



SINCE **1983**

Zakład Kół Zębatych s.c.



54-212 Wrocław ul. Małopanewska 29
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ISO 9001 / 14001 / AQAP 2110 / CSR 26000

GEARS - WE DO IT BEST

Family company – **Zakład Kół Zębatych s.c.** co-own: Czesław Borkowski, Anna Borkowska, Andrzej Olszacki, Monika Olszacka.
Start-up year 1983 The production area of 2000 m² 50 + employees

We provide precision gears to our customers in the highest classes , prototypes for research and development departments with all topographic and heat treatment measurements.

Helical gears grind from module 0.5 to module 16 / outer diameter 10 mm to 800 mm /
also grind internal helical teeth from diameter 80 mm to 800 mm ,and Hirth type clutches.

We can also grind teeth in a solid material with any profile imported from CAD
(motor sports, Formula 1, aerospace, defense industry and, above all prototypes)

We also have heat treatment controlled by computer- hardening, carburizing, carbon nitriding, induction hardening cnc.

Processes: CNC turning, CNC machining centers, CNC grinding,
broaching splines , firing with wire, sandblasting, phosphating and a few more...

Quality control - measuring machine for 4-axis gears(certified annually) ,

3-axis measuring machine , studying the structure-hardening -depth of materials and the residue austenite

Quality management systems ISO 9001;14001:2110-AQAP(NATO) ,CSR, R & D / Constr. Dep.





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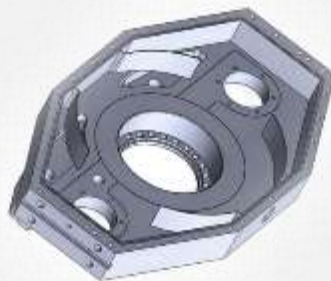
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GEARS - WE DO IT BEST

First, **KNOW HOW**

We know and support this knowledge of our customer
With us, even documentation will be checked and
optimized before starting production



CAMdivision

Enterprise Resource Planning

CAD



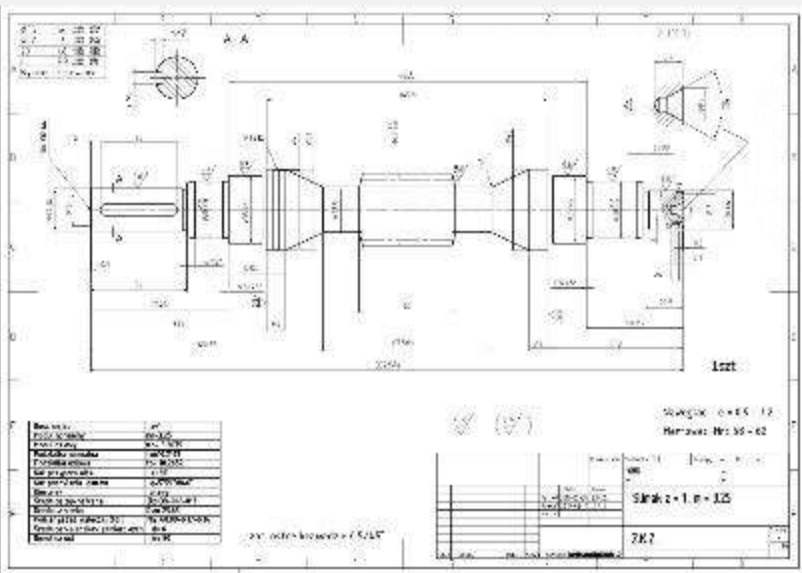
CAM

ERP



MIT

CALC





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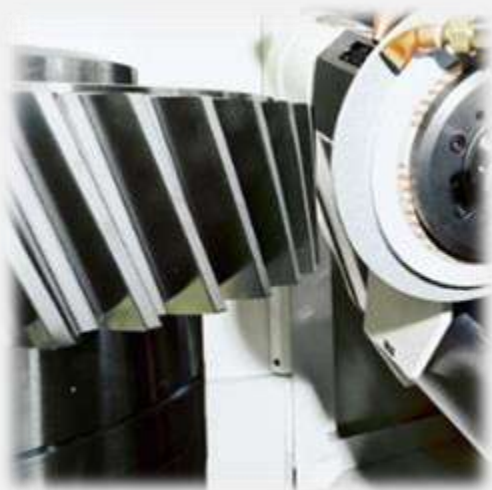


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GEARS - WE DO IT BEST

- TOOTH LINE (BARREL)
- TOOTH PROFIL
- HEAD CORRECTION
- FOOT CORRECTION
- PRESSURE ANGLE
- PROFILES UNDEFINED-
(from CAD import)



KAPP NILES ZE 800

Profile gear grinding machine

- Internal / External Spur Gears & Helical
- Double Helical „APEX”
- Undefined Helical Profiles (import from CAD)
- Synchronous Whels
- Hirth coupling

RENISHAW
INTEGRATED





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GEARS - WE DO IT BEST

KAPP NILES KX 300 P

GEARS centre **G**enerating & **P**rofile grinding of gears

machine concept

Based on a modular system in combination with the application possibilities of different tool and process technologies, user-specific, optimal production solutions can be configured. The following methods are possible:

- continuous generating grinding
- discontinuous profile
- Grinding combination of both methods
- header spindle (dia 30)



RENISHAW
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-TOOTH LINE (BARREL)
-URGENT PROFILE RESULTING
FROM DIAMOND DISK





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GEARS - WE DO IT BEST

GROB G 350T

GEARS POWER SKIVING

- 5-axis universal machining center Production of gears with internal and external toothing by the POWER SKIVING method. The compact G350T mill-turn center enables smaller parts to be machined from virtually any material in one setup.

Technical data

600/855/750 in the X- / Y' - / Z axis (mm)

Speed 70/45/90 in the X- / Y' - / Z axis (m / min)

Interference diameter 620 (mm)



EU grant project -
5 axis milling machine with
innovative power skiving
feature

RENISHAW

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Liebherr LC 800 Gear hobbing machine

•A 6-axis, numerically controlled vertical machine for producing all possible cylindrical profiles on a cylindrical workpiece. Milling of cylindrical and conical gears and profiles with a special circular tool,

Technical parameters:

- minimal. Center distance: 55 mm
- Max. Center distance: 560 mm
- Max. Radial speed: 4000 mm / min
- Max. Workpiece diameter: 800 mm
- Max. Swing angle with FK 3.2: +/- 35 °
- Max. Swing speed: 0.5 ° / s
- Max. Hobbing module: 20 mm
- Max. Module profile milling: 24 mm



Richardon R200 Gear Hobbingmaschine

A 6-axis, numerically controlled vertical machine for producing all possible cylindrical profiles on a cylindrical workpiece. Milling of cylindrical, conical gears and profiles with a special circular tool, a barrel.

Technical parameters:

- The outer diameter of the workpiece min. 10-300 mm
- 42CrMo 4 max.5 mm steel modules
- Axial distance Radial min. – max. 20 – 210 mm
- Vertical path max. 500 mm





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GEARS - WE DO IT BEST

GEAR GRINDING Mod. 0,5 / 17 Metric & Imperial

Inter. Spur Gears & Helical
Dia 80- 800 mm



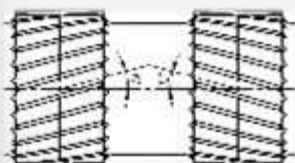
Spur Gears & Helical
Dia 10 – 800 mm



Whels Synchronous



Double Helical
„APEX”



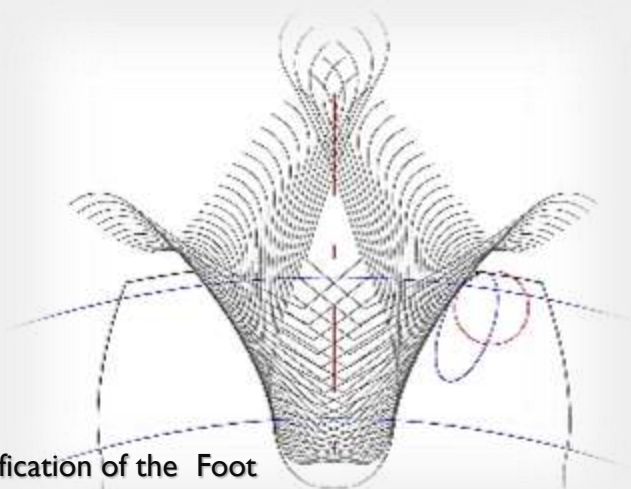
Hirth coupling



Undefined Helical Profiles
(CAD)



Use of Active Profile



Modification of the Foot
-radial
-tangential
-straightline

METHOD OF GRINDING

PROFILE



GENERATING



POSSIBLE MODIFICATIONS

- TOOTH LINE (BARREL)
- TOOTH PROFIL
- HEAD CORRECTION
- FOOT CORRECTION
- PRESSURE ANGLE
- PROFILES UNDEFINED-
(from CAD import)

- TOOTH LINE (BARREL)
- URGENT PROFILE
RESULTING FROM
DIAMOND DISK



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GEARS - WE DO IT BEST

Wenzel WGT 400

CNC machine for measuring gears

Diameter of parts min./max. 5 – 400 mm

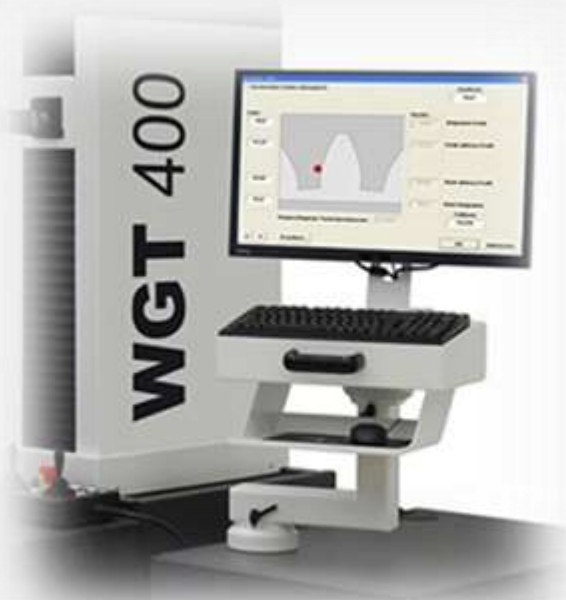
Inner diameter of the wheel min. > 12 mm

Range of modules From 0.5 mm

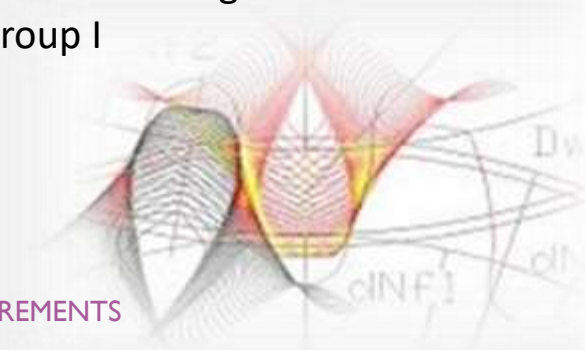
Wheel width max. 500 mm

Inclination angle max. <90 °

Accuracy of control of gears according to VDI / VDE 2612/13, Group I



PRECISE TOPOGRAPHIC MEASUREMENTS



Wenzel LH 108

3D measuring machine

additional measurements of gears up to 800 mm diameter





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GEARS - WE DO IT BEST

ZKZ MAZAK VTC 800/20HD Matrix Nexus 2

CNC machining center for the production of bodies and other elements of gears

Work space

Table height from the posture-870 mm

Table working surface (transverse) -2.500 mm

Working surface table (longitudinal) -820 mm

Cross slide (longitudinal) of the X-2,000 mm axle

Column (transversal) of the Y-800 mm axis

Spindle head (vertical feed) of the Z-720 mm axis

Maximum spindle speed (standard) 18,000 min⁻¹

Fast travel (X axis) 50 m / min

Fast travel (Y axis) 50 m / min

Fast travel (Z axis) 50 m / min

The size of the T-slot (rotary table) 18mm +0.018 -0.000

Table length 2,500 mm

Table width 820 mm

Automatic tool changer

Tool magazine capacity (standard) 30

Tool holder CAT-40 / MAS BT-40





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MAZAK NEXUS 410A

milling center
Technical parameters
Travel length in the X axis
900 mm
Travel length in the Y axis
410 mm
Z axis travel length 570



MAZAK QT 200 MB

High Performance for demanding workpiece applications

- Specifications designed to meet your production requirements – Milling function
- Tailstock travel and thrust is controlled by a servo motor
- The low thrust force ensures high accuracy turning even for small diameter shaft workpieces
- Advanced features of the Mazak Smooth G CNC



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MAZAK QTS350M

The QUICK TURN SMART 350 offers machining diameters of 420 mm and machining up to a diameter of 102 mm. The new MAZATROL SMART control system – a dialogue programming system with unrivaled efficiency. Heavy turning – increased rigidity and speed of machining due to the use of roller guides.

- Maximum machining diameter 420 mm
- Maximum machining diameter from the bar 102 mm





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Okamoto IGM 15 NC III

•CNC grinder for two-spindle holes
Range: Ø 6 to Ø 150
grinding: gears – holes and foreheads
from one mounting



Robbi Omicron CNC 3210

Precision CNC roller grinder with active MARPOS measurement

- The CNC versions were developed in response to needs for medium-high production volumes.
- Equipped with the latest-generation of SIEMENS 840D sl control system.
- The work cycle can be optimised in-process with geometrical and working parameters.
- The machine can be equipped with automatic measurement devices to process complex components.
- The CNC version allows the operator to profile the grind wheel in relation to geometries specifically created for the type of production required.
- High precision crowning operations can be performed by equipping the machines with a third interpolated axis and a bespoke software for this processes.



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GEARS - WE DO IT BEST

Carburizing

Carbonitriding

Hardening

Tempering

**Micro hardness testing
CHD/ EHT**



- Measurements of gear in a tooth cross-section
- Vickers-DIN EN ISO 6507, ASTM E-384, ASTM E92
- KnoopDIN EN ISO 4545, ASTM E-384, ASTM E92
- BrinellDIN EN ISO 6506, ASTM E-10

NC Induction hardening



FULL REPEATABILITY AND PROCESS CONTROL

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GEARs - WE DO IT BEST

Production of **Worm wheels** and multi-**Worm Snails**



Richardon R200 CNC Thred –snails milling



Reishauer NRK Thread Grinding Maschine



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Complementary processes :

- Performing splines
- Rounding of teeth gears
- Impact marking
- Laser marking
- Threting
- Sand ,glass , steel-blasting
- Ultrasond washing
- Phosporating
- & more





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GEARS - WE DO IT BEST

We support Technical Schools

Assembled on the best mechanical parts, of course ours:



Warsaw University of Technology

Wroclaw University of Technology





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.....the latest news www.zkz.net.pl

We invite you to cooperation