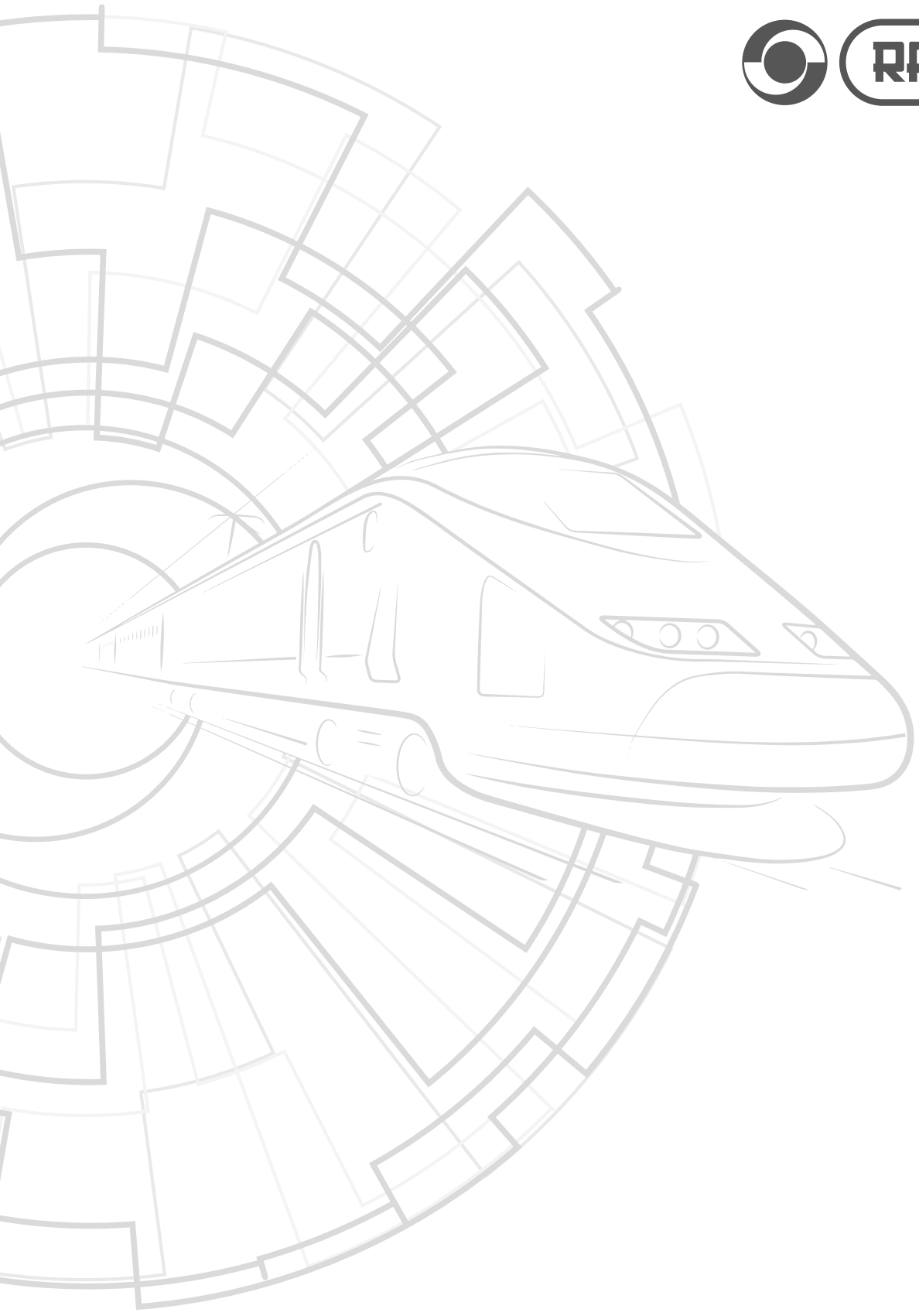


Machine Tools for Railways

At the begining

of the twentieth century, the foundry shops of the time have served to meet the diverse needs of the metalworking industry. Since then, RAFAMET has become a global company and the most recognizable brand in the market of special purpose machine tools. Our company is a widely respected supplier of heavy-duty special-purpose machine tools for railway, machine-building, energy, shipbuilding, metallurgical, aerospace and arms industry.

Now, just as back then, we are convinced that comprehesive solutions, advanced technologies and efficient productivity are obvious requirements the right equipment supplier is expected to meet in order to help various industries to be successful. That is why we are constatly adapting and continuing our efforts aimed at satisfying and serving customers' needs. We would like to invite you to take advantage of RAFAMET's many years of competence.

RAFAMET Group

Over...

70 countries around the world

80 % export share in total sales

70 years of experience, innovation and quality

170 years of history

5300 machines for railways

700 other heavy-duty machine tools

Content

Railway business

code: E-1

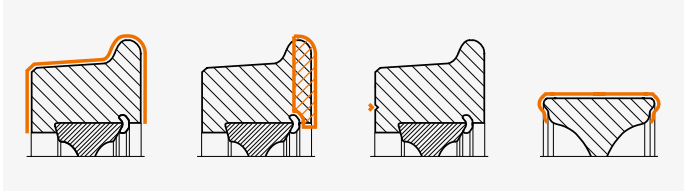
UBF 112 N

The UBF 112 N Above Floor Wheel Lathe is CNC double-saddle special-purpose lathe designed for reprofiling railway rolling stock wheelsets with axle boxes, gears and brake discs, operating in roll-in roll-out system.

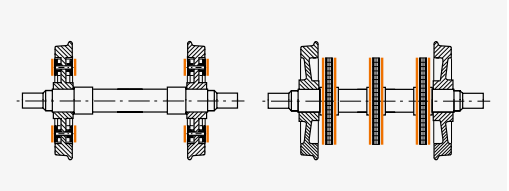
- Machine major body elements made as extremely rigid, heavily ribbed box-type, high grade grey iron castings providing maximum vibration-damping capabilities during cutting process
- Main drive powered by two AC motors of continuously variable rotation rates providing high productivity and quality of wheelset machining
- Automatic and reliable touch-type profile wear measurement
- Versatile equipment and wide programming options guarantee precise machining of even unusual wheel profiles
- Multi-track gauge version available

Available Machining Operations

Wheels



Brake discs



TECHNICAL SPECIFICATIONS		UBF 112 N	
Wheelset geometry			
Track gauge	mm	1435 [1]	
Version [2]		A	B
Max. wheel tread diameter (before machining)	mm	1120	1250
Min. wheel tread diameter (after machining)	mm	700	850
Max. width of wheel rim	mm	145	
Min. / Max. length of wheelset axle	mm	1910 / 2360 [3] [4]	
Max. weight of wheelset	×10 kN	3	
Machine tool parameters			
Max. chip cross-section (for each saddle)	mm^2	10 [5]	
Max. working feed rate	mm / min	1000	
Max. travel rate of saddles	mm / min	5000	
Max. rate of continuously variable rotation of main drive:			
• Profile machining	rpm	45	
• Brake discs facing	rpm	72	
Number of main drive motors	pcs	2	
Power of each main drive motor	kW	28	
Total power installed (standard execution)	kW	80	
Machine tool overall dimensions and weight			
Machine tool overall dimensions:			
• Length	mm	3000	
• Width	mm	7220	
• Height	mm	2620	
Workshop floor surface demand	mm	15500 × 6500	
Approximate weight of machine tool	×10 kN	36 [3]	
Machine tool accuracies			
Difference in diameters between two wheels of the same wheelset	mm	≤ 0.15	
Radial run-out of wheel tread	mm	≤ 0.10	
Axial run-out of wheel inner faces	mm	≤ 0.10	
Accuracy of profile machining	mm	≤ 0.15 [6]	
Roughness of wheel profile surface after machining, Ra	µm	5 to 20	
Roughness of brake disc surface after machining, Ra	µm	2.5 to 3.2	

[1] – Another track gauge to be agreed upon. Multi-gauge version available.
[2] – Range of clamping diameter – to be selected by Purchaser.
[3] – For track gauge of 1435 mm and standard execution.
[4] – Other length of wheelset axles to be agreed upon.
[5] – Wheel material – Steel: Hardness ≤ 270 HB, Tensile strength ≤ 950 N/mm^2.
[6] – Measured with machine tool measuring system or clearance between profile gauge and wheel profile surface.

Some of the above data can be altered to meet the Customer requirements.
Above data are subject to change due to product development, without prior notice.

code: E-3

UDA 125 N

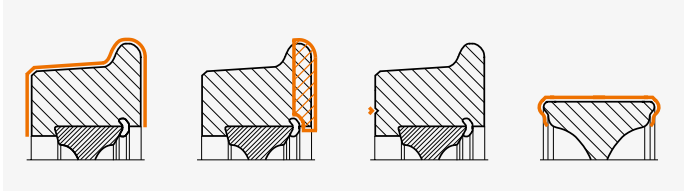
The UDA 125 N Portal Wheel Lathe is CNC double-saddle special-purpose lathe designed for reprofiling of wheels and discs used in rail vehicles. The machine tool is provided with either radial or axial wheelset clamping system and it ensures machining of solid (monoblock) wheels and wheels with tyres of both used and new wheelsets.

Roll-Through / Radial or Axial Clamping

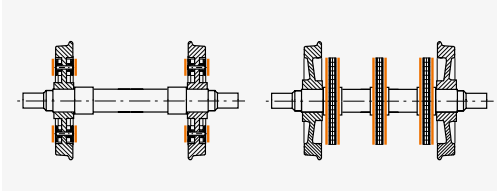
- Machine main structure made in form of portal as extremely rigid, heavily ribbed box-type, high-grade grey iron casting providing maximum vibration-damping capabilities during cutting process
- Main drive powered by two AC motors of continuously variable rotation rates providing high productivity and quality of wheelset machining
- Automatic and reliable profile wear measurement using touch-type measuring heads
- Versatile equipment and wide programming options guarantee precise machining of even unusual wheel profiles
- Multi-track gauge version available
- Two versions of wheelset clamping system
- Roll-through and/or Roll-in Roll-out arrangement

Available Machining Operations

Wheels



Brake discs



TECHNICAL SPECIFICATIONS		UDA 125 N	
Wheelset geometry			
Track gauge	mm	1435 [1]	
Wheelset clamping system [2]		Radial	Axial
Max. wheel tread diameter (before machining)	mm	1250	1200
Min. wheel tread diameter (after machining)	mm	660	770
Max. width of wheel rim	mm	145	
Min. / Max. length of wheelset axle	mm	1645 / 2370 [3] [4]	
Max. weight of wheelset	×10 kN	4.5	
Machine tool parameters			
Max. chip cross-section (for each saddle)	mm^2	12 [5]	
Max. working feed rate	mm / min	1000	
Max. travel rate of saddles	mm / min	3000	
Max. rate of continuously variable rotation of main drive:			
• Profile machining	rpm	45	
• Brake discs facing	rpm	70	
Number of main drive motors	pcs	2	
Power of each main drive motor	kW	40	
Total power installed (standard execution)	kW	140	
Machine tool overall dimensions and weight			
Machine tool overall dimensions:			
• Length	mm	3825	
• Width	mm	8400 [3]	
• Height	mm	2840 [3]	
Workshop floor surface demand	mm	15500 × 6500	
Approximate weight of machine tool	×10 kN	36 [3]	
Machine tool accuracies			
Difference in diameters between two wheels of the same wheelset	mm	≤ 0.15	
Radial run-out of wheel tread	mm	≤ 0.10	
Axial run-out of wheel inner faces	mm	≤ 0.10	
Accuracy of profile machining	mm	≤ 0.15 [6]	
Roughness of wheel profile surface after machining, Ra	µm	5 to 20	
Roughness of brake disc surface after machining, Ra	µm	2.5 to 3.2	

[1] – Another track gauge to be agreed upon. Multi-gauge version available.
[2] – Range of clamping diameter – to be selected by Purchaser.
[3] – For track gauge of 1435 mm and standard execution.
[4] – Other length of wheelset axles to be agreed upon.
[5] – Wheel material – Steel: Hardness ≤ 270 HB, Tensile strength ≤ 950 N/mm^2.
[6] – Measured with machine tool measuring system or clearance between profile gauge and wheel profile surface.

Some of the above data can be altered to meet the Customer requirements.
Above data are subject to change due to product development, without prior notice.

code: E-4

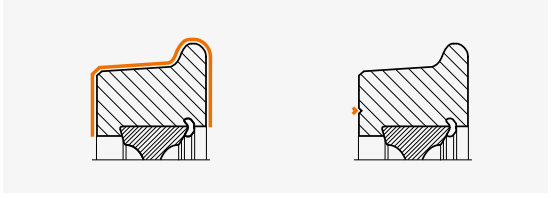
UFB 125 N

The UFB 125 N Above Floor Wheel Lathe is CNC double-saddle special-purpose lathe designed for reprofiling railway rolling stock wheel-sets with axle boxes, gears and brake discs, operating in roll-in roll-out system.

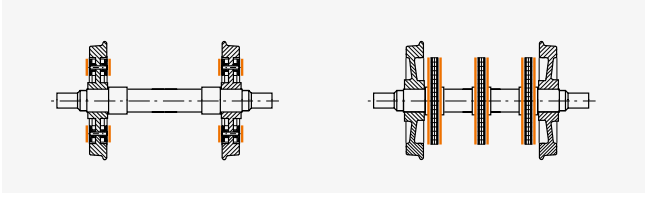
- Machine major body elements made as extremely rigid, heavily ribbed box-type, high-grade grey iron castings providing maximum vibration-damping capabilities during cutting process
- Main drive from six independent friction rollers, individually powered by AC motors of continuously variable rotation rates providing high productivity and quality of wheelset machining
- Automatic and reliable profile wear measurement using touch-type or laser-based system
- Versatile equipment and wide programming options guarantee precise machining of even unusual wheel profiles
- Adjustable track gauge in the range of 1000 to 1676 mm

Available Machining Operations

Wheels



Brake discs



TECHNICAL SPECIFICATIONS		UFB 125 N
Wheelset geometry		
Track gauge	mm	1000 to 1676 (1)
Max. wheel tread diameter (before machining)	mm	1250
Min. wheel tread diameter (after machining)	mm	600
Max. width of wheel rim	mm	150
Min. / Max. length of wheelset axle	mm	1215 / 2840
Max. weight of wheelset	×10 kN	3
Machine tool parameters		
Max. chip cross-section (for each saddle)	mm^2	10 (2)
Max. working feed rate	mm / min	1000
Max. travel rate of saddles	mm / min	5000
Max. continuously variable cutting speed for wheel profiling	m / min	130
Number of main drive motors	pcs	6
Power of each main drive motor	kW	12
Total power installed (standard execution)	kW	110
Machine tool overall dimensions and weight		
Machine tool overall dimensions:		
• Length	mm	4500
• Width	mm	7700
• Height	mm	2500 (3)
Workshop floor surface demand	mm	12000 × 4700
Approximate weight of machine tool	×10 kN	25 (3)
Machine tool accuracies		
Difference in diameters between two wheels of the same wheelset	mm	≤ 0.15
Radial run-out of wheel tread	mm	≤ 0.10
Axial run-out of wheel inner faces	mm	≤ 0.10
Accuracy of profile machining	mm	≤ 0.15 (4)
Roughness of wheel profile surface after machining, Ra	µm	5 to 20
Roughness of brake disc surface after machining, Ra	µm	2.5 to 3.2

(1) – Adjustable track gauge in the range of 1000 to 1676 mm available.
(2) – Wheel material – Steel: Hardness ≤ 270 HB, Tensile strength ≤ 950 N/mm^2.
(3) – For standard execution.
(4) – Measured with machine tool measuring system or clearance between profile gauge and wheel profile surface.

Some of the above data can be altered to meet the Customer requirements.
Above data are subject to change due to product development, without prior notice.

code: E-5

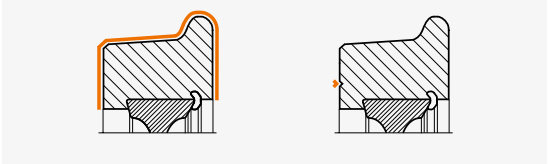
UFD 140 N

The UFD 140 N Portal Wheel Lathe is CNC double-saddle special-purpose lathe designed for reprofiling of railway rolling stock wheelsets with axle boxes, gears and brake discs, operating in roll-through system.

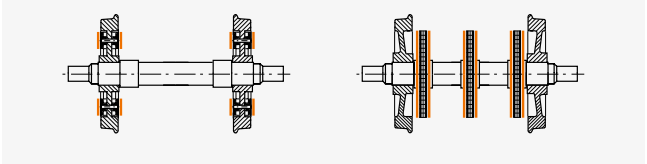
- Machine major body elements made as extremely rigid, heavily ribbed box-type, high-grade grey iron castings providing maximum vibration-damping capabilities during cutting process
- Main drive from six independent friction rollers, powered by AC motors of continuously variable rotation rates providing high productivity and quality of wheelset machining
- Automatic and reliable profile wear measurement using touch-type or laser-based system
- Versatile equipment and wide programming options guarantee precise machining of even unusual wheel profiles
- Multi-track gauge version available
- Roll-through and/or Roll-in Roll-out arrangement

Available Machining Operations

Wheels



Brake discs



Roll-Through / Friction Roller Drive

TECHNICAL SPECIFICATIONS		UFD 140 N
Wheelset geometry		
Track gauge	mm	1435 (1)
Max. wheel tread diameter (before machining)	mm	1400
Min. wheel tread diameter (after machining)	mm	540
Max. width of wheel rim	mm	150
Min. / Max. length of wheelset axle	mm	1650 / 2600 (2) (3)
Max. weight of wheelset	×10 kN	5
Machine tool parameters		
Max. chip cross-section (for each saddle)	mm^2	18 (4)
Max. working feed rate	mm / min	1000
Max. travel rate of saddles	mm / min	5000
Number of main drive motors	pcs	4
Total power of main drive motors	kW	111
Total power installed (standard execution)	kW	185
Machine tool overall dimensions and weight		
Machine tool overall dimensions:		
• Length	mm	3825 (2)
• Width	mm	8400 (2)
• Height	mm	2840
Workshop floor surface demand	mm	15500 × 6500
Approximate weight of machine tool	×10 kN	40 (2)
Machine tool accuracies		
Difference in diameters between two wheels of the same wheelset	mm	≤ 0.15
Radial run-out of wheel tread	mm	≤ 0.10
Axial run-out of wheel inner faces	mm	≤ 0.10
Accuracy of profile machining	mm	≤ 0.15 (5)
Roughness of wheel profile surface after machining, Ra	µm	5 to 12.5
Roughness of brake disc surface after machining, Ra	µm	2.5 to 4.5

(1) – Another track gauge – to be agreed upon. Available double-track gauge version.
(2) – For track gauge of 1435 mm and standard execution.
(3) – Other length of wheelset axles to be agreed upon.
(4) – Wheel material – Steel: Hardness ≤ 270 HB, Tensile strength ≤ 950 N/mm^2.
(5) – Measured with machine tool measuring system or clearance between profile gauge and wheel profile surface.

Some of the above data can be altered to meet the Customer requirements.
Above data are subject to change due to product development, without prior notice.

code: D-2 / D-2T

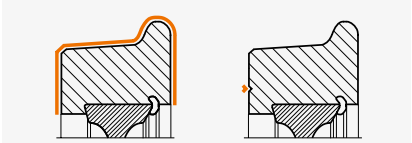
UGE 180 N
2 UGE 180 N

The UGE 180 N Underfloor Wheel Lathe is CNC double-saddle special-purpose lathe designed to machine wheelsets, used in light rail transit system vehicles (trams, metro, suburban trains), with or without dismantling them from the vehicle. The machine tool is also available in the tandem configuration – 2 UGE 180 N – capable of machining two wheelsets of the same bogie at the same time.

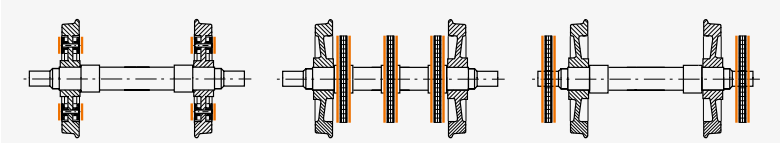
- Installed in a pit-type foundation (below the traffic rails) and operating in roll-through system
- Reconditioning of wheel profiles and brake discs mounted on vehicles significantly shortens the shutdown time of the rolling stock and thus increases efficiency of its exploitation
- Unique system of wheelset lifting and driving realized by four independent drives ensures flexible pressure of rollers and constant contact between driving rollers and wheels
- Automatic and reliable profile wear measurement using touch-type or laser-based system
- Versatile equipment and wide programming options guarantee precise machining of even unusual wheel profiles

Available Machining Operations

Wheels



Brake discs



TECHNICAL SPECIFICATIONS		UGE 180 N	2 UGE 180 N Tandem
Wheelset geometry			
Version		D-2	D-2T
Track gauge	mm	1435 [1]	
Max. wheel tread diameter (before machining):			
• Wheelset centered on axle boxes	mm	1270	
• Wheelset centered in rotary centres	mm	900	
Min. wheel tread diameter (after machining):			
• Wheelset centered on axle boxes	mm	350 [2]	
• Wheelset centered in rotary centres	mm	400	
Max. width of wheel rim	mm	145	
Max. axle load	×10 kN	18	
Machine tool parameters			
Min. wheel base	mm	–	1700
Max. chip cross-section (for each saddle)	mm^2	6 [3]	
Continuously variable cutting speed of main drive for wheel profile machining	m/min	20 to 90	
Max. peripheral speed of drive rollers:			
• Profile machining	m / min	165	
• Brake discs facing	m / min	265	
Number of main drive motors	pcs	4	2 × 4
Power of each main drive motor	kW	9	
Total power installed (standard execution)	kW	65	135
Machine tool overall dimensions and weight			
Machine tool overall dimensions:			
• Length	mm	2300 [4]	3200 [4] [5]
• Width	mm	4530 [4]	
• Height	mm	2005	2005
Approximate weight of machine tool	×10 kN	18 [4]	36 [4] [5]
Machine tool accuracies			
Difference in diameters between two wheels of the same wheelset	mm	≤ 0.15 [6]	
Difference in diameters of four wheels in the same wheelset	mm	≤ 0.30 [6]	
Radial run-out of wheel tread	mm	≤ 0.10 [6]	
Axial run-out of wheel inner faces	mm	≤ 0.10 [6]	
Accuracy of profile machining	mm	≤ 0.15 [6] [7]	
Roughness of wheel profile surface after machining, Ra	µm	≤ 16	
Roughness of brake disc surface after machining, Ra	µm	≤ 4.5	

[1] – Another track gauge to be agreed upon.
[2] – Additional equipment as rail brakes, sanders, etc. not considered.
[3] – At axle load ≥ 80 kN and wheelset holding down; Wheel material – Steel: Hardness ≤ 270 HB, Tensile strength ≤ 950 N/mm^2.
[4] – For track gauge of 1435 mm and standard execution.
[5] – For wheel base 1700 mm.
[6] – The tolerances concern the following conditions: machining process of steel solid wheels in two cutting passes and with intermediate measurement of wheel tread diameter; The cutting tools in good condition; the wheelsets equipped with outboard axle boxes of bearing slackness within tolerances by manufacturer.
[7] – Measured with machine tool measuring system or clearance between profile gauge and wheel profile surface.

Some of the above data can be altered to meet the Customer requirements.
Above data are subject to change due to product development, without prior notice.

code: D-3, D-3T

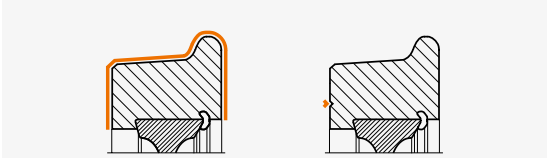
UGE 300 N
2 UGE 300 N

The UGE 300 N Underfloor Wheel Lathe is CNC double-saddle special-purpose lathe designed to machine wheelsets of heavy rail vehicles (locomotives), with or without dismantling them from the vehicle. The machine tool is also available in the tandem configuration – 2 UGE 300 N – capable of machining two wheelsets of the same bogie at the same time.

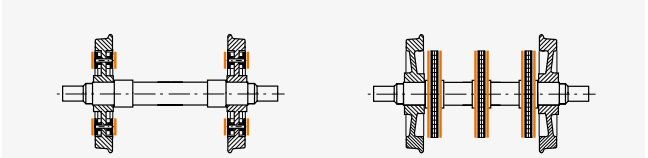
- Installed in a pit-type foundation (below the traffic rails) and operating in roll-through system
- Reconditioning of wheel profiles and brake discs mounted on vehicles significantly shortens the shutdown time of the rolling stock and thus increases efficiency of its exploitation
- Unique system of wheelset lifting and driving realized by four independent drives ensures flexible pressure of rollers and constant contact between driving rollers and wheels
- Automatic and reliable profile wear measurement using touch-type or laser-based system
- Versatile equipment and wide programming options guarantee precise machining of even unusual wheel profiles

Available Machining Operations

Wheels



Brake discs



TECHNICAL SPECIFICATIONS		UGE 300 N	2 UGE 300 N Tandem
Wheelset geometry			
Version		D-3	D-3T
Track gauge	mm	1435 (1)	
Max. wheel tread diameter (before machining)	mm	1500	
Min. wheel tread diameter (after machining)	mm	600 (2)	
Max. width of wheel rim	mm	150	
Max. axle load	×10 kN	30 / 40	30 / 40
Machine tool parameters			
Min. wheel base	mm	–	1800
Max. chip cross-section (for each saddle)	mm^2	10 (3)	10 (3)
Continuously variable cutting speed of main drive for wheel profile machining	m / min	20 to 90	20 to 90
Max. peripheral speed of drive rollers:			
• Profile machining	m / min	130	130
• Brake discs facing	m / min	300	300
Number of main drive motors	pcs	4	2 × 4
Power of each main drive motor	kW	15	15
Total power installed (standard execution)	kW	95	195
Machine tool overall dimensions and weight			
Machine tool overall dimensions:			
• Length	mm	2270	3700 (5)
• Width	mm	5600 (4)	
• Height	mm	1850	
Approximate weight of machine tool	×10 kN	24	50 (4) (5)
Machine tool accuracies			
Difference in diameters between two wheels of the same wheelset	mm	≤ 0.15 (6)	
Difference in diameters of four wheels in the same wheelset	mm	≤ 0.30 (6)	
Radial run-out of wheel tread	mm	≤ 0.10 (6)	
Axial run-out of wheel inner faces	mm	≤ 0.10 (6)	
Accuracy of profile machining	mm	≤ 0.15 (6) (7)	
Roughness of wheel profile surface after machining, Ra	µm	≤ 16	
Roughness of brake disc surface after machining, Ra	µm	≤ 4.5	

(1) – Another track gauge to be agreed upon.
(2) – 540 mm – with additional drive rollers.
(3) – At axle load ≥ 240 kN and wheelset holding down; Wheel material – Steel: Hardness ≤ 270 HB, Tensile strength ≤ 950 N/mm^2.
(4) – For track gauge of 1435 mm and standard execution.
(5) – For wheel base 1800 mm.
(6) – The tolerances concern the following conditions: machining process of steel solid wheels in two cutting passes and with intermediate measurement of wheel tread diameter; The cutting tools in good condition; the wheelsets equipped with outboard axle boxes of bearing slackness within tolerances by manufacturer.
(7) – Measured with machine tool measuring system or clearance between profile gauge and wheel profile surface.

Some of the above data can be altered to meet the Customer requirements.
Above data are subject to change due to product development, without prior notice.

code: S-1

3RS Rail-Road Shunter

RAFAMET 3RS Rail-Road Shunter is designed for shunting / manoeuvring the rolling stock of maximum total mass up to 350 tonnes. The shunter moves on rails and flat surfaces of e.g. production workshops, manoeuvring areas, loading platforms within enclosed industrial facilities (railways, metro, tram depot, ports etc.). The 3RS Shunter can be also used as auxiliary equipment for Underfloor Wheel Lathe.

- Versatile applications thanks to rail and road drivability
- Excellent manoeuvrability thanks to four independently driven wheels rotating around their axes
- Easy control by means of portable panel (radio remote control)
- Vented, robust lead acid battery with electrolyte refill
- Two adapter plater for couplers or two couplers (type to be agreed upon)
- Emission-free operations

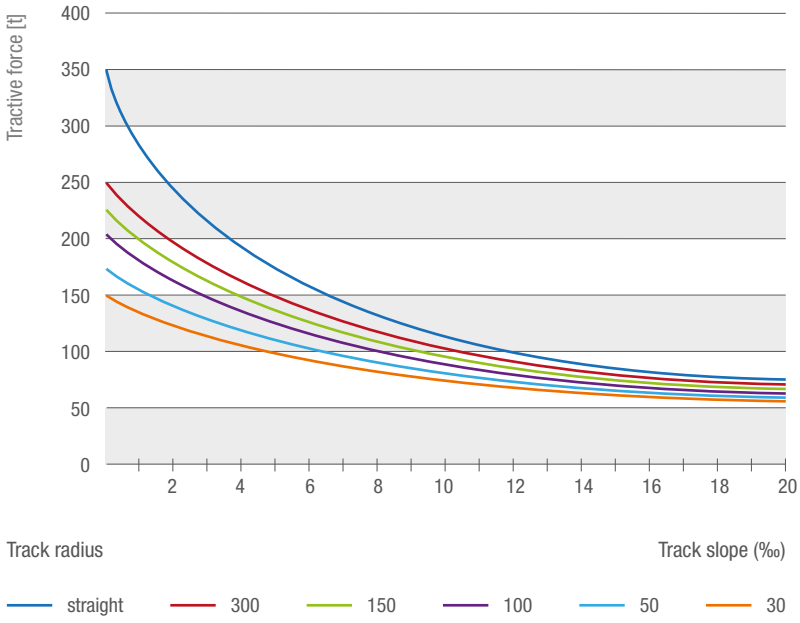
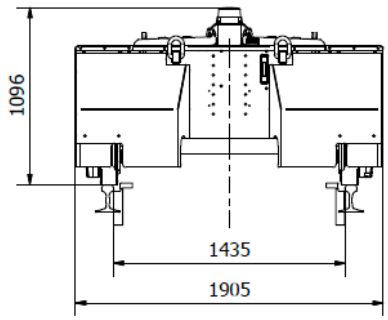
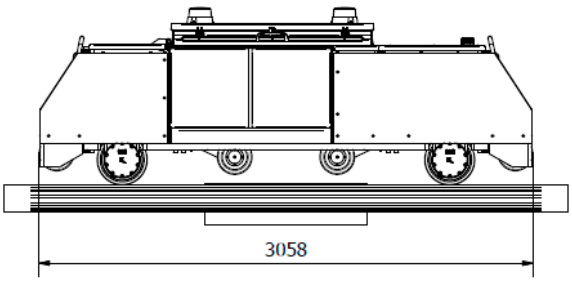


Fig. RAFAMET 3RS 350 Shunter. Towed weight in function of track slope and track radius

TECHNICAL SPECIFICATIONS	3RS
Capacities	
Track gauge	1435 mm (another to be agreed upon)
Min. turning radius	30 m
Tractive force	Min. 17.5 kN
Max. weight to shunt in normal conditions (dry, straight and flat track)	350 tonnes
Max. speed on road	6 kmph
Max. speed on rails without load	6 kmph
Max. speed on rails with load	2 kmph
Drive system	
Number of guiding / driving wheels	4 + 4 / 4 pcs
Turning drive	4 (*) / 2 electric servo-motors and gears
Turning directions	Curves and diagonals (*) / Curves
Power of electric drive motors	4 × 5 kW
Battery	
Type	Vented, robust lead acid battery with liquid electrolyte
Rated voltage	80 V
Capacity	320 Ah
Recharging cycles	Min. 1200
Overall dimensions	
L / W / H (without couplers, without operator's cab)	3058 / 1905 / 1096 mm
H (without couplers, with operator's cab)	2700 mm
Approximate weight	5 tonnes





(*) – Not available in Austria, France, Germany, Great Britain, Japan, the Netherlands, Switzerland, USA.

code: A-2, A-3

KCM 150 N

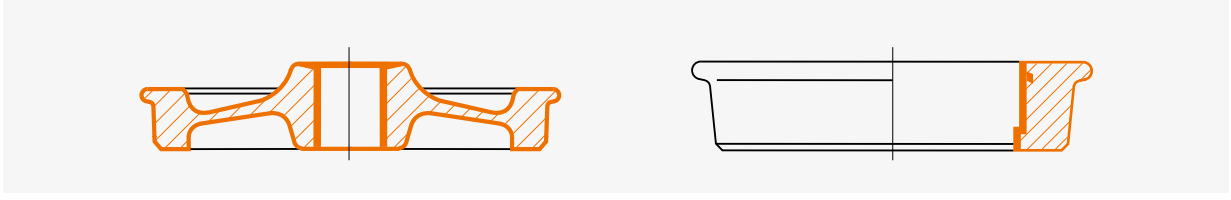
The KCM 150 N Wheel Boring Machine is single-column Vertical Turning Lathe specifically designed to machine railway wheels. It is available in single and double railhead versions, the latter with increased productivity.

Wheel Boring Machine

- Major body components made as extremely rigid, heavily ribbed box-type, high-grade grey iron castings providing maximum vibration-damping capabilities during cutting process
- Main drive powered by AC motor of continuously variable rotation rates providing high productivity and quality of wheelset machining
- Solid forged steel railhead ram equipped with Coromant CAPTO® quick-change tool adapter
- Workpiece measuring probe (of Renishaw or equivalent make) mounted in tool seat

Available Machining Operations

Wheels



TECHNICAL SPECIFICATIONS		KCM 150 N	
Table			
Version		A-2	A-3
Table diameter	mm	1500	
Max. turning diameter	mm	1800	
Max. tread diameter of solid wheel/wheel tyre	mm	1250	
Max. weight of workpiece	×10 kN	6	
Max. continuously variable rotation rates of table:			
• Cast iron table	rpm	250	
• Forged steel table of diameter 1350 mm (option)	rpm	400	
Power of main drive motor (1)	kW	55	110
Cross – rail (fixed)			
Max. height of turning	mm	400	
Railhead			
Number of railheads		1	2
Ram stroke	mm	400	
Range of feed rates in X and Z axes	mm / min	0.1 to 6000	
Ram cross-section	mm	250 × 250	
Machine tool overall dimensions and weight			
Machine tool overall dimensions (2):			
• Length	mm	3800	
• Width	mm	3400	4150
• Height	mm	4500	
Workshop floor surface demand	mm	6500 × 7000	6500 × 7700
Machine tool weight (2)	×10 kN	21	27
Machine tool accuracies			
X – axis positioning accuracy M_{ar} (L=1000 mm)	mm	0.015	
Z – axis positioning accuracy M_{ar} (L=1000 mm)	mm	0.015	
X – axis positioning repeatability $RP_{Max.}$ (L=1000 mm)	mm	0.012	
Z – axis positioning repeatability $RP_{Max.}$ (L=1000 mm)	mm	0.012	

(1) – Main drive motors of higher power available.
(2) – For standard execution of machine tool.

Some of the above data can be altered to meet the Customer requirements.
Above data are subject to change due to product development, without prior notice.

code: A-5

KKB 150 N

The KKB 150 N Vertical Wheel Lathe is single-column Vertical Turning & Boring Mill specifically designed for productive machining of railway wheels with two railheads.

Vertical Wheel Lathe

- Machine column and cross-rail combined into a single-piece (monolithic structure)
- Major body components made as extremely rigid, heavily ribbed box-type, high-grade grey iron castings providing maximum vibration-damping capabilities during cutting process
- Main drive powered by modular torque motor with continuously variable speed control
- Workpiece measuring probe (of Renishaw or equivalent make) mounted in tool seat
- Solid forged steel railhead ram equipped with Coromant CAPTO® quick-change tool adapter and HSK® angle machining head
- Tool / toolhead magazines

Available Machining Operations

Wheels

TECHNICAL SPECIFICATIONS		KKB 150 N
Table		
Table diameter	mm	1450
Max. turning diameter	mm	2000
Max. wheel tread diameter	mm	1250
Max. weight of workpiece	×10 kN	2
Clamping stroke of chuck jaws	mm	82
Max. clamping force of chuck	kN	370
Max. rotation rate for turning	rpm	400
Max. torque (of main drive) on table	kNm	31.3
Max. power of main drive	kW	362.5
Cross – rail (fixed)		
Max. height of turning	mm	800
Railhead		
Number of railheads		2
Ram stroke	mm	630
Rapid traverse	m / min	25
Max cutting force – RH / LH railhead	kN	30
Machine tool overall dimensions		
Machine tool overall dimensions:		
• Length	mm	6800
• Width	mm	7800
• Height	mm	5200
Machine tool accuracies		
X – axis positioning accuracy M_{ar} (L=1000 mm)	mm	0.015
Z – axis positioning accuracy M_{ar} (L=1000 mm)	mm	0.015
X – axis positioning repeatability RP_{max} (L=1000 mm)	mm	0.012
Z – axis positioning repeatability RP_{max} (L=1000 mm)	mm	0.012

Some of the above data can be altered to meet the Customer requirements.
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code: K-1

TOK 80 N

The TOK 80 CNC is special-purpose horizontal lathe designed for turning of railway wheelset axles. Latest CNC system enables automatic, precise and productive workpiece machining according to technological program, thereby allowing to perform both rough and finish machining of worn and new axles.

Axle Lathe

- Slant bed made of high-grade cast iron of enhanced mechanical properties, standardized, heavily ribbed with four guideways made as hardened and ground steel blocks
- Carriage travel along two guideways ensuring its precise guidance
- Longitudinal and cross-wise travels along guideways lined with anti-friction material and assisted by central lubrication system
- Optionally, machine can be equipped with burnishing attachment, rotary tools, tool and workpiece measuring systems
- 8-postion or 12-postion turret

Available Machining Operations

Axle

TECHNICAL SPECIFICATIONS		TOK 80 N
Machining capabilities		
Swing over bed	mm	800
Swing over carriage	mm	670
Max. distance between centres	mm	3000
Max. weight of workpiece	×10 kN	6
Headstock		
Spindle bore diameter	mm	95
Range of continuously variable rotation rates of face plate	rpm	4 to 800
Power of main drive motor	kW	39
Max. torque on spindle	Nm	3250
Carriage and cross-slide		
Max. rate of travels in X and Z axes	rpm	5000
Longitudinal travel	mm	3000
Cross-wise travel	mm	410
Tool system: automatic turret, no. of tool positions		8
Tailstock		
Quill stroke	mm	150
Internal tape	size	1:12 / 65
Machine tool dimensions and weight		
Machine tool overall dimensions:		
• Length	mm	2350
• Width (with chip conveyor)	mm	7800
• Height	mm	2900
Approximate weight of machine tool	×10 kN	21

Some of the above data can be altered to meet the Customer requirements.
Above data are subject to change due to product development, without prior notice.

code: T-1

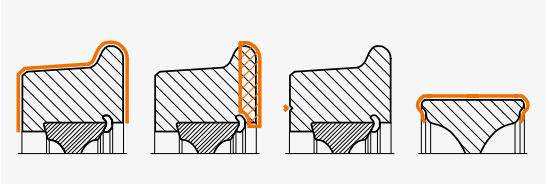
TCG 135 N

The TCG 135 N is a CNC special-purpose horizontal lathe designed for reprofiling of wheels and brake discs used in rail vehicles. The machine tool enables to perform turning and burnishing of outboard & inboard journals, axle, conical or curvilinear surfaces.

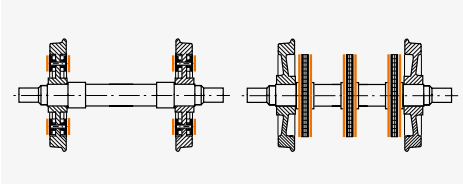
- Machine major body elements made as extremely rigid, heavily ribbed box-type, high grade grey iron castings providing maximum vibration-damping capabilities during cutting process
- Main drive powered by AC motor of continuously variable rotation rates providing high productivity and quality of wheelset machining
- Automatic and reliable touch-type profile wear measurement
- Versatile equipment and wide programming options guarantee precise machining of even unusual wheel profiles
- Multi-track gauge version available

Available Machining Operations

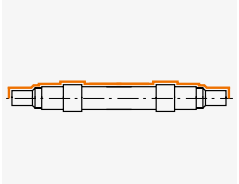
Wheels



Brake discs



Axle



TECHNICAL SPECIFICATIONS		TCG 135 N
Wheelset geometry		
Track gauge	mm	1435 (1)
Max. wheel tread diameter (before machining)	mm	1250
Min. wheel tread diameter (after machining)	mm	600
Max. width of wheel rim	mm	145
Min. / Max. length of wheelset axle	mm	2800 (2) (3)
Max. weight of wheelset	×10 kN	3
Machine tool parameters		
Max. chip cross-section	mm^2	10 (4)
Max. working feed rate	mm / min	1000
Max. travel rate of saddle	mm / min	5000
Power of main drive motor	kW	40
Total power installed (standard execution)	kW	60
Machine tool overall dimensions and weight		
Machine tool overall dimensions:		
• Length	mm	8700
• Width	mm	3500
• Height	mm	2600
Approximate weight of machine tool	×10 kN	16 (2)
Machine tool accuracies		
Difference in diameters between two wheels of the same wheelset	mm	≤ 0.20
Radial run-out of wheel tread	mm	≤ 0.20
Axial run-out of wheel inner faces	mm	≤ 0.10
Accuracy of profile machining	mm	≤ 0.20 (5)
Roughness of wheel profile surface after machining, Ra	µm	≤ 12.5
Roughness of brake disc surface after machining, Ra	µm	≤ 3.2
Roughness of axle surface after machining, Ra	µm	≤ 1.25

(1) – Another track gauge to be agreed upon. Multi-gauge version available.
(2) – For track gauge of 1435 mm and standard execution.
(3) – Other length of wheelset axles to be agreed upon.
(4) – Wheel material – Steel: Hardness ≤ 270 HB, Tensile strength ≤ 950 N/mm^2.
(5) – Measured with machine tool measuring system or clearance between profile gauge and wheel profile surface.

Some of the above data can be altered to meet the Customer requirements.
Above data are subject to change due to product development, without prior notice.

code: G-1, G-2

GMC 320/400 CNC

The GMC 320/400 CNC Milling Machines are designed for machining of the complex workpieces, including rolling stock bogie frames, diesel engine blocks and rails. GMC Series machines are capable of 3D milling, drilling, reaming, boring, threading or envelope threading in all machining planes.

Gantry Milling Machines

- Gantry with fixed or movable cross-rail (full NC W axis)
- Two parallel runways with fixed table plate provided with 2-plane geometry adjustment system
- Gantry consisting of cast iron cross-rail and two columns
- Milling railhead consisting of cast iron body and forged steel ram
- All movable assembly units travel along precise rolling or hydrostatic guideways
- High energy electro permanent magnetic system for rails

TECHNICAL SPECIFICATIONS		GMC 320/400 CNC	
Table			
Version		G-1	G-2
Surface of table for workpiece clamping (width × length) (1)	mm	2500 × 8000	3200 × 8000
Length of runway guideways (1)	mm	11400	
Max. load of table	×10 kN / m^2	8	
Gantry (moveable)			
Gantry travel (X axis) (1)	mm	9000	
Clearance between columns (Y axis) (1)	mm	3200	4000
Max. distance between spindle face and table (Z axis) (1)	mm	2500	
Range of continuously variable feed rates of Gantry (X axis)	mm / min	3 - 2500	
Gantry rapid travel (X axis)	mm / min	8000	
Milling railhead			
Ram travel (1)	mm	1500	
Ram cross-section (1)	mm	450 × 450	
Machine tool overall dimensions and weight			
Machine tool overall dimensions:			
• Length	mm	19000	
• Width	mm	10500	11450
• Height	mm	6750	
Approximate weight of machine tool	×10 kN	115	130
Machine tool accuracies			
X – axis positioning accuracy M_{ar} (L=1000 mm)	mm	0.020	
Y – and Z – axis positioning accuracy M_{ar} (L=1000 mm)	mm	0.012	
X – axis positioning repeatability $RP_{Max.}$ (L=1000 mm)	mm	0.012	
Y – and Z – axis positioning repeatability $RP_{Max.}$ (L=1000 mm)	mm	0.008	

(1) – For standard execution of machine tool. Other parameters to be agreed upon.

Some of the above data can be altered to meet the Customer requirements.
Above data are subject to change due to product development, without prior notice.

code: P-1

SP 125 N

The SP 125 N is CNC special-purpose measuring machine designed for precise wheelset wear measurements. Automatic system inspects the conditions of wheel tread surface, brake discs and axles.

The following measurements can be taken before and after machining:

- Wheelset back-to-back distance
- Wheel tread diameter and width
- Wheel rim thickness and width
- Radial and axial run-outs
- Flange thickness and height
- qR inclination
- Distance wheel rim inner faces to axle dust-shield collar (C-C' dimension)
- Depth of wheel tread wear
- Depth of flat spots on wheel tread

TECHNICAL SPECIFICATIONS		SP 125 N
Track gauge	[mm]	1435 (1)
Min. wheel tread diameter	[mm]	600
Max. wheel tread diameter	[mm]	1250
Max. difference of flange diameters	[mm]	8 (2)
Max. length of wheelset axle	[mm]	2600 (3)
Min. length of wheelset axle	[mm]	1720 (3)
Rapid travel	[mm/min]	5000
Max. weight of wheelset	[t]	3

(1) – Another track gauge to be agreed upon.
(2) – For centre holes diameter of 12 mm.
(3) – For track gauge of 1435 mm.

Laser Measurement System

The laser measurement system for wheelset is designed for monitoring of wheel profile wear. The degree of wheel profile wear is determined on the base of a virtual picture of wheel surface created from the measured data.

The system consists of the modules installed in tracks and providing the following functions:

- Vehicle and wheelset identification
- Data collection and processing with optimisation of wheel profile machining
- Full communications between the system and Undefloor or Above floor Wheel Lathe
- Wheel measurement carried out on a vehicle running with the maximum speed of 10 kph

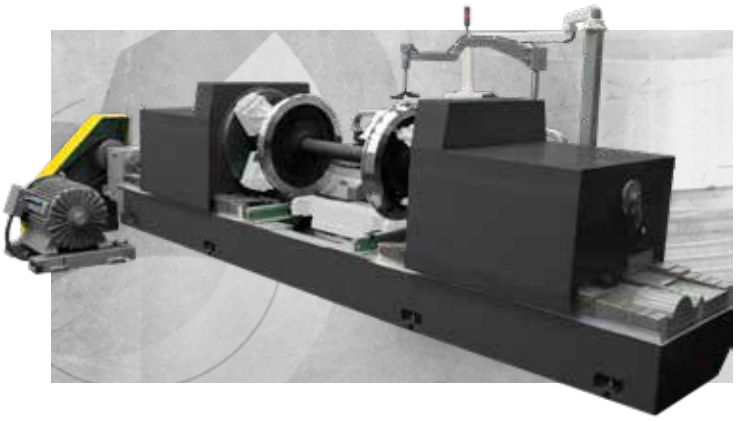
The offer elaborated in cooperation with the company P.U.T. GRAW Sp. z o.o., a supplier of track and rolling stock wheel measuring systems.

Overhauls & Modernisations

Thanks to long experience in designing and manufacturing of machine tools as well as the large own machine stock the highest quality of the overhaul services can be easily ensured. As a part of the repairs and renovations, we supply the new operation and maintenance manuals in the scope of the performed works.

The offer covers the following activities:

- Reconditioning of major components of machine tools
- Replacement of mechanical components
- Overhauls and modernisations of hydraulic systems
- Overhauls of electrical equipment and modernisations of control systems
- Spare parts
- General services, modernisations and relocations of the various types of machine tools i.e. Wheel Lathes, Vertical Turning Lathes, Horizontal Lathes, Machining Centres and others



All works are performed by highly qualified crews and engineering staff. The scope of servicing activities is fitted to the Customer's requirements. Moreover, the company provides servicing and technical guidance.

Turntable

The Turntable is designed to be installed in the production and repair lines and it serves to change the flow direction of single wheelsets. The wheelset is rolled on rails and captured by turntable which rotates left or right as programmed.

TECHNICAL SPECIFICATIONS		
Track gauge	[mm]	1435 (1)
Angle of rotation	[deg.]	90°
Drive type	electric / manual	
Max. wheel diameter	[mm]	1250
Max. weight of wheelset	[t]	4.5

(1) – Another track gauge to be agreed upon. Multi-gauge versions available.

RAFAMET Group

RAFAMET S.A. Machine Tools is one of the world-wide leading companies in the field of designing and manufacturing medium and large size heavy-duty machine tools, including vertical turning & boring lathes. The vertical heavy-duty lathes are intended for turning and boring of cylindrical, conic and curved surfaces, as well as complex shaped large-size workpieces up to 350 tonnes, 16,000 mm diameter and 7,000 mm height of turning. The application of the CNC system provides automatic and productive machining controlled by technological program. The use of the latest hardware and digital drive technology guarantee maximum performance and the complete compatibility of all drive and control components.

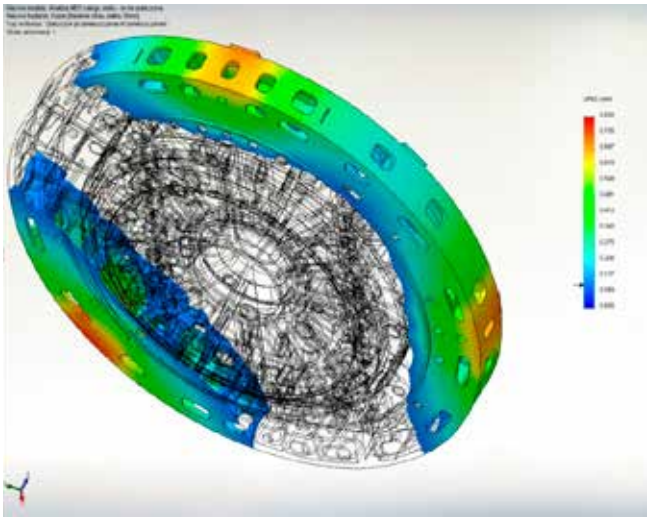
POREBA Machine Tools Ltd. is the inheritor of the technical achievements of the FUM POREBA Ltd. and after its acquisition by RAFAMET S.A., solid member of RAFAMET Group. It is a manufacturer of CNC super heavy duty, heavy duty and medium centre and floor-type horizontal lathes, as well as large horizontal drilling machines and drilling & boring machines for deep hole drilling. The POREBA machine tools are used for roughing and finishing of workpieces of up to 100 tonnes in weight and up to 4,500 mm in diameter, made of grey iron, ductile iron, steel, custom steel and alloy steel. The machine tools are applicable in the metallurgical, mechanical, defense, power, mining, paper and shipbuilding industries.

Foundry RAFAMET Ltd. is a well-known manufacture of iron castings made from grey, ductile and alloy iron, which specializes in the production of large and heavy castings in small-batch series, weighing more than 5,000 kg. Iron castings are made to individual customer needs, based on the received technical documentation. Comprehensive service package includes: technical assistance in the selection of iron type, optimization of design & build of new pattern, adaptation of the patterns provide by the clients, iron castings, priming and machining. We also offer laboratory services, heat treatment and grinding castings and steel constructions as well as repairs using the METALOCK method.

RAFAMET Railways is focused on machine tools for wheelset machining (wheels and axles), rail vehicle bogies and rail switches. It also offers rail-road shunting vehicles, as well as measuring devices for the wheel geometry and flaw detection. Thanks to constant development of the product line and compliance with the requirements of customers, RAFAMET has developed a broad range of machining tools, including special-purpose wheel lathes for railways, metro, tram, and other light-rail transit systems and belongs to the top companies in this line of business on the global market.

Engineering & programming

Thanks to Company's own, highly-qualified engineering & programming task force, equipped with Solid Edge, EdgeCAM, AutoCAD and Simatic Step 7 software, as well as our extensive knowledge and hands-on experience in applications, we offer the best engineering solutions to our customers. As a result, we continue to develop new product lines to meet specific needs of wide variety of metalworking industries. Living this value is done through understating that changing and adapting is a must to face the new technological challenges. Furthermore, for our company innovation processes are often based on a close collaboration with customers. Such a development, in recent years, has helped RAFAMET to be able to enter new manufacturing fields, i.e. bridge type milling machines, horizontal lathes, special machines, modular machining centres etc.



High quality

Total commitment to customer satisfaction has become a daily routine for the entire RAFAMET's staff and production process. Sales of products and services of quality that meets the expectations of customers while maintaining safe working conditions and respect for the natural environment are the main goals for our Company. In this context, it should be noted that the Company undertakes development tasks in the area of increasing the science & research potential, including "Industry 4.0" projects. Moreover, RAFAMET has been working in the ISO 9001 Quality Assurance/Management Standard environment since 1996.

Service & technical support

From the concept, through production, to the maintenance phase – RAFAMET makes every effort to keep machine in peak operating condition. Therefore, we provide professional training and technical service. During installation, operators and maintenance staff receive specific training on how to use and maintain the machine in order to ensure its best performance and fault-free operations. The English / German / Russian speaking servicemen possesing great skills in CNC machine tools are ready to assist our customers in case of any need. RAFAMET machine tools users have at their disposal dedicated remote diagnostics facility able to communicate with the machines control systems for immediate fault recognition and reporting.

Timeline

1846

After the start-up of the Berlin – Vienna railway line (which ran through Kuźnia Raciborska), the first steel plant called "Nadzieja" ("Hope") is founded right next to the railway station. In the second half of the nineteenth century, a rolling mill and an cast iron foundry is added.

1889

Takeover of the factory by Wilhelm Hegenscheidt. During that time, the factory is manufacturing various building equipment and products for railways (such as bolts and axles for wheelsets).

1920

The first lathe for machining of heavy wheelsets is produced.

1946

The RAFAMET comes into being. During the next few years the company acts under the name "RAFO".

1964

As an economic experiment, RAFAMET (and two other Polish companies) acquires the right to independent export and import activities without the Foreign Trade Agencies.

1996

The company's shares are admitted to be traded on the over the counter market CeTO S.A., making it the first company in Poland to do so.

2007

RAFAMET S.A. makes its debut on the Warsaw Stock Exchange (Giełda Papierów Wartościowych w Warszawie S.A.).

2016

Acquisition of the PORĘBA 1798 trademark.

Product lines

Notes:

RAFAMET Machine Tools

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