Alpine Metal Tech is a world leading supplier of machines and systems to support aluminum wheel production, from handling, marking, machining, and measurement to testing.

In close cooperation with the automotive industry and leading vehicle wheel manufacturers, Alpine Metal Tech has developed an extensive repertoire of measuring and testing systems that guarantee the quality and safety of the finished products. Top quality equipment optimizes the aluminum wheel manufacturing process and creates the conditions for stable and efficient production with the lowest reject rates and highest product quality in the industry.

Aluminum wheel producers benefit from automated production processes, improved quality control, and minimized investment costs. During the manufacture of aluminum wheels, a special cast parts coding process developed by Alpine Metal Tech is employed to automatically guide the unfinished parts through the entire finishing process and direct them to the various processing operations.

New laser measuring techniques further increase productivity. Our expertise in measuring cast parts has been successfully adapted for the measurement of engine parts and will soon be used industry-wide.

“Our goal is to use our enlarged product portfolio to structure comprehensive solution packages according to customer needs. Optimum quality, innovation, and customer satisfaction are the driving force behind all our activities. In-house production facilities, continuous R&D, and local service and sales offices ensure that we can reliably fulfill these commitments in all of our markets.”

Dr. Roland Ruppel, General Manager Makra

Dr. Andreas Pichler, CEO Alpine Metal Tech Group
AUTOMOTIVE PRODUCT PORTFOLIO

Wheel Business

Testing
- Biaxial testing
- Dynamic multiaxial testing
- Radial fatigue testing
- Sprue point drilling machine
- Wheel deburring machines
- Wheel robot handling
- Seal plug handling
- Universal chucking for first OP
- Flexible chucking for second OP
- Chucking at centre bore
- Customized chucking systems

Production
- Impact test
- Radial impact test
- Distortion measurement and flatness measurement
- Diameter and height control

Workholding
- Runout measurement
- PCD and bolt hole measurement
- Modular quality inline measurement lines
- Inline runout measurement machines
- Inline bolt and PCD measurement
- Design recognition system
- Valve hole positioning system

Life Cycle Business

Lifecyle
- Impact test
- Flexible workholding on inboard flange
- Chucking at centre bore
- Customized chucking systems

Spare & Wear Parts
- Flexible workholding on inboard flange
- Chucking at centre bore
- Customized chucking systems

Services & Support
- Revamps & Upgrades

Conveniently located in

ALPINE METAL TECH 3
The unique MAKRA testing machine portfolio enables all alloy wheel producers, testing organisations and car companies to stay in compliance to all regulations and specifications.
AZN - ZWARP MULTIAXIAL WHEEL TESTING

► Execution of fatigue and endurance tests for passenger and light-truck alloy wheels by rolling the wheel on a coated steel drum.
► Corresponding forces for load, camber and skew will be applied by electrical servo motors and motion control systems.
► Measurement of the forces in all directions will be done with load cells.
► Available with 1 or 2 individual load stations, as standard or as dynamic test machine
► Testing according regulations §30 StVZO, AK-Lastzyklus AK-HL08, SAE J328, and SIS D4103 (Nürburgring)
Test of fatigue and endurance simulation for passenger cars and light truck alloy wheels with defined load profiles

Load and camber angle will be applied with electrical servo drives

Side forces will be applied by rolling against a spacer disk

Test according wheel specification §30 StVO, SAE J2562, AK-LH08

Available with 1 to 4 load stations, individually for passenger cars or truck wheels.

Performance of fatigue and endurance test by constant rolling on the steel drum.

Easy and user friendly wheel change position due to vertical drum arrangement.

For execution of all law regulations according §30, StVO, AK-LH08 Lastenheft, SAE J2562, NBR 6752
TESTING
FATIGUE TESTING

IMPACT TESTING

BUP - CORNERING
FATIGUE TEST

- Simulation of the rotary bending moment which will be applied during normal road cornering
- Depending on machine version, the bending moment can be individually selected from 0.5 to 80 kN.
- Test according wheel specification §30 StVO, SAE J2562, AK-LH08, NBR 6752

IMPACT / RADIAL IMPACT TEST

- The impact test simulates the fracture behaviour of the wheels on the front side flange travelling over a defined obstacle
- The radial-impact test simulates the fracture and deformation behaviour of the wheels on the back side flange travelling over a defined obstacle
- Test according specification ISO 7141, BSAU, TRIAS 43, SAE J175, JASCO O608-750, FORD S74 EB 100 /CD, JASCO O608-75 IJ, AK-LH08, §30 STVO and NBR 6752
RUNOUT AND CONCENTRICITY

EXA - RADIAL AND AXIAL RUNOUT

- Simultaneous measurement of radial and axial runout on the front and back side tire seat
- Calculation of 1st to 10th harmonic and physical identification for positioning and marking
- Measurement of the following parameters: radial runout front and back side, axial runout front and back side, tyre seat circumference inside and outside, wheel width, wheel offset, centre bore diameter

EXA - MANUAL RADIAL AND AXIAL RUNOUT

- Portable and compact measurement machine for testing close to production site
- For optimization of lathe process, for special adjustments of the chucking system based on measurement results.
- Clamping on the centre bore with the special MAKRA chucking system
Makra and Numtec supplying machines for various production steps at alloy wheel manufacturing. This equipment ensures the highest quality and efficiency at wheel production through automation and quality control.
PRODUCTION
NUMTEC BARCODE SYSTEM

► Automation control of production, from the casting process to the mechanical machining
► Highest reliability of the system with the use of laser scanner, reaching reading rates of more than 99.9%
► More than 20 wheel producers in Europe, USA and Asia producing more than 70 million wheels / year based on the NUMTEC barcode system
► The mould based coding system ensures a reliable separation of the wheels for the various production steps.
► Far higher reliability compared to conventional camera systems.
► The Numtec barcode system can be used for standard monoblock and for flow forming wheels
► Automatic production control of conveyor systems, X-ray systems, sprue punching systems, sprue drilling systems, marking systems, deformation measurement systems and mechanical machining cells.
STANDARD CASTING WHEELS

FLOW FORMING WHEELS

NUMTEC SCANNER

WHEEL MARKING
BARCODE READING

HEAT TREATMENT (1)

HEAT TREATMENT (2)

DISTORTION MEASUREMENT
MACHINING LINE (1)

DISTORTION MEASUREMENT
MACHINING LINE (2)

DISTORTION MEASUREMENT
MACHINING LINE (x)

MACHINING LINE (1)

MACHINING LINE (2)

MACHINING LINE (x)

MARK-100 MARKING SYSTEM
Automatic wheel marking
Online in process
S. 14

SLS 3000 BARCODE
Type recognition on mould basis

SLS 3000 BARCODE
Type recognition on mould basis

SLS 3000 DISTORTION MEASUREMENT
Measurement of distortion at hub area and positioning
S. 20

MU 300 DISTORTION MEASUREMENT
CELL
Fully automatic flexible production cells
S. 18

MARK 100 DISTORTION MEASUREMENT
Fully automatic flexible
production cells
S. 18

ALPINE METAL TECH 13
MARK 100 - MARKING SYSTEM

► Automatic needle marking system for stamping of readable characters at the inside of the wheel (spoke area or attachment face)
► Individual position of the marking text based on the wheel type
► Can be used for mono-block and flow-forming wheels
► Inline machine, loading with standard roller tables.
► Free scalable marking characters.
► Options available (i.e. sprue control, …)

MD 825 - CAMERA SYSTEM

► Automatic camera system for design recognition
► 3D-geometric measurement for safe separation of wheel types
► Additional separation criteria like wheel diameter, height and offset
► Machine recognition capacity of maximal 600 wheels/hour
► Integrated system, all necessary components ready and assembled
DISTORTION MEASUREMENT & DIAMOND CUT

MD 140 - INLINE DISTORTION MEASUREMENT
- Automatic distortion / deformation measurement directly after casting process
- 100% automatic measurement of up to 200 wheels / hour with a single unit
- Flatness measurement of outboard flange and hub float
- Integrated type recognition (with NUMTEC barcode scanner or optionally with design recognition camera system)

MD 30 - MANUAL DISTORTION MEASUREMENT
- Distortion / deformation measurement for manual operation
- Measurement at casting area: flatness of outboard flange and hub float measurement
- Measurement of painted wheels: correction and optimization of diamond cut process
- Including interface Profibus / Profinet
PRODUCTION
SPRUE POINT DRILLING MACHINE

ABV - SPRUE POINT DRILLING MACHINE FOR ROBOT LOADING
- Machine for sprue drilling with robot loading
- Drilling speed up to 13mm/sec without deformation to wheel hub
- Flood or mist cooling through drilling tool
- Connection to standard chip conveyor

ABV - SPRUE POINT DRILLING MACHINE INLINE-VERSION
- Inline loading with included conveyor system
- Drilling of sprue from design side of wheel
- Special cleaning system after drilling process
- Connection to standard chip conveyor
**DEFLASHING MACHINE**

**REF - DEFLASHING MACHINE FOR ROBOT LOADING**
- Automatic deflashing for reliable X-ray and roller table transport
- Robot loading with mixed wheel types
- Deflashing of outboard, inboard and side/split flash
- With optional laser contour measurement system

**REF - DEFLASHING MACHINE INLINE-VERSION**
- Automatic deflashing for reliable X-ray and roller table transport
- Single or double unit machines available
- Deflashing Capacity up to 240 wheels/hour
- Deflashing of outboard flange, inboard flange, side/split flash
- With optional laser contour measurement system
FLEXIBLE ROBOT CELLS FOR FULLY AUTOMATIC MIXED WHEEL PRODUCTION IN BEST WHEEL QUALITY

- Integration of all available CNC machines possible
- Flexible production, simultaneous machining of different wheel types and sizes without setup times
- Chucking for lathe and drilling in highest precision, flexible for up to 3-inch sizes
- Automatic orientation of the wheels for the drilling process with turning unit and camera system
- Production capacity of up to 960 wheels/day, depending on the machining times
- Cell layout with 1 or 2 lathe machines, drilling with or without changing table
- Improvement of wheel quality with flexible orientation due to measurement at the cell entrance with a NUMTEC MD300 machine
- Wheel type recognition with NUMTEC barcode system or with design recognition system
- Integration of a fully automatic MD420 centre bore measurement optionally, including automatic correction of OP1 lathe program
- Control of the cell with a PLC system including visualisation, full data storage of wheel information for flexible production, with interface to a plant control system
WORKHOLDING DRILLING
Flexible, for 3-Inch sizes

CHUCKING OP 1
For best wheel quality, up to 24 Inch

CHUCKING OP 2
3, 4 and 6 jaw chucks

ROBOT
With flexible double wheel gripper

TURNING UNIT
Orientation of wheels for drilling process

MEASUREMENT MACHINE
MD300
For type recognition and improvement of wheel quality

CONTROL SYSTEM
With central PLC system for data control

MEASUREMENT OF CENTRE BORE MD 420
Including closed loop control or OP1 machining
PRODUCTION
MEASUREMENT MACHINES FOR MACHINING CELLS

MD 300 - MEASUREMENT AND POSITIONING AT CELL
- For integration into a production cell
- High reliable NUMTEC-Barcode or camera system
- Reduction of runout and imbalance issues through overall wheel quality improvement
- Flexible production with automatic wheel recognition and individual program selection
- Fully automatic laser measurement in the area of outboard flange and hub
- Generation of correcting data for CNC machines

POSITIONING UNIT FOR MD 300
- Rotation positioning for CNC drilling process
- Automatic correction of angle at drilling machine loading
- Operation and control fully integrated into MD300 system
- Different wheel types on one production cell through camera system
**TEST SYSTEMS**

- Check of centre bore directly after CNC machining
- Range of centre bore diameter from 48 to 85mm
- Closed control loop with OP1 CNC machine for centre bore machining
- Non-contact laser measurement
- Different wheel types on one production cell through laser system

**CAMERA SYSTEMS**

- Precise measurement of valve hole pre-cast for drilling
- Different options for several environment conditions available
- Interface to all standard CNC machines
- Different light options available
- Special protection housing for integration at the drilling machine available
DHS - VALVE STEM HANDLING SYSTEM

- Automatic measurement of valve hole position at mixed wheel feeding
- Gas-tight closing of valve hole with standard stems for helium leak test machines
- No individual programming of different wheel types necessary
- Specially designed for helium leak test machines built by vDH

MD 200 - MEASUREMENT FOR DIAMOND CUT

- Precise measurement of the wheel design side for diamond cut process
- Calculation of correction values for CNC machining
- For chucking at inboard flange or attachment face
- Massive reduction of scrap and rework rate at diamond cut process
- Different versions for manual lines available
GEOMETRICAL WHEEL TESTING SYSTEMS

**EXA - INLINE RUNOUT MEASUREMENT**
- Measurement of axial and radial runout at inboard and outboard side
- Inline machine with automatic wheel loading
- MAKRA universal chucking system
- For applications prior or after painting
- Measurement, calculation and marking of matchpoint
- Combination with additional wheel parameters (offset, …)
- Optional design recognition system

**BOLT AND PCD HOLE MEASUREMENT**
- Measurement of PCD diameter, displacement and bolt hole drilling depth
- Combination of NUMTEC camera and laser technology
- Inline machine with automatic wheel loading
- MAKRA universal chucking system
- For applications prior or after painting
- Combination with additional wheel parameters (offset, …)
PRODUCTION
MD 860 - MODULAR INLINE TESTING MACHINE

WHEEL TRANSPORT SYSTEM
- Modular, expandable wheel transport system
- Lifting and longitudinal movement with servo motor
- Precise positioning of wheels with high quality rails and servo systems
- High acceleration/speed for short wheel to wheel time

INBOUND - LOADING STATION
- Pneumatic centring
- Offset measurement
- Optional design recognition with NUMTEC MD825 system

UBAL - IMBALANCE MEASUREMENT
- Measurement of dynamic imbalance, outer and inner bead seat flange
- Measurement of static imbalance, outer and inner bead seat flange
- Valve weight correction
- MAKRA precision chucking

BORE - CENTRE BORE MEASUREMENT
- Measurement of centre bore
- Adjustable measurement height in respect of mounting face
- NUMTEC laser measurement

24 ALPINE METAL TECH
Completely modular housing system
Later installation of additional measurement modules at any time
Transport system on standardized rail system
Modular control structure
Measurement modules can easily be removed and replaced
Closed housing system, no additional protection fence necessary
Operated from a central control unit (IPC with 19 inch touch panel)

**Completely modular housing system**

- Measurement of drilling depth of each bolt hole
- Measurement of PCD diameter and position
- Makra precision chucking
- NUMTEC 3D-camera system
- Chip detection in bolt hole (optional)
- Control of cap seat and diameter (optional)

**Runa – Radial and Axial Runout Measurement**

- Radial and axial runout measurement
- Measuring of 1st to 4th harmonics, incl. position calculation of match point
- Measurement of offset and rim width
- MAKRA measurement unit with mechanical rolls
- MAKRA precision chucking
- NUMTEC evaluation software
- Match point marking (option)

**Bubb – Checking for Porosity**

- Checking for porosity at the back side flange
- NUMTEC line laser
- Adjustable test parameters according to OEM customers specification
- MAKRA precision chucking

**Bolt – Bolt Hole and PCD Measurement**

- Measurement of drilling depth of each bolt hole
- Measurement of PCD diameter and position
- Makra precision chucking
- NUMTEC 3D-camera system
- Chip detection in bolt hole (optional)
- Control of cap seat and diameter (optional)
Beside the strong construction, the most important aspects considering the MAKRA design of chucking are safety, intuitive handling and wheel quality. Our biggest advantages are long life time, extended service intervals and the best transfer of the theoretical chucking situation into real life condition. We continuously develop new solutions fitting to our customers changing requirements.
CHUCKING AT 1ST OPERATION

- Chucking solutions with finger chucks for highest quality of wheels in respect of runout and imbalance
- Different options for centring from inside or outside of the outboard flange
- Construction and positioning of resting pad and chucking fingers create the ideal chucking situation for best wheel quality
- Chucking sensors for detection of clamping errors

CHUCKING AT 1ST OPERATION
3 INCH SIZE

- Chucking of up to 3 different inch sizes without changing procedure
- Size detection system integrated into chucking system
- Chucking of all sizes at the same vertical height
- High turning speed up to 2500 rpm for fast machining
For the workholding at CNC bolt hole and valve hole drilling, a wide range of different types of workholding is available.

- The tilting of the workholding for valve hole drilling can be done with CNC axis or with pneumatic control.
- Customized version available for machining of front-AND backside of the wheel without unclamping.
- Reduction of setup time with the use of step-jaws for 3-inch sizes.

- Chucking at the machined inboard flange with 3-jaw chuck with centrifugal force balancing for constant chucking force over the total rpm range.
- For big size wheels and/or fragile wheel designs, 4 or 6 jaw chucks with up to 8-times higher stiffness with less chucking force available.
- Different jaw designs to avoid any deformation at the chucking process.
Die Alpine Metal Tech ist ein Weltmarktführer bei Komplettlösungen für die metallurgische Industrie und Aluminiumradproduktion und agiert weltweit unter sechs führenden Marken.
The Alpine Metal Tech Group develops, designs, produces and services special plants and machines for rolling, processing and handling of long products, product identification and product inspection as well as complete packages for continuous casting machines. Furthermore, Alpine Metal Tech delivers special applications for the testing, production and handling of aluminium wheels. Alpine Metal Tech operates globally under six world leading brands.

Alpine Metal Tech is a premium one-source supplier that continually updates and expands its product portfolio with customized one-stop solutions. An excellent example is the Alpine Metal Tech CCM package, which responds to customer needs by minimizing interfaces and effectively utilizing synergies.

Alpine Metal Tech’s continuous research & development activities focus on customer needs to achieve efficient and reliable production. Our R&D concentrates on creating new technological standards.

Alpine Metal Tech has a worldwide sales network and is represented both by its own sales subsidiaries and by partners and sales representatives in more than 40 countries. A worldwide concept for customer-focused lifecycle services supports the reliability and functionality of all AMT machines in operation. Our international service network allows us to compete as a global player supplying standardized products and services to meet the needs of our increasingly multinational customers.
Alpine Metal Tech has a global network of sales, engineering, production, and service facilities as well as representation offices all over the world.
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