

NDT Technologies. Performance. Test Systems. People.



# Product and Services Guide



# The MAC<sup>®</sup> Edge Has Four



## A Message from the New President and CEO of MAC<sup>®</sup>

*As we approach our 100th year, the entire MAC team is excited and ready for the future, inspired by our long and storied history in the NDT space.*

*The four key tenets of*

*THE MAC EDGE comprise our foundational operating philosophy and underpin how we operate every day. Equally important in helping our customers succeed is how we listen, cooperate, and solve your toughest challenges together. Our collaborative approach generates solutions that are critical to tackling the ever-increasing performance specifications and productivity requirements of today's markets.*

*The moment you engage MAC, our NDT professionals become part of your team. From our Business Development Managers through our many ASNT Level III certified Field Engineers, they will be with you throughout the entire process, from specifying requirements, through facility preparation, equipment installation, start-up, and operator training.*

*The world-class team at MAC stands ready to help provide innovative solutions to your most challenging problems. We will always be driven by cutting-edge engineering to deliver solutions that positively impact metal manufacturers worldwide.*

*We invite you to put our team to the test.*

**Daniel Lawrence**  
President and CEO

### **ON OUR COVER:**

**MAC's Echomac<sup>®</sup> 8 channel, Ultrasonic 25mm Rotary, designed to test small diameter wire as small as 5mm diameter, at speeds up to 120m/min. The Rotary is mounted on an automated bench with triple guide roll pinches, and the system includes a complete input/output conveyor.**

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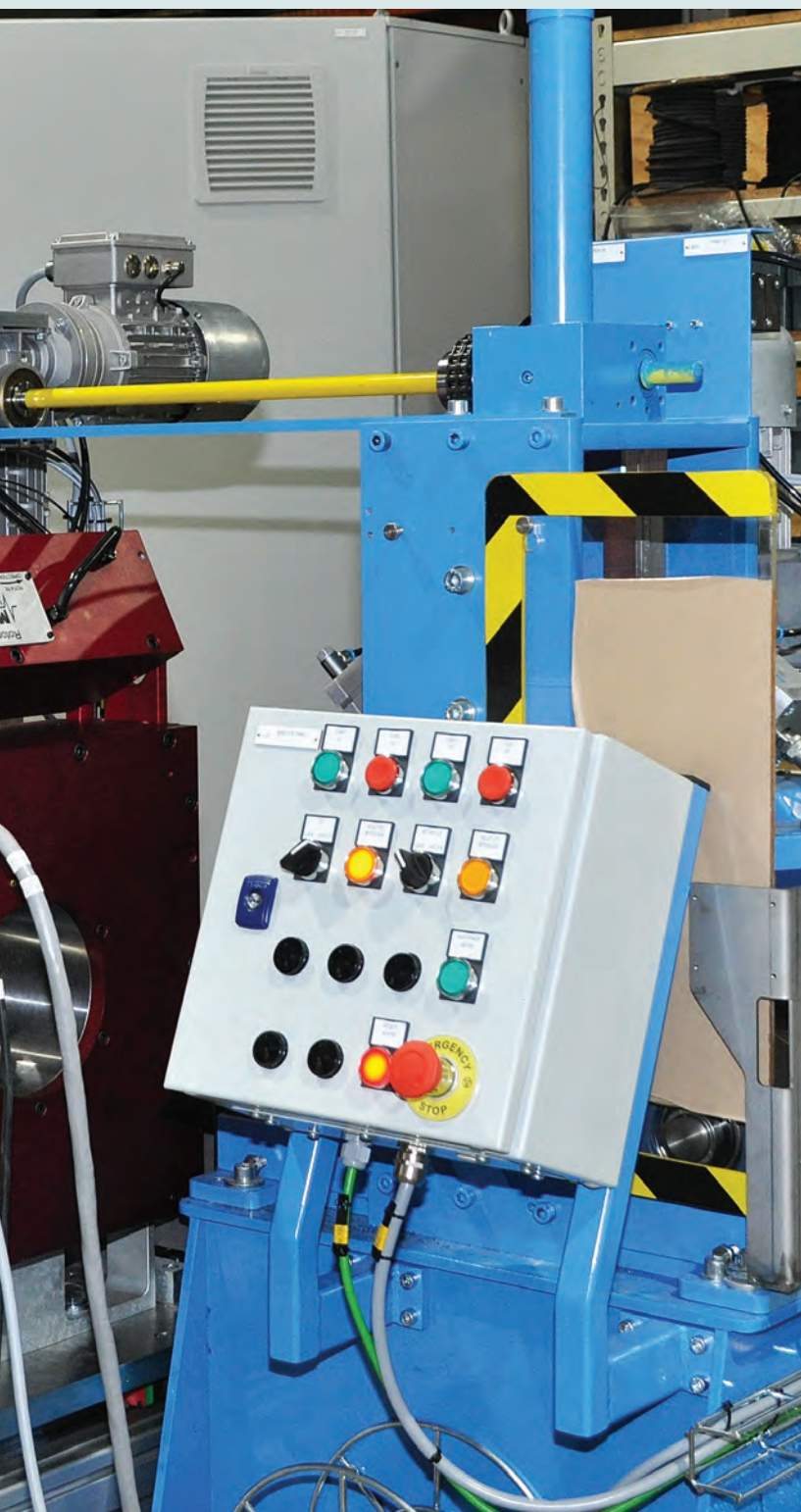
# Cornerstones

*In The  
Spotlight*

TEST SYSTEMS



PEOPLE



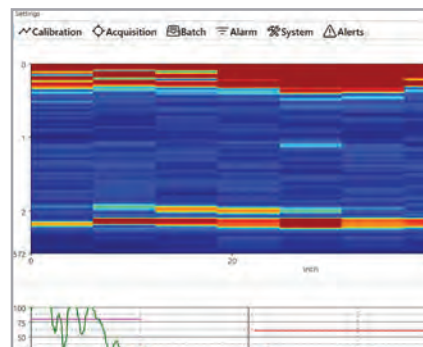
**ROBOTIC  
ECHOMAC®  
PA TW -  
page 18**  
*Operator-  
friendly system  
detects weld  
zone defects in  
tube and pipe*



**ECHOMAC®  
25MM UT  
ROTARY -  
page 18**  
*Inspects high-  
precision, small-  
diameter tube  
and bar*



**MINIMAC® II SINGLE  
OR 2-CHANNEL  
TESTER -  
page 19**  
*Affordable, high-  
performance Eddy  
Current technology  
for small batches*



**ROWA OR BIS  
UPGRADE  
PROGRAM -  
page 4**  
*Echomac® CWS  
software for  
Phased Array UT  
installations*

# BAR TESTING

MAC offers complete systems with a range of technologies to evaluate defects and integrity in round, square, and hex bar. Eddy Current, Conventional and Phased Array Ultrasonic, and Magnetic Flux Leakage testing methods, used alone or in combination, can be applied to carbon steels and stainless alloys, as well as aluminum, titanium, copper, and other non-ferrous metals.

## Inspecting for Internal Discontinuities and Inclusions

Normal incidence and shear wave Ultrasound is the preferred method for applications where a full volumetric inspection of bar is required, such as detecting small internal flaws, voids and other anomalies, as well as shallow seams and subsurface defects.

## Achieving High Productivity in Automated Inspection

Whether you are using an Ultrasonic Probe Rotary or a "Spin the Bar or Tube" system, the critical factor in achieving high productivity is the speed of the rotation.

- **Echomac® UT Rotaries (p. 18) offer the highest productivity for automated inspections.** The Rotaries utilize UT transducers mounted in a mechanical system which positions them in an enclosure that spins the transducers and the water couplant around the product as it passes through the test. Throughput speeds up to 2 meters per second can be achieved, depending on the product size.

The UT Rotary is designed and balanced to achieve exceptionally high rotational transducer speed (up to 8,000 RPM) resulting in 100% coverage. This offers the highest possible productivity - a result that cannot be achieved with "Spin the Tube" type systems. For more details, visit:

<https://www.mac-ndt.com/ut-rotaries/>

- **TacTic® (p. 18) cost-effective "Spin the Bar or Tube" immersion-style UT Systems** are a good option for testing small batches of material and frequent diameter changes, while maintaining fast change-over times. Maximum throughput speeds, however, are limited to around 38 meters per minute.

TacTic® systems spin the bar or tube through an immersion tank which contains fixed UT transducers. For critical applications above ½" diameter, the transducers are mounted on followers which surface ride the material as it rotates through the tank. This allows testing non-straight material and provides the ability to detect exceptionally small defects typical of some critical applications. For more details, visit: <https://www.mac-ndt.com/tactic-testers/>

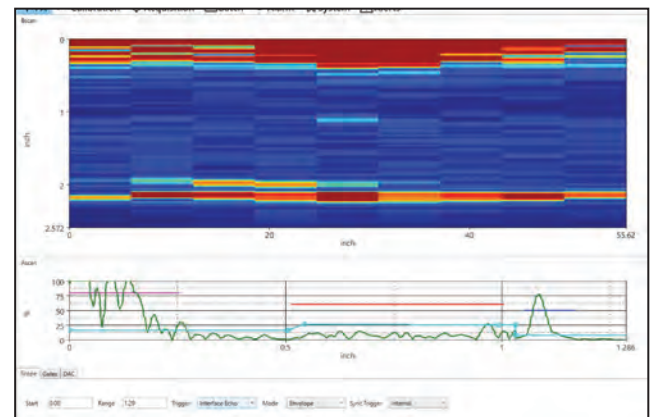
- **Echomac® PA BT (p. 18)** inspects a wide range of round and square bar diameters at speeds up to 2m/sec with minimal operator adjustments.

## Echomac® PA CWS Software Upgrade for ROWA UT Systems

MAC software ROWA upgrades can improve the performance of your existing system, provide MAC's application-specific graphical user interface (including B and C Scan results), and assure you of after-sale support and service.

The captive water Phased Array system can inspect the complete circumference of round bars for core, surface, and subsurface flaws.

Phased Array technology allows electronic scanning of the sound beam around the bar with no mechanical movement, resulting in savings from minimal maintenance and short size changeovers.



**Echomac® PA CWS Screen displays Echohunter® software A and B scans of a defect in steel bar.**



***“MAC is highly experienced in supplying equipment for high-speed bar testing. Whether it involves integrating into existing production lines or customizing complete material handling systems, we provide support and assistance that continue well after the sale and installation are completed.”***



**Bill Hoffmann**  
District Manager



**TacTic® 46 ft long standard duty ultrasonic “spin the tube” system for testing precision centerless ground titanium bar .250” – 4.00” diameter for use in the aerospace and medical industries. The system includes MAC’s Echomac® FD-6A UT electronics.**



**Echomac® UT 25mm Rotary for testing high-precision, small-diameter tube and bar.**



# BAR TESTING



*“Our robust software development and unwavering customer support have resulted in higher throughput speeds and quality for end users. We’re committed to delivering the kind of innovative solutions that ensure our clients stay ahead of the curve.”*



**Massimo Matta**  
Senior Field Engineer



Eddy Current Rotary and Encircling Coil Testers detect longitudinal and transverse defects in SBQ bar.

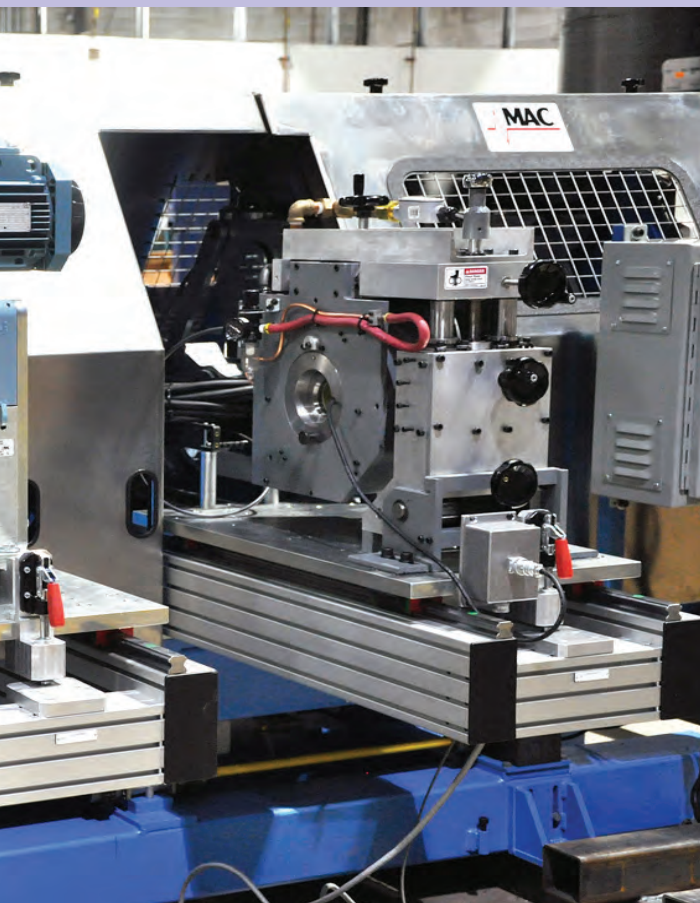




**Multi-test AC Flux Leakage, Ultrasonic and Electromagnetic Test System for 100% volumetric inspection of steel bar.**

## **Detecting Shallow Defects in Hot-Rolled Steel Bar**

AC Flux Leakage (p. 20), with its high-power AC saturating field, provides better correlation between the signal amplitude and the defect depth than a typical Eddy Current test, especially for deeper seam defects. MAC's Rotoflux® AC (p. 20) is designed to test bar from 15-180mm and can detect longitudinal flaws as small as 0.1mm deep, depending on surface condition.



## **Detecting Longitudinal Surface Seams**

MAC's Eddy Current MultiMac® instrument (p. 19) with a Rotomac® Rotary (p. 20) spins test probes around the bar to detect seams as small as 0.10mm deep in as-drawn material. If the bar is surface finished, it is possible to detect shallower seams.

## **Finding Short Length Surface & Subsurface Flaws**

Eddy Current MultiMac® (p. 19) will provide the best results. The encircling test coil detects changes in the flow of eddy currents around the short defects and is often used in conjunction with the Rotomac® Rotary (p. 20).

## **Checking Alloy or Grade**

The Eddy Current Varimac® Comparator (p. 19) can handle ferrous or non-ferrous products. MAC's Production Comparator instrument, (p. 19), shown in the system pictured above, is a low-frequency tester for ferromagnetic material. Both can easily be incorporated into a test system.



# WIRE & ROD TESTING

Eddy Current technology is the go-to method for checking continuity, alloy, flaws, and other conditions. It's also used for locating welds and splices in a range of metal wire including cut lengths, continuous production, stranded, multi-conductor and insulated cable. Carbon steels, stainless alloys, copper, titanium, nitinol, and other nonferrous metals can also be inspected.

*“Eddy Current Testing is particularly useful in aerospace, automotive and electronics manufacturing, where wire integrity is critical for safety and performance.”*



Trevor Moore  
Business Development  
Manager

## Detecting Short & Longitudinal Defects in Cold Drawn Wire

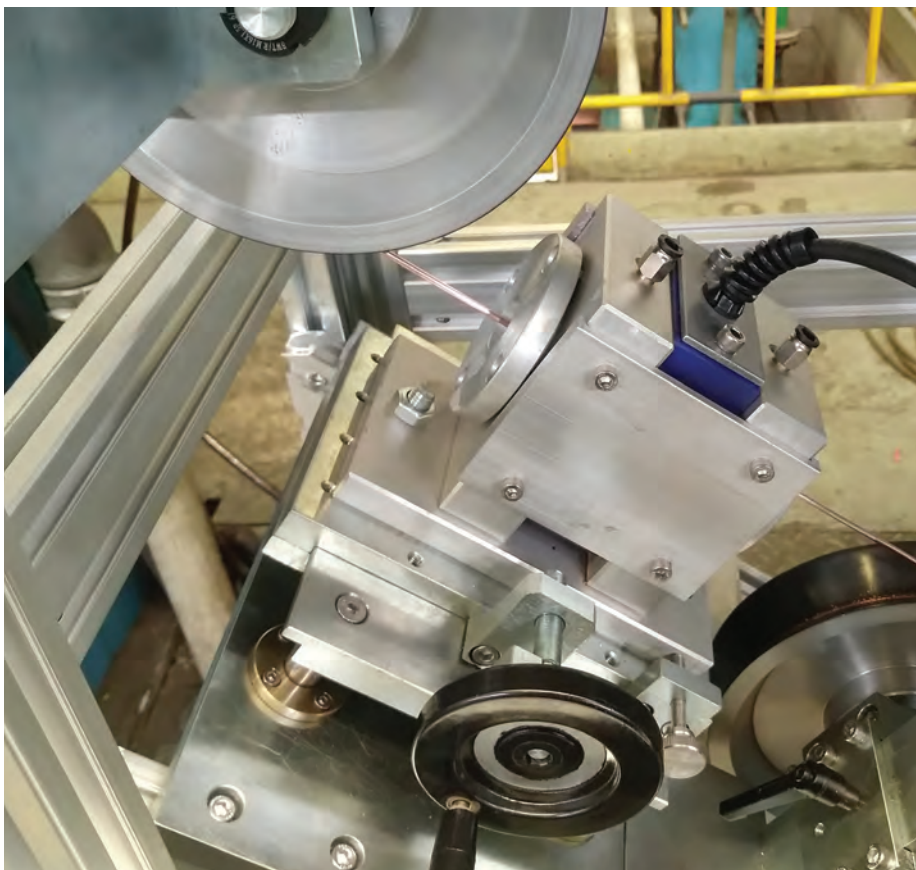
A MultiMac® Eddy Current Tester (p. 19) can be installed on processing machine lines to inspect for surface defects. By using encircling test coils with DC saturation, magnetic steel wire can be tested to detect short defects. Combining encircling test coils with a Rotomac® Rotary ET System (p. 20) allows detection of both short and longitudinal defects.

## Testing for Splices, Welds & Breaks

MultiMac® (p. 19) is a good choice to handle high throughput speed testing of multi-conductor wire to detect splices, welds, and breaks. Split coils are available to accommodate oversized splices.



MultiMac® Eddy Current Tester inspects hex and round bars on a Schumag line. A CP 65mm “floating” Coil Platform with pneumatically loaded triple guide rolls is in the foreground.



Eddy Current test coil in holding and guiding mechanism for testing drawn copper wire during production, after annealing, and before the tensioning and coiling process.



## Detecting Longitudinal Defects in Slow Throughput Operations

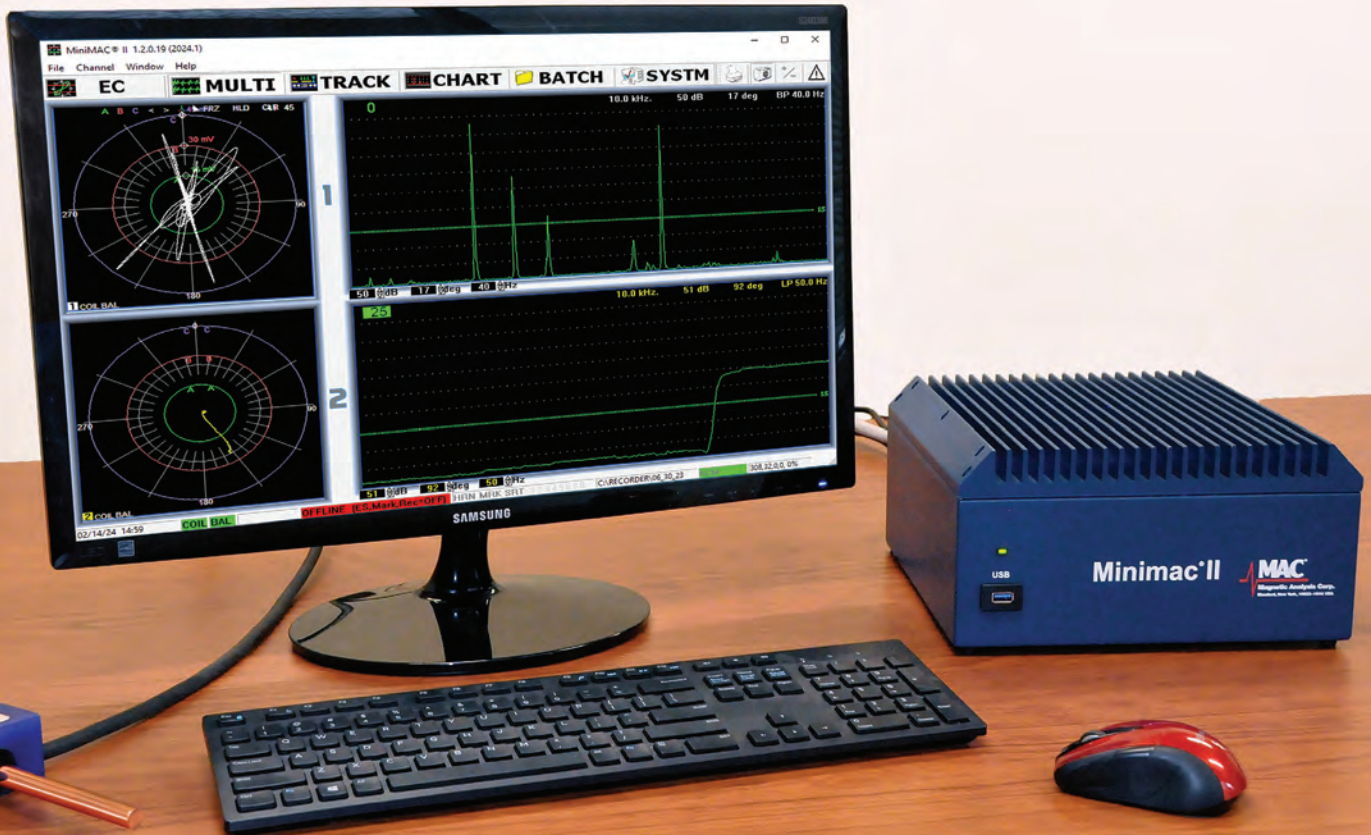
The 25RM Rotomac® Rotary (p. 20) provides cost-effective, reliable on-line inspection for longitudinal surface defects in 3-25mm diameter wire, rod, and heavy wall tube when combined with MAC's Minimac® II. The Rotary is designed for cold heading, spring making, strut rod, and other slow throughput operations.

## Checking for Continuity in Wire

Minimac® II (p. 19) requires minimal operator time to check for continuity in single or multi-conductor insulated wire and cable. It can be installed directly on the production line. Split or segment coils can be used to allow for dimensional changes in the outside diameter of the insulation.



25RM Rotomac® Rotary for cold heading and similar applications.



Minimac® II testing copper rod for flaws and ferrous inclusions.



# WIRE & ROD TESTING

## Detecting Defects in Small Diameter Wire

Test frequencies up to 5 MHz are most effective on diameters as small as 0.004mm using encircling coils.

The 20mm Rotomac® High Speed Rotary (p. 20) is designed to detect longitudinal defects such as seams and laps in wire ranging from 2-20mm diameter. It operates at speeds up to 18,000 RPM for high production output.



**Rotomac®  
20mm High  
Speed Rotary**

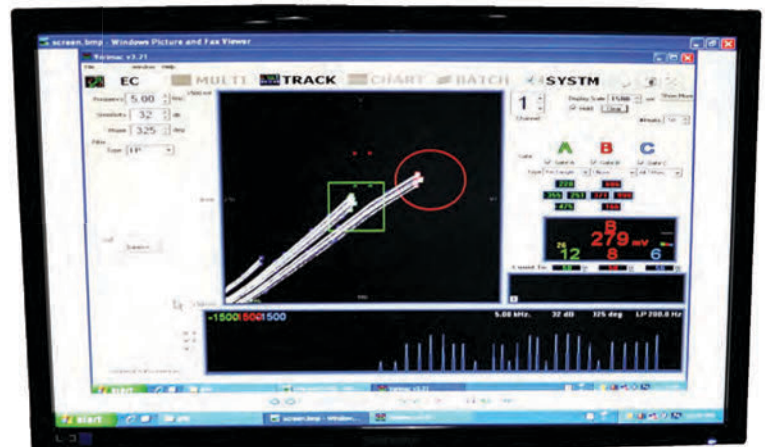
*“When MAC’s Metal Inclusion Detection (MID) Coils and Grading Software are used together, they give our customers the advantage of evaluating wire and rod quality at very high speeds. The MID Coil will detect ferritic inclusions in copper that would ultimately be injurious to the end user’s product.”*



**Dave O’Connor**  
District Manager

## Detecting Variations in Alloy, Heat Treatment, Case Depth & Hardness

The Varimac® Eddy Current Comparator Tester (p. 19) can test a range of product shapes and materials including nonmagnetic stainless steel. Variations in carbon steel wire are best detected by the low-frequency electromagnetic Production Comparator (p. 19).



**Varimac® Eddy Current Comparator**



# TUBE TESTING

MAC has a full range of technologies, instruments, and mechanics for automated inspection of welded, seamless, stainless, alloy, heavy wall, ferrous, and nonferrous tube and pipe. Our experience—which has included countless manufacturing processes, configurations, and sizes—is anchored by a large base of test equipment that meets ASTM, API, EN, ISO, and other industry-quality standards.

***“In my opinion, locally based and highly experienced service engineers are the key to providing our customers with quick responses and high-level support.”***



Shijie Li  
Business leader,  
China & Southeast Asia



**A Spinning Tube Full Body Ultrasonic test system for detecting longitudinal and transverse flaws, wall thickness, and lamination in ERW cold drawn carbon steel tube.**

## ***Testing ERW Carbon Steel Tube***

### **Detecting Long Continuous Seams, Inclusions, Voids, or Cavities in Moderate to Heavy Wall Welded Tube & Pipe**

Ultrasonic technology is recommended for the detection of incomplete seam welds and inclusions, voids, or cavities in thicker wall tube and pipe. MAC's Echomac® line of ultrasonic test systems (p. 18) can inspect the weld zone or the full body.

Conventional Echomac® Ultrasonic Systems use fixed or rotating test transducers mounted in a mechanical system to position the transducers for the test. Rotaries can test a wide range of circumferences from 5-500mm diameters.



# TUBE TESTING

## Short Surface ID/OD Defects in Thin Wall Tube

Eddy Current technology is the most versatile and cost-effective method for testing thin wall metallic tubes. It is applicable to a broad range of diameters and throughput speeds, and can detect short, incomplete welds as well as subsurface and inside diameter conditions in carbon steel, stainless or nonferrous tube. MAC's MultiMac® (p. 19) or Minimax®II (p. 19) testers, used with encircling test coils and coil platforms, both provide effective solutions.

## Phased Array Echomac® Systems

These systems (p. 18) utilize a gantry or robot to position the test transducer head on the tube for testing the weld. A large range of diameters can be tested, and both gantry and robot options can provide better coverage of the weld zone with less operator intervention and maintenance than conventional UT.

## Monitoring Weld Profile & Detecting Longitudinal Weld Zone Defects

MAC's Echomac® PA TW Phased Array Ultrasonic system (p. 18) – installed in the hot zone, close to the welder, at temperatures up to 252° F (122° C) – is an excellent choice to monitor the seam trim tool. The upstream location allows quick operator feedback on scarfing tool errors and gross welding defects. The system can also operate in the cool zone, after the forming rolls, for higher precision defect detection as the pipe has a more predictable shape and temperature. The Phased Array system can handle pipe 51–700mm diameter.

Echomac® PA TW Phased Array Ultrasonic System positioned in the hot zone for monitoring the weld profile in welded steel tube.



## Detecting Surface & Subsurface Defects Using Immersion “Spin the Tube” Systems

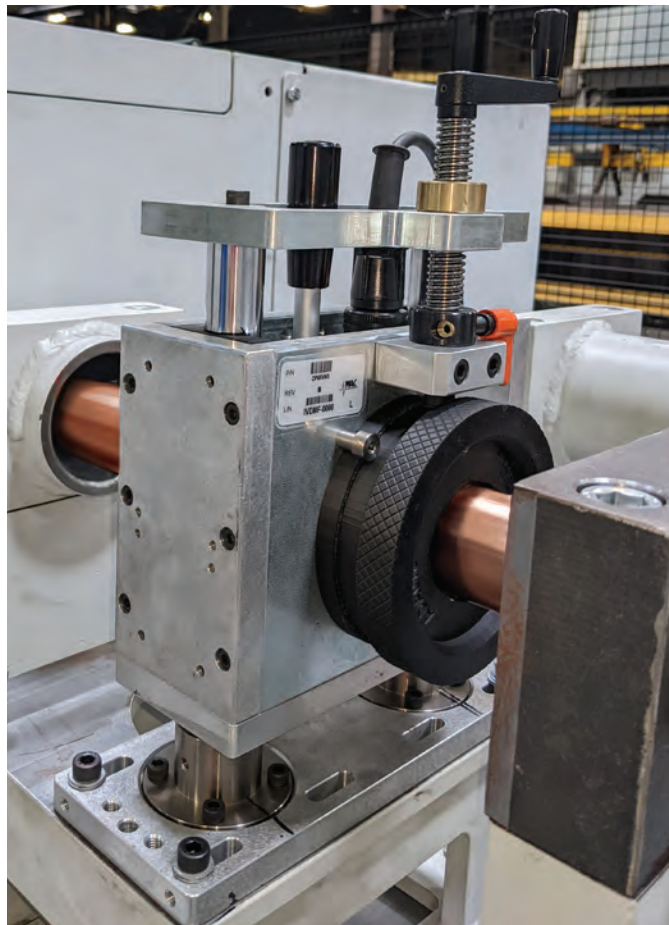
MAC’s TacTic® “Spin the Tube” Ultrasonic Immersion Tank Systems (p. 18) provide cost-effective solutions for testing small batches of material or for frequent diameter size changes. The systems operate with MAC’s Echomac® UT test electronics (p. 18). Systems for inspecting round materials with diameters ranging from 6.35–200mm and solid bars ranging from 6.35–150mm are available.



MAC’s Echomac® FD 6A ultrasonic instrument with TacTic’s® standard heavy duty “Spin The Tube” Immersion-Style System to test titanium tube.

## Detecting Long Continuous Surface Seams in Seamless Tube

A MultiMac® (p. 19) used with a Rotomac® Rotary (p. 20), which spins the test probes around the tube, is recommended for detecting long surface seams, especially in thin wall tube. Diameters from 5-180mm can be supported. A MultiMac® instrument with encircling coil and rotary probes can be used in combination for testing short flaws, as well as surface seams.



Eddy Current encircling test coil for finding short flaws in seamless thin wall water tube includes bushings to position and guide the tube through the test.

## Finding Inclusions in Finned Tube

A two-channel Minimac® II (p. 19) or MultiMac® (p. 19) with an MID (Magnetic Inclusion Detector) will detect small ferromagnetic inclusions in nonferrous tube. The system would include a Coil Platform, specialized ZZ coils and a Pinch Stand. Flaws in all areas of the tube, including the land/transition, finned, and smooth non-finned sections, can be detected.



# PARTS TESTING

*“MAC excels at fast and economical solutions for inspecting and sorting parts. Our leadership stems from a selection of highly adaptive comparator equipment and the support of a professionally trained field staff. It’s a combination that has proven to be an important asset for our customers.”*

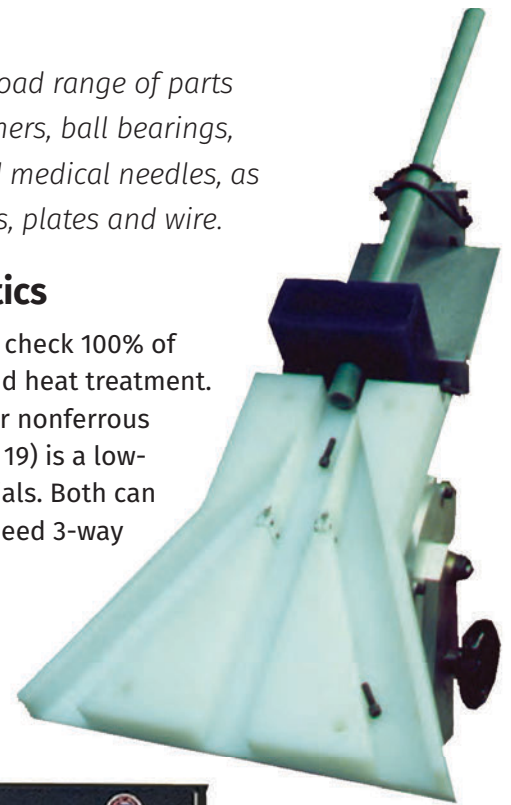


Mike Rakos  
District Manager

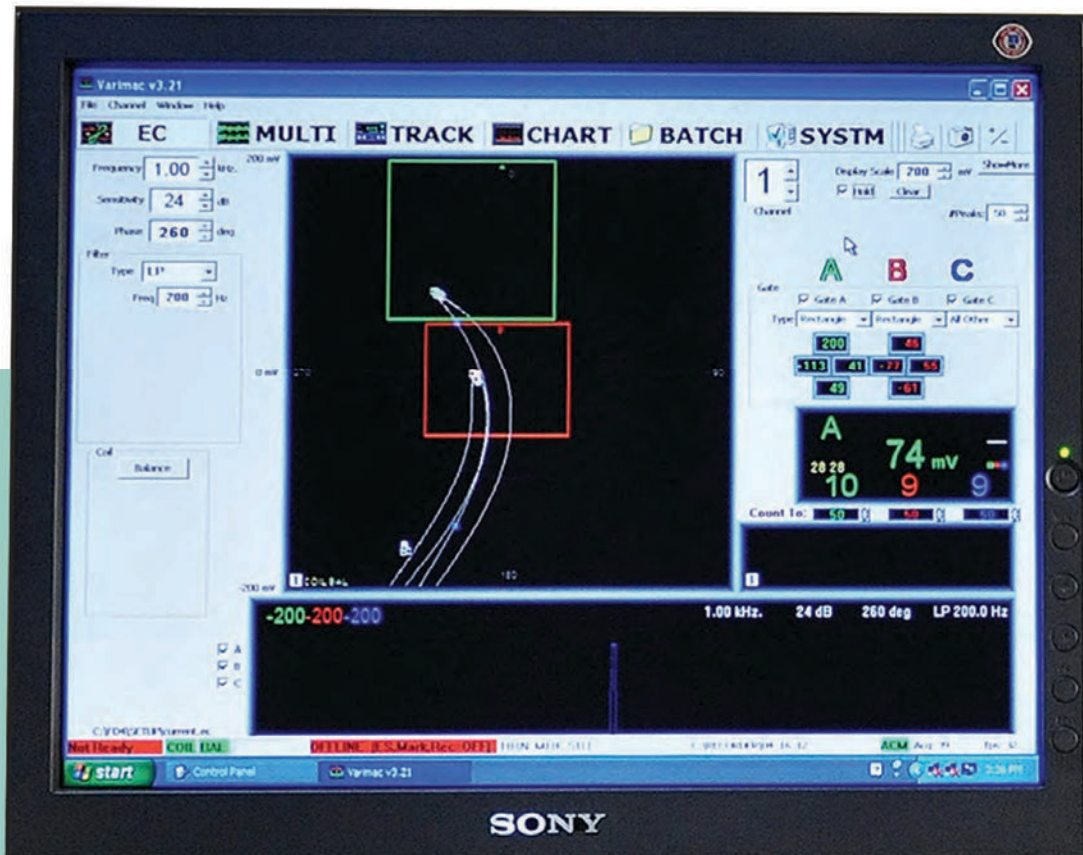
MAC’s installed testers can inspect a broad range of parts during fabrication. These include fasteners, ball bearings, pistons, strut rods, expanders, pins and medical needles, as well as components such as tubes, bars, plates and wire.

## Detecting Physical Characteristics

MAC’s comparators are the best choice to check 100% of your parts for dimensions, alloy, grade and heat treatment. The Varimac® (p. 19) can handle ferrous or nonferrous materials. The Production Comparator (p. 19) is a low-frequency tester for ferromagnetic materials. Both can be used with MAC’s Parts Gate for high-speed 3-way sorting of up to six parts per second.



Three-way  
Parts Gate for  
sorting.



The Varimac® monitor screen displays rectangular targets that show “acceptable” parts in the green box, “above spec” in the red box, and “below spec” outside the boxes.

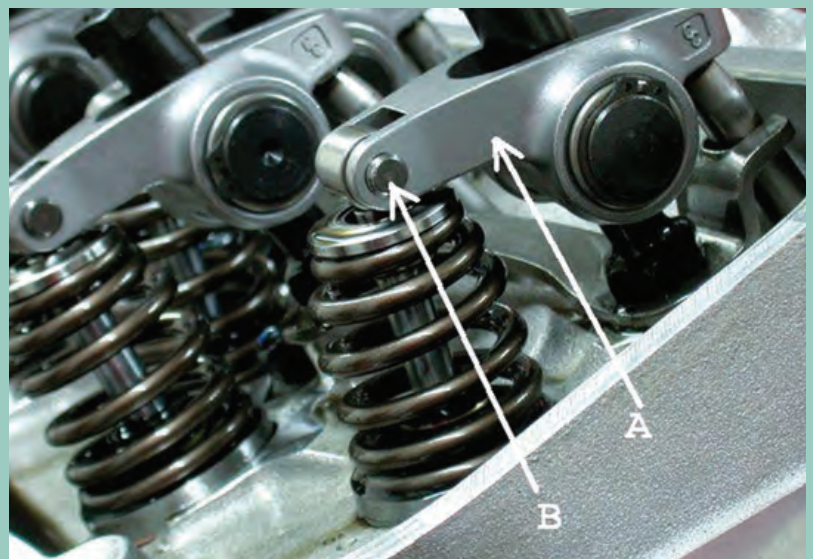
## Assessing Nodularity in Ductile Iron Cast Automotive Components

Echomac® VM evaluates velocity, thickness or flaw detection to meet the industry-accepted means of automotive part integrity. Two parts can be tested simultaneously from separate test stations using only one instrument. Associated test immersion tank systems are also available.



## Finding Cracks, Unwanted Inclusions, Seams and Weld Defects

MAC's Eddy Current, Ultrasonic and Flux Leakage technologies can be applied to inspect many ferrous and nonferrous parts, similar to the applications used for testing wire, bar and tube.



Valve train assembly with pins (B) that have been tested by a Varimac® for proper heat treatment, and a rocker arm (A) that is inspected by the Production Comparator to detect gas pockets resulting from the casting process.



# COMPLETE SYSTEMS

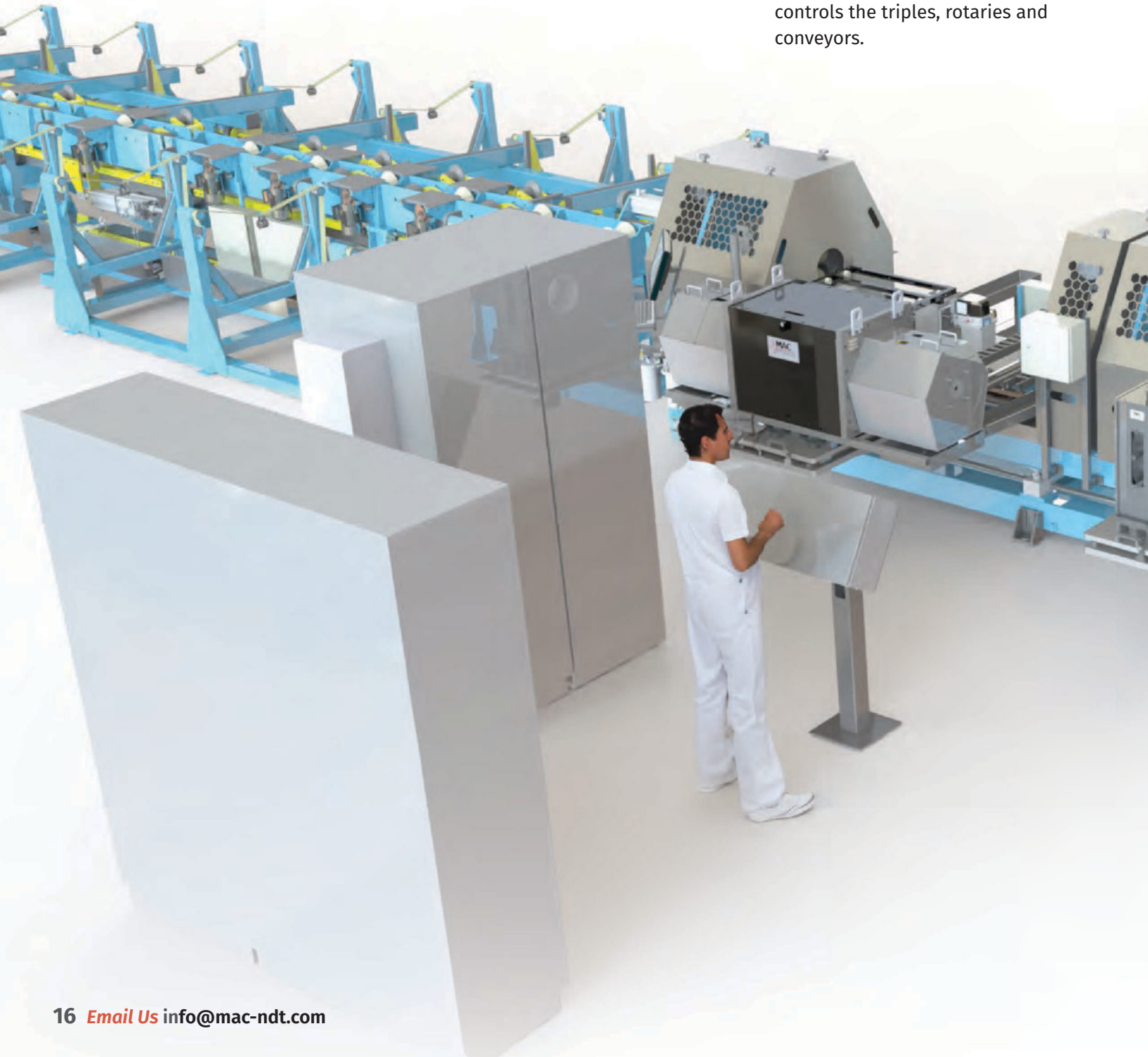
Whether you need to inspect bar, tube, wire or parts, MAC's full range of test benches, coil platforms and handling components can fully integrate with your production process. When combined with MAC instrumentation, your NDT inspection systems can reach their fullest potential.

## Standard and Custom-Designed Options

Components and systems are available to precisely hold and position test instruments, coils, rotaries and drives. Conductor control options enable complete command of test benches, multiple test instruments and pinches. In addition, extensive input/output configurations can be handled.

## Triple Guide Roll Constant Center Test Bench

This bench is a constant centerline guiding and driving unit that propels the tube or bar through the test units. The dual leading and trailing triple guides guarantee a controlled entrance and exit from the test stations which eliminate vibrations from tubes that can cause false reject signals. Almost no manual settings are needed when dimensions change, and the PLC controls the triples, rotaries and conveyors.



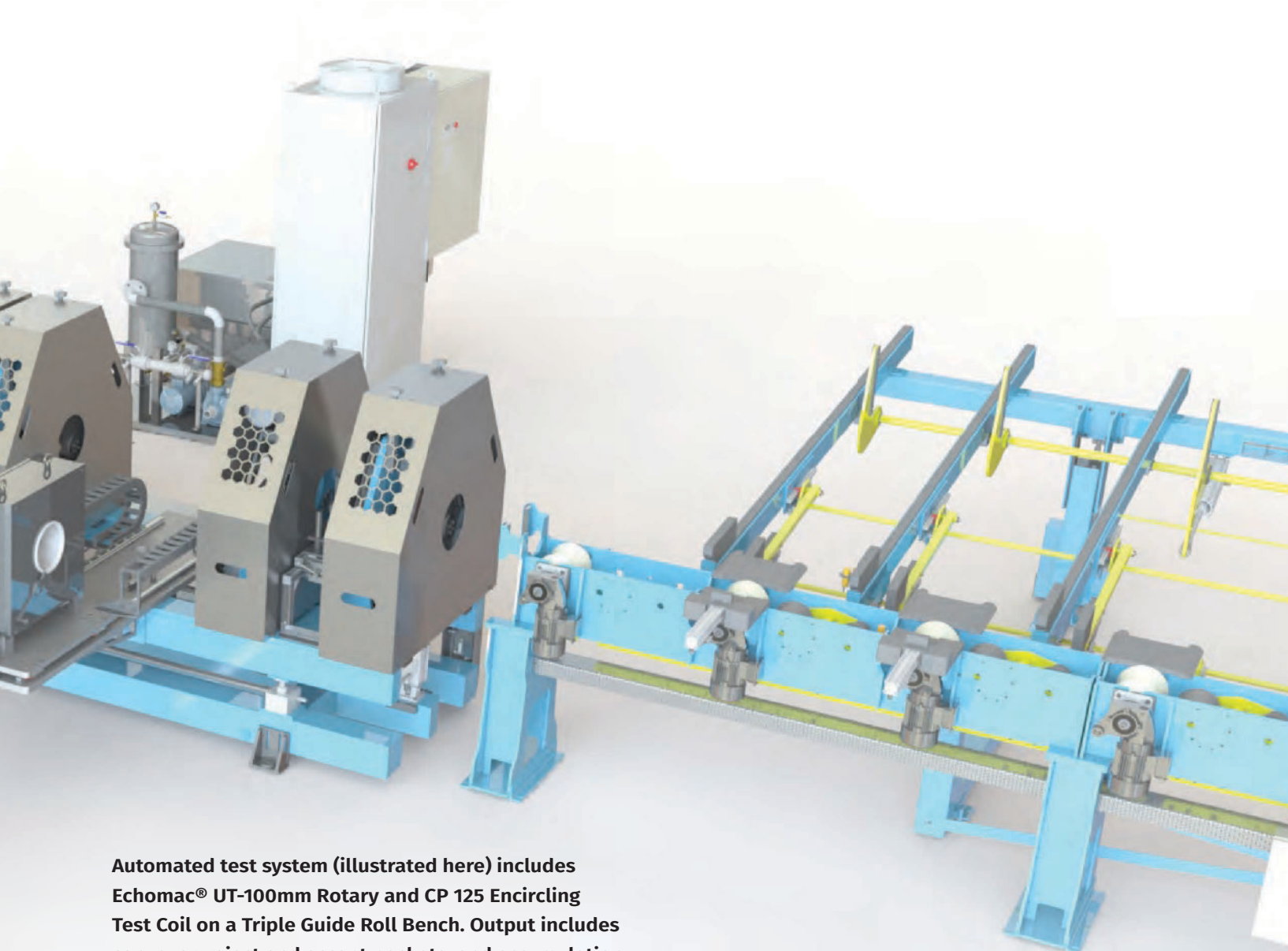
## “V” Roll Test Bench

Our standard test bench utilizes 120-degree “V” rolls and pinch stands to accurately support and position test materials. The “V” rolls feature three points of contact and a flat top roll to ensure firm support and eliminate vibrations. Automated or manual controls are also offered for making easy adjustments in testing material size and diameter.

*“Throughout Europe, MAC is recognized as a premier provider of essential NDT modalities. Because the company’s efforts are supported by a dedicated team of field and application engineers, we can offer clients unparalleled customization compared to standard solutions.”*



Thierry Laffont  
Sales Leader Europe



**Automated test system (illustrated here) includes Echomac® UT-100mm Rotary and CP 125 Encircling Test Coil on a Triple Guide Roll Bench. Output includes conveyor, reject and accept pockets, and accumulation table. Input includes conveyor and loading table.**





## Echomac® FD-6/6A

- On- or off-line flaw detection, thickness, weld inspection and dimensional measurement of bar and tube
- Operates with rotary, immersion, squirter, bubbler and “Spin the Tube” systems
- High S/N ratio, precise thickness resolution (<math><1\mu\text{m}</math>), and excellent repeatability
- Available with up to 32 test channels or as a smaller unit with up to 6 test channels

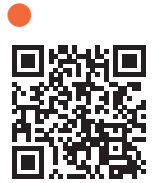


INSTRUMENTS



## Robotic Echomac® PA TW

- Finds defects in tube and pipe caused by scarf or the welding process
- Cost-effective phased array test system for welded tube
- Weld profile quickly alerts operator to scarfing process issues
- Detects longitudinal OD/ID defects
- Minimal operator intervention
- Can operate in hot zone close to weld operation



ULTRASONIC TEST SYSTEMS



## Echomac® PA BT

- Handles a wide range of bar diameters in a single installation
- 100% inspection of round bars for core and surface defects
- 3 models cover a range of 10-254mm diameter
- Change cassettes for different sizes in under five minutes



ULTRASONIC TEST SYSTEMS



## TacTic® “Spin the Bar or Tube” UT

- For round tube or bar 6.35–200mm diameter
- Immersion type “Spin the Tube” system
- Detect surface and subsurface defects
- Cost effective for small batches or frequent diameter changes



ULTRASONIC TEST SYSTEMS

*Echomac® Rotaries can test materials ranging from 5-500mm diameter. We show two of our models.*

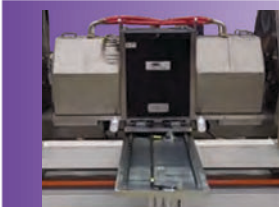


## Echomac® 25mm UT Rotary

- Tests 5-25mm diameter material with wall thickness down to 0.3mm
- 630mm length allows easy installation in existing lines
- Precise thickness resolution (<math><1\mu\text{m}</math>) for excellent repeatability



ULTRASONIC ROTARIES



## Echomac® 150mm UT Rotary

- High-speed testing of round bar & tubular products
- Tests 30-150mm diameter material
- Maximum RPM is 1800



ULTRASONIC ROTARIES



INSTRUMENTS



### MultiMac®

- Simultaneous coil and/or rotary probe testing
- Up to 8 test channels to use in any combination
- Detects transverse, short and/or longitudinal, seam-type surface defects
- Tests magnetic or nonmagnetic material
- Compact MultiMac® SM is also available with up to 2 test channels

### Minimac® II Compact

- Affordable one or two channel full feature tester for tube, bar, wire
- Operate any combination of up to 2 Flaw, Absolute, or MID test channels
- Detect short surface flaws with encircling coil or long seams with rotary
- Operate at speeds up to 4000 f.p.m.



INSTRUMENTS

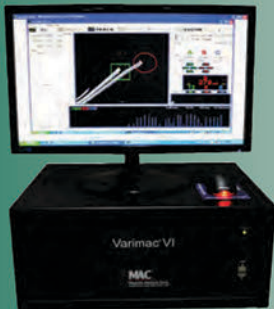


### Varimac® Comparator

- Fast sorting of metal parts for physical variations
- Check alloy, heat treatment or hardness in bar, wire or parts
- Select and adjust threshold levels within on-screen target regions
- Use with MAC Parts Gate to sort up to 6 parts per second



INSTRUMENTS

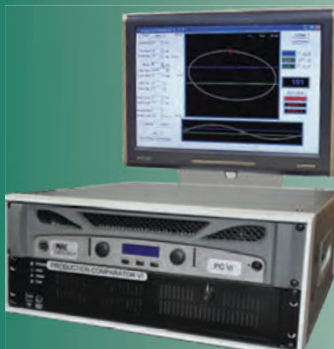


### Production Comparator

- Low-frequency tester for ferromagnetic materials
- Detects variations in alloy, heat treatment or case depth
- Allows for rapid NDT sorting of ferromagnetic parts

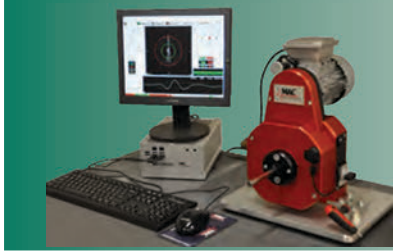


INSTRUMENTS





Eddy Current Rotaries with rotary test probe technology are the method of choice for detecting seam-type defects. MAC's range of Rotomac® models can test from 3-180mm diameter.



### 25RM Rotomac® Cost-Effective Rotary

- Reliable on-line inspection for longitudinal surface defects in products ranging from 3-25mm diameter
- Operates at speeds up to 1,000 RPM for slow throughput applications



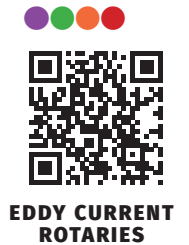
### 20mm Rotomac® High-Speed Rotary

- Fast EC testing for longitudinal defects in smaller diameter products
- Detect surface flaws such as seams and laps in products ranging from 2-20mm
- Operates at speeds up to 18,000 RPM



### 150mm Rotomac® Rotary

- Inspects products 12.7-150mm diameter
- Up to 1800 RPM, continuously variable



## For Flux Leakage Testing



### Rotoflux® AC Flux Leakage System

- The best technology to detect surface defects in hot-rolled black steel bar
- Tests 15-180mm diameter
- Detects longitudinal flaws down to 0.1mm in depth



# THE RIGHT PARTNER FOR INTEGRATORS

*As testing specifications become increasingly more exacting and manufacturers need to go above and beyond what is dictated, the role of an Integrator becomes more essential in*

*meeting the demands of specialized testing systems. MAC's reputation for exceeding customer expectations makes the company and its products a valuable resource.*

***"As an Integrator, my name stands behind every custom system we build. Each component I select needs to function flawlessly...and that's why I've come to depend on MAC's instruments and software. Although there are many choices out there, in my eyes, there is just no substitute for proven performance and reliability."***

## Finding the Right Fit

Every customer of Integrator services has unique NDT design needs, but the core of every specialized system is the electronics package. After an analysis of a client's testing requirements has been completed and an evaluation of software capabilities has been explored, MAC stands above the rest and offers Integrators advantages such as these:

- User-friendly design and operational features
- Electronics that will support and perform dependably with an Integrator's array of individually selected components and mechanics
- Access to features-such as MAC's Data Collection-that offer customers an accurate method for tracing critical inspection records and results
- For more information, reach out to us at [info@mac-ndt.com](mailto:info@mac-ndt.com).

## A Network of Highly Responsive Field Engineers

Collaboration is rarely easy. But unlike other companies you might have dealt with in the past, MAC's team makes an Integrator's challenges an important priority.

When you select a MAC component to build your custom system, you also gain access to the many benefits and advantages that can only come from trained professional support.

Our engineers will be available throughout your integration process, ready to answer questions, eliminate problems and explore new possibilities. We also understand that timing is always important, so we make responsiveness a priority.



**Kyle Wells**  
President, Reliant NDT



**For industries such as Aerospace, Automotive, OCTG and Medical Device manufacturing, MAC offers Integrators a proven portfolio of high-performance options to custom build NDT systems that meet increasing demands.**



# SUPPORT & SERVICES

For more than 95 years, metal producers the world over have relied on MAC's innovative NDT solutions. Our global support team spans 25 countries and includes the collective expertise of over 40 Field Engineers and Representatives.



***“Magnetic Analysis Corp. has been providing NDT products and services to the tube and pipe industry for almost 100 years. Regardless of dimensions or alloy, our innovative instruments, mechanics and techniques – coupled with on-site technical support – make MAC the clear choice for your inspection needs.”***

**John Fundy**  
Business Development Manager



## Your Assurance of Worldwide Support

MAC's global network ensures your highest productivity and satisfaction:

- Staff members trained and tested to ASNT requirements, many with Level III ASNT certification
- Immediate remote diagnostic support backed with a strong field team for quick resolution of issues
- Conventional and Phased Array Ultrasound, Eddy Current, Flux Leakage and Electromagnetic testing technologies
- Detailed knowledge of mill production processes
- Latest technology to meet all industry standards
- Rigorous factory and site acceptance testing to meet customer requirements
- Complete service of products: installation, training, maintenance and extended warranty
- The support of MAC's Research and Development operations in the U.S. and Sweden



## Handle Small Jobs with our ISO/IEC 17025 Accredited Test Facility

MAC's Boardman, Ohio U.S.A. manufacturing and testing facility handles small jobs that might not require a customer investing in a system.

- Test and return-ship your product within 48 hours, if necessary
- Gain access to encircling coil, rotary probe Eddy Current, high-speed Rotary Ultrasonic and other testing methods
- The facility can test your product to industry specifications, including ASTM E-213, ASTM E-243 and MIL STD 2154
- Call (330) 758-1367 for more information



## Flexible Lease Options

Join the many companies that lease their NDT instruments and systems from MAC. Short and long-term operating leases are offered. In fact, over 35% of our current lease customers have been with MAC for more than 25 years.

Here are some of the many advantages these customers now have:

- The latest NDT technology is available, without the need to take out expensive loans or finance
- There are no requirements for upfront capital
- Obsolescence is never an issue as an upgrade to the latest technology is available at any time during the lease, simply by adding or replacing equipment
- MAC's trained Field Engineers and Representatives provide supervision and training during the installation
- Service for NDT equipment is provided by MAC's Field Engineers and Representatives
- One OEM calibration service is provided each year to maintain maximum operating conditions.

Service contracts are also available for customers that are not currently leasing their NDT equipment from MAC.



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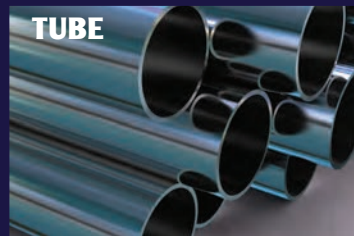
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**Instruments, systems and solutions for nondestructive testing.**



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