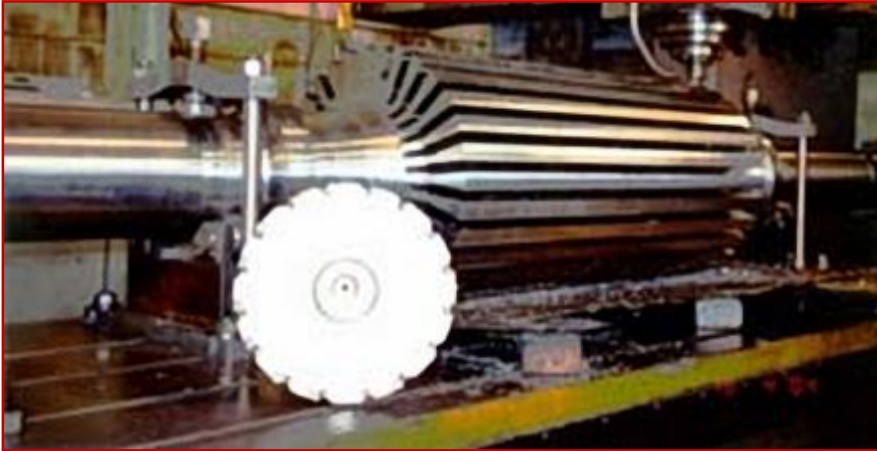
<i>Machine brief characteristics</i>	<i>model 50DVS</i>
MAX diameter of the machined part, mm	5,500
MAX height of the machined part, mm	4,000
MAX weight of the machined part, tn	100



MILLING MACHINES

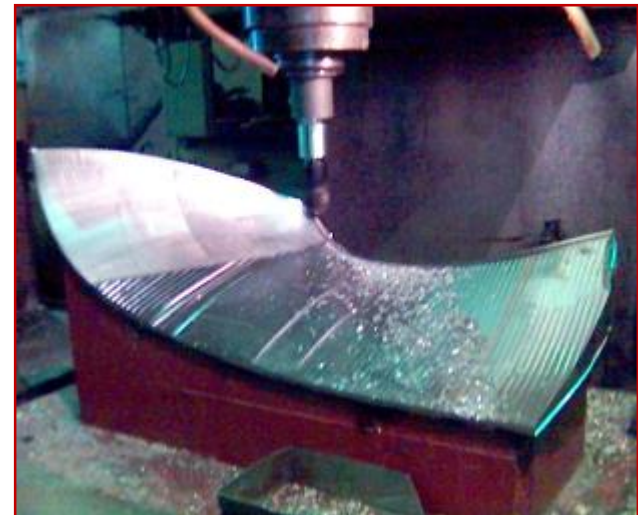
Fabrication facilities incorporate all types of vertical & horizontal milling machines including models 6P12, 6P13, 654, 6560, 6580.

2 Double column design Waldrich-Siegen multifunctional milling centers allow to perform 5-dimension part machining for single work piece positioning.



<i>Brief machine characteristics</i>	<i>model 6672</i>
Table dimensions, mm	2,500 x 8,500
Portal column distance, mm	3,000
MAX work piece height, mm	2,000
MAX work piece weight, tn	32 (65)

<i>Brief machine characteristics</i>	<i>model V/H-AR-100</i>
Table dimensions, mm	2,250 x 6,200
Portal column distance, mm	2,350
MAX work piece height, mm	1,650
MAX work piece weight, tn	120



MULTIFUNCTIONAL BORING MACHINES

Fabrication facilities incorporate boring machines with spindle shaft diameter 110 mm – 220 mm and working table surface 3,600 x 3,600 mm

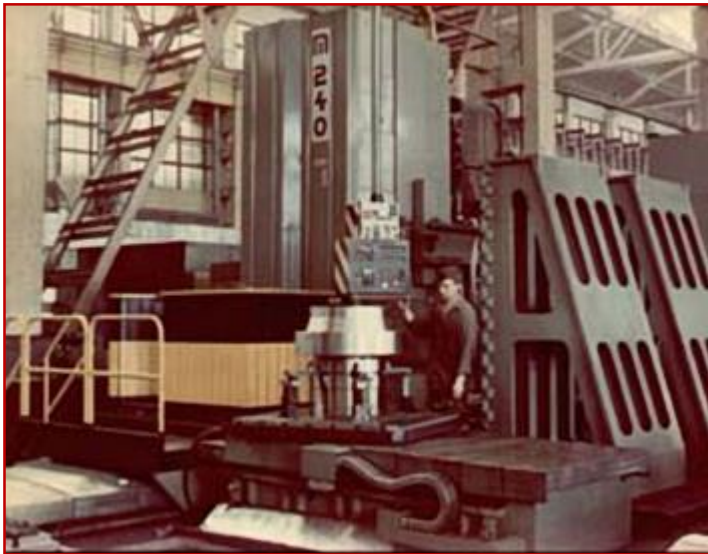


<i>Machine brief characteristics</i>	<i>model 2E660</i>
Spindle shaft diameter, mm	220
MAX processed hole diameter, mm	1,800
Face plate diameter, mm	1,150
Working table dimensions, mm	3,600 x 3,600
Spindle carrier displacement, mm	3,000
Working table weight capacity, tn	50

CNC BORING MACHINES

Fabrication facilities incorporate unique CNC boring machines that allow to perform almost any machining process.

5 units of INNSE CNC boring multifunctional machines with spindle shaft diameter 221mm and 2 units of 5-dimensional machining MEKOF CNC milling centers should be remarked separately.

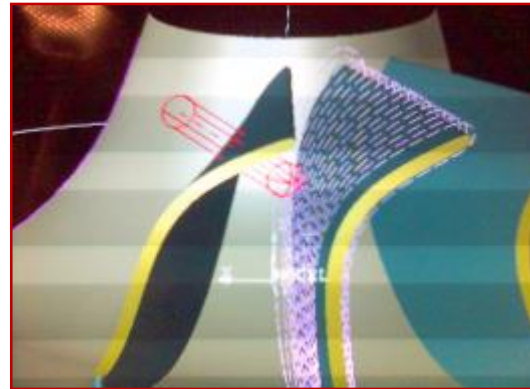


<i>Brief machine characteristics</i>	<i>F200</i>	<i>M-240</i>	<i>FA-F221</i>
Cartridge spindle diameter, mm	200	-	221
Table surface dimensions, mm	9,000 x 5,000	1,220 x 1,220	4,500 x 4,500
Console horizontal displacement, mm	13,500	6,000	9,000
Spindle carrier vertical displacement, mm	5,000	2,000	4,000
Number of simultaneously controlled axes	3	5	4
Table turn dimensional resolution	90	Continuous control	
Table weight capacity, tn	120	5	120

CNC MACHINES PROCESS SUPPORT



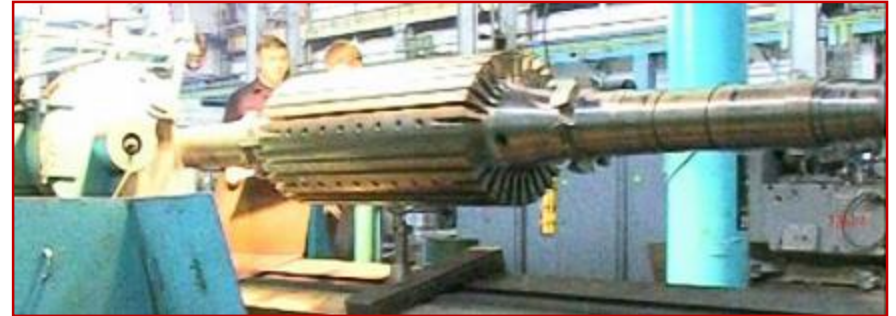
1. Work piece fabricability try-out
2. Development of mathematic models for estimation of positioning & coordination correctness.
3. Development of operation software based on CAD/CAM systems:
 - CIMATRON
 - ADEM
 - Mini APT
4. Implementation of new software at CNC machining centers
5. Development of mathematical postprocesses for reincoding of SAM data for CNC machining centers codes.



GRINDING MACHINES

Grinding machines allow to perform spherical external, internal and flat grinding of work pieces. Fabrication facilities incorporate double column flat grinding HACKERT unit with working surface of the table 1,250 x 4,200mm.

<i>SPHERICAL EXTERNAL GRINDING</i>	
Brief machine characteristics	3A174
MAX grinding diameter, mm	1,300
MAX grinding length, mm	5,600
MAX part weight, tn	5



<i>INTERNAL SPHERICAL GRINDING</i>	
Brief machine characteristics	3A229
MAX grinding diameter, mm	400
MAX grinding length, mm	320

<i>Flat Grinding</i>		
Brief machine characteristics	SZ 1250x4000	3Д725
Table dimensions, mm	1,250x4,200 0	630x2,000
MAX grinding height, mm	1,200	630
MAX part weight, tn	52	1,5

DRILLING MACHINES

Radial drilling machine «NOVIZA» (Czech Rep.) allows to drill steel parts with 100 mm diameter. Unique multy-spindle «COLB» drilling machine allows to drill using 12 spindles simultaneously.



<i>Brief machine characteristics</i>	NOVIZA
MAX drilling diameter for steel, mm	100
MAX table to spindle height, mm	2,700

<i>Brief machine characteristics</i>	MPN 12/40	2550 OS1000
MAX drilling diameter for steel, mm	40	50
MAX spindles displacement, mm	350	400
Working process area, m	3,5x6	1x1,6
Number of spindles	12	1



GEAR MAKING MACHINES

Fabricating facilities incorporate specialized machine tools that allow to perform gear making operations as follows:

- external catching – polished straight and scalene gears up to $m=18$, 5th precision degree at tempered and nitrided work pieces with diameter up to 1200mm.
- Internal clutching– straight gear up to $m=10$, 8th precision degree at nitrided work pieces with diameter up to 800 mm



Brief machine characteristics	Gear milling machines			Gear shaping	Gear grinding	
	Vertical medium prec.	Vertical high prec.	Horizontal		Increased prec.	High prec.
Module	1...20	2...16	1...12	1...10	0,5...8	2...18
Machining diameter, mm	60...2 000	100...1 500	60...400	30...800	10...300	100...1 200
Machining length, mm	до 600	до 600	до 3 500	до 180	до 170	до 600
Tilt, deg	+/- 45	+/- 35	+/- 45	+/- 0	+/- 30	+/- 30
Accuracy degree	8	5	8	8	6...7	5

DEEP HOLE MACHINING EQUIPMENT

The Company has available a number of tools that provide drilling, boring and deep hole honing in the details of length up to 6500 mm.



<i>HONE FINISHING</i>	
Brief machine characteristics	HM155 CNC
MAX honing diameter, mm	250
MAX work piece diameter, mm	400
MAX honing length, mm	6,500
MAX work piece weight, tn	5

<i>DRILLING & BORING</i>	
Brief machine characteristics	PT 294120
MAX boring diameter, mm	250
MAX work piece diameter, mm	800/400
MAX boring length, mm	6,500
MAX work piece weight, tn	6,9



SPHERICAL MACHINING TOOLS

Fabrication facilities incorporate specialized tools that allow to perform the machining of the ball valve plugs with diameters DN 25 - DN 1400mm



<i>BRIEF MACHINE CHARACTERISTICS</i>	<i>RT</i>	<i>SAFOP</i>	<i>Complex</i>
Sphere diameters range, mm	80...320	470...780	1 000...2 160
Ball valve diameter range	DN 50...200	DN 300...500	DN 700...1400



CRANKSHAFTS MACHINING TOOLS

JSC “SMNPO-Engineering” is the sole technology owner and manufacturer of the heavy reciprocating compressors crankshafts.



<i>MAIN JOURNAL GRINDING</i>	
Brief machine characteristics	RGM 1100
Grinding diameters range, mm	150 / 400
MAX centers height / grinding length, mm	670 / 8,000
MAX part weight, tn	10

<i>BEARING JOURNALS GRINDING</i>	
Brief machine characteristics	RGK1700
MAX diameter / radius of the crank, mm	1,700 / 300
max shaft length, mm	7,900
MAX part weight, tn	10

<i>DISC LATHES</i>	
Brief machine characteristics	9A804
MAX diameter / radius of the crank, mm	1,650 / 275
MAX main / bearing journal diameter, mm	300 / 200
MAX main / bearing journal length, mm	230 / 100

EDM PROCESS TOOLS

High precision Swiss AGIE tools allow to perform cutting figurine-shaped surfaces at steels and hard alloys using EDM process providing +/- 5 mkm accuracy.



<i>CUTOUT MACHINE</i>	
Brief machine characteristics	AGIECUT
MAX thickness, mm	200
Machining area, mm	400x250
MAX part weight, kg	200



<i>PUNCHING MACHINE</i>	
Brief machine characteristics	AGIETRON
MAX thickness, mm	350
Machining area, mm	420x320
MAX part weight, kg	600

WELDING & ASSEMBLY TOOLS & FACILITIES

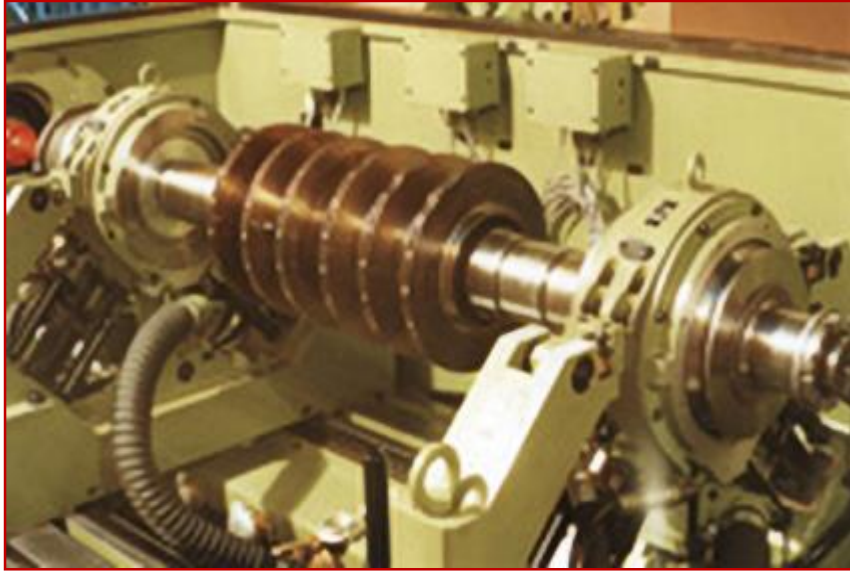


Aisle width - 24...36 m.
Cranes & weight lifting machines - up to 150 t.
Hydraulic test benches - up to 600 bar.
Unique compressor hydraulic test bench - 3,400 bar.
Pneumatic test benches - 400 bar.

Unique test benches for testing all fabricated products
(including full load tests) .



BALANCING & OVERSPEED TESTS TOOLS & BENCHES



Assembly facilities incorporate 17 balancing tools that allow to perform balancing of single rotor parts and assembled rotors with diameter up to 2,100mm, length up to 4,700mm and weight up to 7,000kg. Rotation speed - up to 3,150 rpm

Unique SCHENCK (Germany) overspeed test bench allows to run 40,000rpm vacuum tests for 2,500kg rotors.
