

With manufacturers' pressure from increased competition, reduced budgets, capital constraints, and the need to maximize throughput, it is more important than ever to ensure that when capital dollars are spent that they return the highest value long term for the stakeholders and shareholders of your company.

Magwerks machines are designed from top to bottom to be the most robust, accurate, and dependable magnetic particle inspection machines available. Since we began production in 1994 we have continuously incorporated improvements and added features to our machines that truly set us apart from any other brand MPI machine available.

To maintain our status as industry leaders for the manufacturing of magnetic particle inspection equipment we have never stopped doing research and engineering.

As we are continuously improving our equipment we are very careful to ensure that all improvements and new features we develop are backwards compatible with our earlier machines whenever possible.

Magwerks only business is magnetic particle inspection equipment and supplies and we take our business very seriously. We are privately owned and not a division of a large multi-national corporation that arbitrarily decides when equipment is obsolete and to cease support.

We have been in business since 1993 and we are not going anywhere and we will never stop supporting your new machine or the other machines we have sold.

If your expectation is that your equipment should be supported by the manufacturer for 5, 10, or more years from now, Magwerks is the only company that will meet your expectation. Your Magwerks machine will never be "obsolete", guaranteed!

The following information and images highlight some of the features and benefits of Magwerks magnetic particle inspection equipment.

When you compare our equipment and our capability you will see there really is a difference.

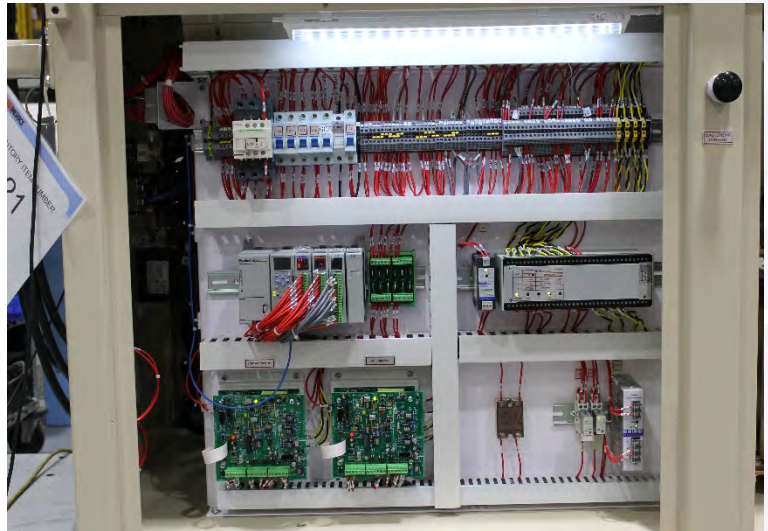
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## Magwerks Chassis Electrical:

Look inside a Magwerks machine and you will quickly see the craftsmanship of construction we are known for. These machines are custom built by craftsman in the United States who still care.

Magwerks MPI machine features:

- Full PLC machine control
- All components are circuit breaker protected
- Closed Loop current control
- Solid State switching
- All wiring is track mounted and numbered
- AC Phase and Voltage Sensing safety
- Built in LED panel lighting



Magwerks Tri-Vector

## Typical Electrical Control Panels

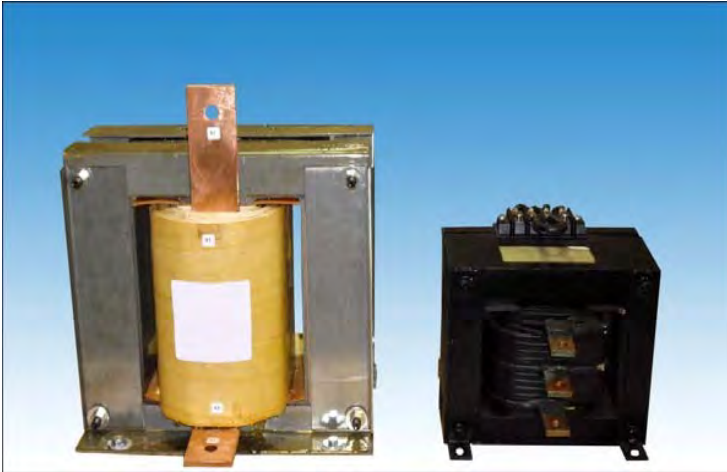


Magwerks Mobile  
Power Pack



Magwerks Standard  
Single Phase Wet  
Horizontal

## Magwerks Power Transformers:



Magwerks transformers are typically twice the size of transformers commonly used in the MPI equipment industry.

The image on the left shows the Magwerks transformer on the left and the competitions transformer on the right. Both transformers shown are from 6,000 amp rated machines. The power transformer is the last place to be cutting corners on for this type of equipment

Magwerks transformers feature:

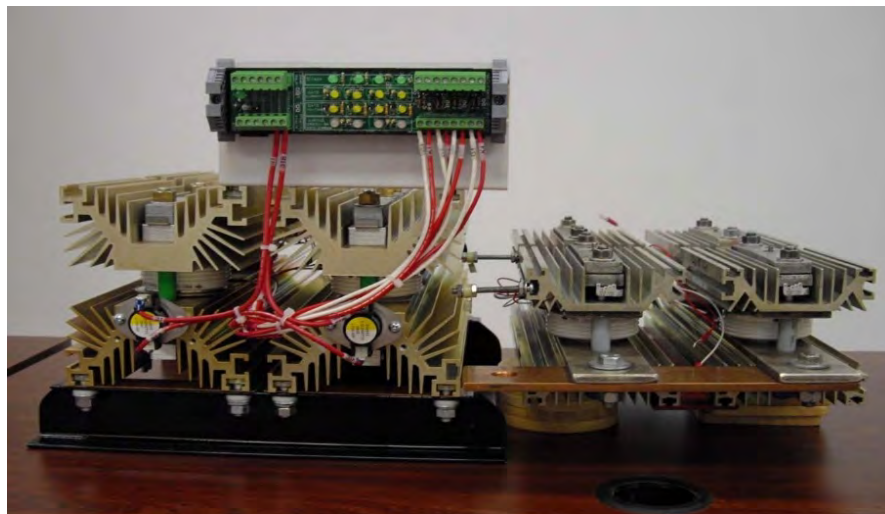
- A propriety design with increased size and mass provide improved heat dissipation and current carrying capability.
- A premium core using only 100% genuine silicon orientated grain steel.
- Solid pure copper wrapped. NO cheap alloys or recycled materials here!
- A 13.5 Volt boosted output to balance resistive losses. 18 Volt transformers are also available.

## Switching SCR Stack:

Modern MPI equipment use silicon controlled rectifier (SCR) stacks for switching. Gone are the old troublesome magnetic contactors that were used for high current switching. The key to dependable operation and long life for these critical devices is the ability to dissipate the high amount of heat they generate during operation. Pictured below is the Magwerks SCR stack on the left and the competitions SCR stack on the right. Both stacks shown are from machines with the same capacity rating.

Smaller heat sinks mean a higher operating temperature which shortens the life of any electronic component, especially a large SCR.

Magwerks heat sinks are 66% larger than the competitions typical heat sink and our Buss work is 100% solid copper with a minimum cross section of 500,000 square mils for our 6,000 Amp machine. This is definitely no place to be stingy with materials cost.



### Magwerks 'SCR Diagnostic Interface'- an exclusive!

Included as standard equipment on Magwerks machines is the exclusive Magwerks SCR Diagnostic Interface.

This SCR Interface allows a technician or operator to quickly see which SCR's are operating and if the SCR's are wired and operating correctly. No other manufacturer's equipment has this capability.



If a maintenance issue is suspected or should arise this SCR interface allows a technician to quickly identify the operational status of the SCR's and specifically which SCR is not operational if there has been a failure.

Before the development of the "Magwerks SCR Diagnostic Interface" finding a failed SCR could have taken a trained technician hours. Now any electrician can identify the problem almost instantly saving hours of diagnostic time and money. The Magwerks SCR Interface also has the additional benefit of warning the technician if an SCR has been installed improperly during replacement.

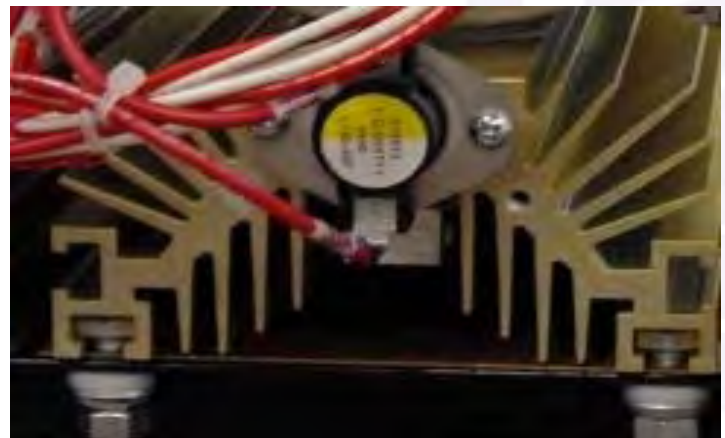
### Over Temperature Protection:

Pictured at right is a **Thermal Overload Safety** switch.

These safety switches protect your valuable investment from overheating.

To increase the dependability and to prolong the life of your equipment Magwerks installs numerous thermal overload safety devices in all the critical locations of our machines.

This is another Magwerks exclusive standard feature for protecting your investment.



### Plug and Play Pneumatics:

On Magwerks equipment with pneumatic devices we supply as standard equipment an installed air pressure regulator with oil/water separator with gauge with an air hose quick release already attached.

With Magwerks equipment the first thing you will need to do for installation *IS NOT* going to be having to find and purchase more things to be able to properly hook the machine up.



### Heavy Duty Main Power Contactor:

Standard on Magwerks wet horizontal and stationary power pack equipment is equipped with a built-in heavy duty main power contactor. This allows the machines main power to be turned on and off at the operator console.

Older equipment and even newly manufactured competitors equipment do not come with a power contactor that can be switched on and off at the operator's console. Without this feature the only way to turn the power off on the competitions machine is at a main disconnect.

Magwerks was the first to offer a Power Contactor and has now expanded on this feature to include a programmable Auto-Shutoff feature for additional power savings.



**Main Power Circuit Breaker:**

(Mobile Power Pack only)

Magwerks installs a built in internal circuit breaker on all of our mobile power pack equipment.

This protects your employees as well as your investment as it is not uncommon for employees to connect this type of equipment to a large power source that is not fused or protected by an appropriately sized circuit breaker.

Another Magwerks exclusive.

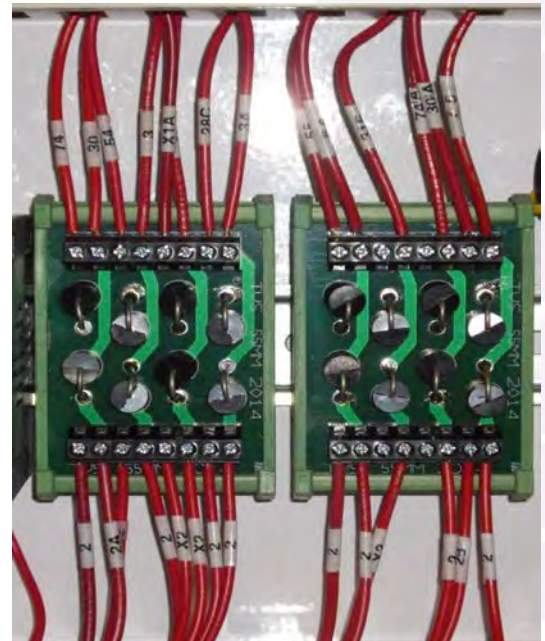
**Machine Protection:**

Beginning in 2012 production Magwerks added even more internal safety features to all of our MPI machines.

Pictured on the right is the **Magwerks TVS Block** (Transient Voltage Suppressor).

This control is manufactured by Magwerks exclusively for our equipment and features a specialized diode that is able to react to an over voltage in one Pico Second! (0.000,000,000,001 second)

The addition of this Magwerks exclusive device has saved several of our customers from costly repairs caused from over voltage spikes such as a lightning strike that a typical surge suppressor cannot stop.



## Machine Protection, continued:



The image on the left is our **Voltage Monitoring Device (VMD)**. All Magwerks MPI equipment comes standard with a VMD. This safety device protects the machine and your investment from improper electrical connections, under voltage, over voltage, phase imbalance, phase loss, and prolonged voltage drops.

Our VMD operates continuously monitoring the incoming power and will automatically shut down the machine if the incoming power is not to proper operational specification.

This is another device that is standard on Magwerks equipment that has saved numerous customers around the world from costly damage from an improper voltage input, unstable electrical power from the local provider, or issues with the power distribution system.

## Magwerks 'Micro-Touch' Standard Color Touch Screen:

The Magwerks Color Touch Screen comes standard with Virtual Instrumentation and Multiple Dynamic Ranges and includes the following features:

### - Shot Preview

Displays the current for the next Mag Shot  
No more trial and error with the current knob!  
Typical repeatability is within 1 to 2 Counts of LSD, even at low end amperage shots.

- Ultra-Low Range Mode now standard with a 1 Amp resolution.

Typical useful low end down to 10 Amps.

- Automatic Preview Recalibration keeps shot preview within 1-2 ammeter counts of the actual shot.  
No more trial and error with the current knob!



## Magwerks 'Micro-Touch' 6" Color Touch Screen:

The Magwerks 'Micro-Touch' touch screen has a large 6" color display and includes all of the features of our Handheld Programmer Interface and standard touchscreen but also includes the following additional features:

- Shot Preview with automatic recalibration.  
Displays the current for the next Mag Shot  
No more trial and error with the current knob!  
When adjusting the current knob the display will show the operator what the value of the next mag shot will be.
- Displays the Current Vector, head or coil, which the mag shot will occur on.
- Displays the Current Type. AC, Half-Wave, or Full Wave and will update with the selector switch.
- Mag Shot timer adjustment
- Provides AutoMag adjustments for Clamp Delay, Mag Time, and Pulse Delay.
- Enables the operator to automatically add time to the Mag Shot for low currents or customize for specific current values.
- Create multiple part profiles.



Creating part profiles allows the operator to:

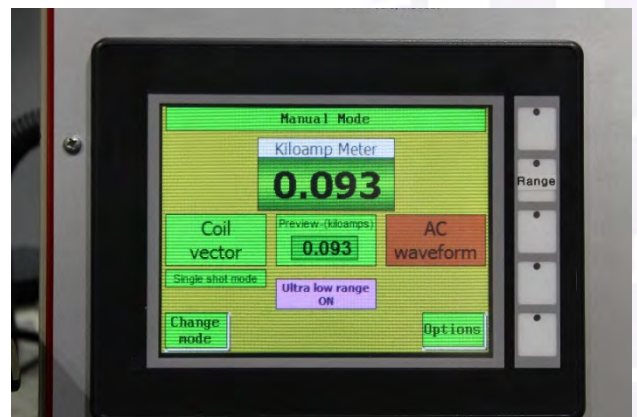
- Create unique names for parts to easily identify them
- Program up to 5 Mag Shot settings per part including Wave Form and automatic vector switching.
- Provides adjustment for the Demag Shot Current and Demag Wave Form type.
- Provides a single button access for 'Ketos Ring Test' mode.
- Provides an adjustment of the 'Ketos Ring Test' parameters.

## Magwerks Virtual Metering:

Another exclusive feature available on Magwerks MPI equipment is Virtual Metering. The low range repeatability and accuracy of this metering is unmatched in the industry.

Specially designed for use on small super critical aircraft components this 4.5 digit current control has +/- 2 amp repeatability with an accuracy of 0.1% far exceeding the current government military specifications and all upcoming new specifications.

This feature makes a Magwerks machine absolutely the most accurate machine on the market and the only choice for complex inspections on critical parts.





## Carrier Bath Pumps:

Magwerks carrier bath pumps are simply the best used by any MPI equipment manufacturer.

The key to keeping a magnetic particle inspection machine in proper working order is to have a pump that works day in and day out and that is as maintenance free as possible.



Magwerks exclusively uses custom designed 1750 RPM Stainless Steel pumps with an impeller and pump curve design that is application specific for MPI machines..

Besides being very dependable the Magwerks pump provides:

- Reduced wear on particle.
- Minimized vibration.
- Reduced noise.
- Minimized bath temperature rise from circulation.
- Maximized pump life.
- Open impeller design to reduce clogging.
- All wetted parts in the circulation system are stainless steel or brass. No rust scale!



Another Magwerks innovative feature is an optional External Basket Strainer. This option provides for very easy cleaning and protects your pump from foreign object damage and the associated down time.

All stainless steel construction of course.

## Magwerks Heavy Duty Steel Head Stocks and Tail Stocks:

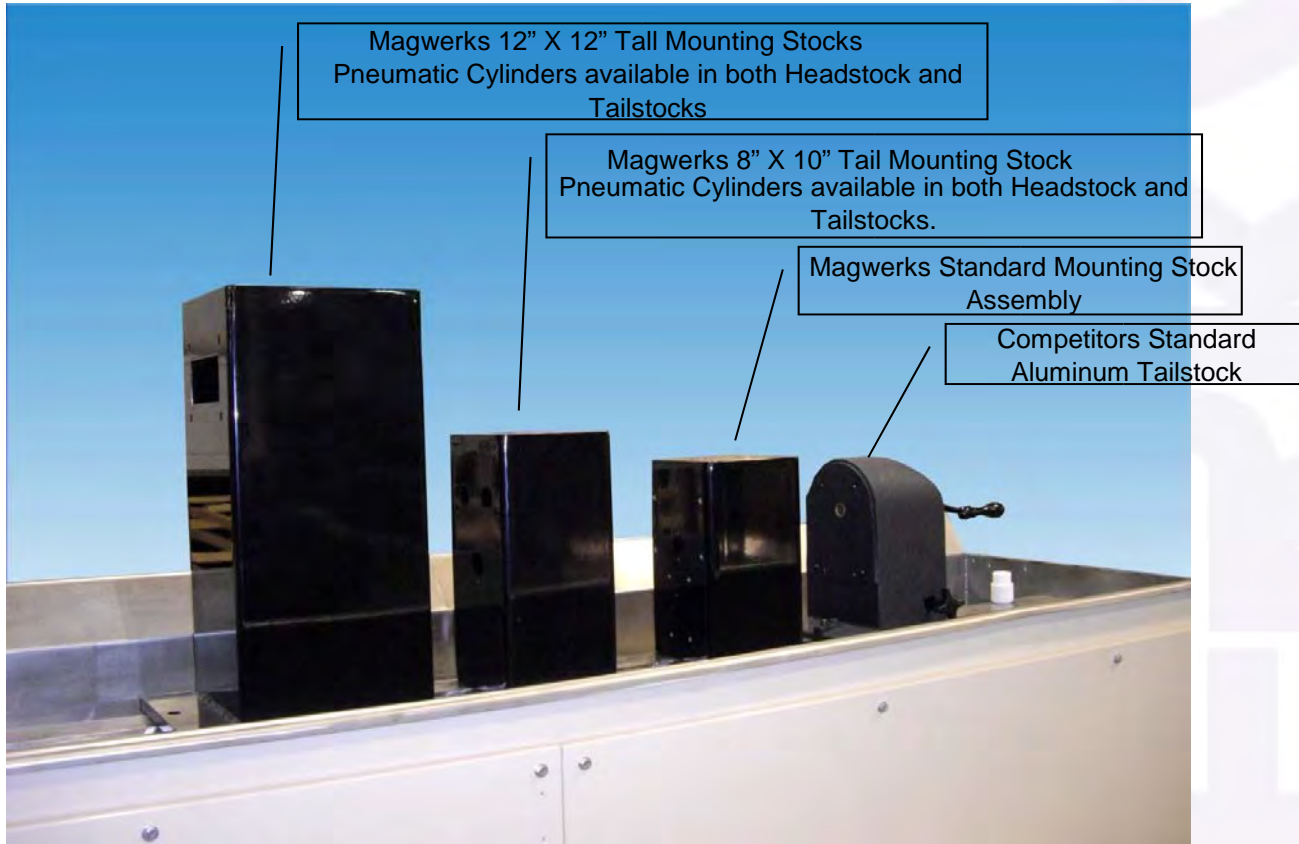
Magwerks fabricates Headstocks and Tailstocks from ¼" plate steel. No cast recycled aluminum here!

They are designed to take a daily beating and keep working.

They Feature:

- Baked on custom powder coating. (No dime store spray paint used on Magwerks equipment!)
- A 2.5" Pneumatic Cylinder that is bearing supported.
- Pre-drilled and tapped holes for mounting roller rests or black light arms.





Magwerks does not just bolt on slightly larger copper plates to a standard Headstock and Tailstock and call them "oversized" or "heavy duty". We understand if a larger contact surface is needed then parts are going to be larger and weigh significantly more. Inspecting these larger parts will generally require a pneumatic cylinder to be installed in the Tailstock to make a proper electrical connection so all Magwerks Extended Tailstocks are designed to accept a pneumatic cylinder.

Additionally all Magwerks Tailstocks have rack gear drives with ball bearing guides to eliminate the Tailstock from sticking or jamming on the bed rails.

### Wet Horizontal Tank and Frame Features:

- All Stainless Steel tank.  
No rust scale or paint chips in the carrier bath.
- 11 and 14 gauge American made steel.  
Used for all support components.  
Built to take the rigors of daily production.
- Sealed Cabinets.  
Keeps the dust, dirt, and contaminated air out of the machine.
- Hinged Doors  
Easy access to the machine internal components. No wasted time looking for tools to remove a panel. No hardware too loose or threads to strip out.
- Large Stainless Steel Hip bar.  
No hardware store conduit on pot metal hinges used here.



### Mobile Power Pack Enclosure Features:



- Cabinet made from 11 and 14 gauge American steel  
Designed to take a real beating in daily use.
- Fully Enclosed design.  
Keeps the dust, dirt, and contaminated air out of the machine
- Large 8" Steel Casters  
Rolls easily on rough surfaces.
- Recessed Controls and Connector Lugs  
Recessed for protection from impact damage.
- Hinged Access Panels  
No bolts or screws loose in the field or strip out.
- Sealed cabinet  
Keeps dirt and containments out of the machine.
- Efficient physical profile.  
Fits through a Standard 36" door way
- 4 Eye-Bolts factory installed.  
Provides for easy lifting by a crane or hoist.

### A Green Machine:

Magwerks machines are available with an Auto-Shutoff feature for the magnetizing circuit for energy savings.



The Auto-Shutoff is user adjustable from 5 to 99 minutes of idle time. This feature can add significant operational savings over a year as the power transformer of an MPI machine consumes between 1,000 watts and 4,600 watts (1.0 to 4.6 kW) just being powered up and idling without performing any mag or de-mag cycles.

This automatic shut-off feature could easily save a plant over 15,000 kWh annually in electrical consumption per machine.

Older equipment and even many newly manufactured machines do not come with a Power Contactor to easily turn on and off the machine at the operator's console. The only way to turn the power off on these machines was at the main electrical disconnect which usually means they are left powered on when not in use.

Magwerks was the first to offer the operator panel switched Power Contactor and has expanded on this feature to now include an Auto-Shutoff feature for even more electrical power savings

### Other Magwerks Magnetic Particle Inspection Machine features:

- ✓ Spring hinge pins used to attach the Hip Bar to the machine.  
It only takes 15 seconds to get into the machine with the Hip Bar attached.
- ✓ Genuine Rock Maple Hardwood Grates standard.  
One of the hardest woods available is used as standard on our machines for grates.  
UV stabilized UHMW plastic grates are also available for water based carrier applications.
- ✓ Adjustable Operator Console  
Can be Rotated and Raised for easy operator use.
- ✓ Built in permanent Forklift slots.  
Under the machine are fully welded steel slots for Forklift forks. This helps protect personnel from injury and the machine from damage from accidentally dropping the machine when moving.
- ✓ Standard 4 ways to operate the Mag Pulse:  
Operator Control Panel, Hip Bar, Foot Pedal, or using the optional pendant.
- ✓ Factory installed 120 volt accessory outlets standard.  
No need for one of the first tasks of installation to be having the electricians install additional power outlets for inspection and task lighting or for accessories.

- ✓ Factory installed needle adjustment air valves.  
Regulates the speed of both opening and closing of Head Stock pneumatics to reduce the risks of operator injury, part damage, and excessive wear of the machine
- ✓ Keyed foot pedal outlet connections.  
Prevents accidentally installing the pedal into the wrong outlet.



Magwerks 172" Tri-Vector with Pneumatic Hood and 36" Coil

From our standard machines to fully customized application specific machines, Magwerks is the 'go to' manufacturer for MPI equipment.

When you compare our standard industry leading features and the craftsmanship of construction of Magwerks magnetic particle inspection equipment along with the state of the art options we have available to any other MPI equipment on the market you will see hands-down that Magwerks offers absolutely the best value investment for your company.

Please contact us to discuss your magnetic particle inspection needs for equipment or supplies and let us know how we can earn your business today.

# MAGWERKS

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DeMag Coils



Accessories



Gauss Meters



Conveyor Systems

Training Classes

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