



APPLYING CARBIDE TO EXTEND MACHINE LIFE, MINIMIZE
WEAR, AND OPTIMIZE GRIP
AN E-BOOK

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WHAT IS ROCKLINIZING?

Carbide Application, Electrospark Deposition & Hard Surfacing

RockLINIZER

RockLINIZER
micro



We often get questions asking what Rocklinizing is. People see sparks flying at a trade show and they're intrigued. Is it EDM? No, it's actually adding material. Is it a welder? No, not quite. Is it a sparkler? No, we don't sell fireworks...

At its core, we're accomplishing the same objectives that drove I.J. Rocklin to invent the first [Rocklinizer](#) way back in the 1960s: depositing precise amounts of extremely hard and wear resistant material onto metals, tools, and dies to expand their useful life. Now, however, we're doing it much faster, more precisely, and with a far greater range of deposits that solve an ever-expanding list of industrial needs.

While we call it Rocklinizing, our proven process gets called many names. Here are three common ones:

1. Carbide application equipment: To put it simply, the Rocklinizer applies tungsten carbide and titanium carbide onto steel surfaces.
2. Hard surfacing: Our electrode material ranges from 60 HRC to 80 HRC, depending on the electrode used, creating a much harder and more wear resistant surface.
3. Electrospark Deposition (or ESD): The Rocklinizer rapidly fires sparks that are triggered when the user touches the electrode to the base material, impregnating the coating on top of and underneath the surface with very little heat generated.

At the end of the day, regardless of what you call it, the most important thing is what the Rocklinizer actually does: it reliably solves the greatest wear and grip problems to drive productivity improvements and cost savings our customers never thought possible. That's been our focus for over a half century, and we're on a mission to continuously improve the Rocklinizer so our customers realize an even greater competitive edge.

We invite you to browse through this e-book to learn more about how the Rocklinizer works, common applications, and the value you can realize through Rocklinizing. Then, simply get in touch to arrange your sample or demo.

THE ROCKLINIZER

Carbide Application Equipment

Eliminate:
Slug pull after
Rocklinizing
punches and
stamping dies



Up to 3-5x:
Longer life on die
casting dies

60/70/80 HRC:
Hardness achieved with Rockhard, tungsten
carbide, and titanium carbide, respectively



60 seconds:
Time it takes to coat
5 sq. in. with the
lightning fast Model 950



>.010": Deposit capabilities with
new Griptite electrode ideally suited
for gripping applications



Countless: # of applications where
the Rocklinizer can improve wear
protection, maintenance and gripping

APPLYING TUNGSTEN CARBIDE TO SOLVE DIE CASTING WEAR

REPRINT FROM



Especially in today's challenging environment, die casters are seeking ways to minimize downtime and repair costs while at the same time delaying new die investments. The goal is to squeeze the most out of existing resources while keeping capital expenses and ongoing maintenance costs to an absolute minimum.

Fortunately, there are solutions to these challenges. We'll describe carbide application, a wear-resistant coating technology, and how it's used in die casting. Then, we'll delve into six of the major culprits of wear that can disrupt a die casting operation and how each can be solved with carbide application. Lastly, we'll discuss some of the key features of one such solution, the Rocklinizer® Carbide Application Equipment.

WHAT IS CARBIDE APPLICATION?

Carbide application refers to the deposit of very hard, wear-resistant material onto metals, tools, and dies. Through a proprietary spark deposition process, material is impregnated both underneath and on top of the workpiece in a highly controlled manner. Because no appreciable heat is generated, the temper of the workpiece is retained, and carbide can be applied to both new or reground and resharpened surfaces.

While different materials can be applied, die casters typically achieve maximum benefit via this process with a tungsten carbide coating, which can carry a hardness of approximately 70 HRC. This extremely hard surface results in greater protection during the constant temperature changes inherent in die casting processes (Figure 1).



Figure 1 - Tungsten carbide coating can carry a hardness of approximately 70 HRC.

WHAT ARE COMMON WEAR ISSUES, AND HOW ARE THEY ADDRESSED?

Heat checking: This type of fatigue results from the stresses created by alternatively heating and cooling of the die surface during the casting process. Small cracks can form a closed network and become so large that the casting metal will flow into the steel surface below, often requiring re-sinking or remaking the die entirely (Figure 2).



Figure 2 - Small cracks can become large enough for casting metal will flow into the steel surface below.

Carbide application reduces the tendency for heat checking to occur on a new die by treating with tungsten carbide and/or titanium carbide on a preventive maintenance basis. Furthermore, applying carbide before heat checking exceeds the limit of acceptability increases the life of the die while also enabling longer runs without stopping for maintenance. **Runners, Overflows, and Vents:** The vents on a die stay much cleaner when they have received a carbide coating. Minor cracks in the die can also receive a carbide coating as long as they haven't become too wide.

Galling and Seizing of Cores: The thermal expansion of aluminum, magnesium and zinc die cast metals is much greater than that of the steel core. The metal shrinks onto the cores, thus resulting in extreme pressure at the core section.

When applying carbide to the cores, it will appear that the core is too rough for releasing the casting. However, this roughness is so shallow that the core actually makes the casting smoother since the aluminum, magnesium or zinc will not adhere to the core as it does to a core that has been stoned to a high polish. The cores with the carbide surface make the lubricant or die releasing agent adhere better to the steel, thereby providing a nice finish on the cast parts.

Fits on Slides: Carbide has been successfully applied to rework areas of fits on slides and has reduced galling.

Soldering: Soldering of aluminum, magnesium or zinc casting material to the die surface is also a cause for rejection of many castings. Treatment with carbide prior to a production run has eliminated soldering at gates, vents, parting lines, and the die cavity where molten metal has a tendency to solder to the cavity.

Ejector Pin Flash: Flash can be eliminated if the die is in fair condition before treatment. Tungsten carbide applied to the ejector pin about 1" back from the face of the cavity has been a successful tactic. Less lubrication is then needed, resulting in a much better finish on the die casting.

WHAT ARE THE RESULTS?

As an example, a complex die was about to be replaced at the request of a die caster's customer due to severe heat checking. The castings produced had become so rough from the thermal fatigue heat checking that they could cut a person's hand. In an attempt to salvage the die, the die caster used a sanding drum to remove the heat checks in the area of the gate.

Tungsten carbide was then applied to three different die cavity areas. First, the die area with heavy heat checking was polished and then tungsten carbide was deposited. Next, tungsten carbide was added to the die area where carbonaceous compound had formed on the die or die-sprayed areas. In the third area, the die was impregnated with tungsten carbide in an area where the die had an exceptionally heavy wall, approximately 0.375" or more, in which the aluminum adhered to the die on the surface.

The final step was to test whether the process would be successful in alleviating these three conditions on the same die. Due to the carbide deposit, the die was successfully salvaged and ran approximately 35,000 pieces, and the parts were still usable. This process could then be repeated as needed without any surface preparation.

SOLVING DIE CASTING WEAR WITH THE ROCKLINIZER®

These results were achieved using the Rocklinizer® (Figure 3), a carbide application unit that deposits tungsten carbide from .0001" to .005", all precisely controllable within .0001" by machine setting. A handheld applicator enables the coating to reach all areas of a die, and an integrated air pump provides cooling at higher power settings while ensuring full portability of the unit (Figure 4).



Figure 3 - The unit is fully portable.



Figure 4 - The application is precisely controllable within .0001" by machine setting.

Wear issues can disrupt a die casting operation and result in costly repairs and accelerated capital expenditures. Carbide application is a proven tactic to alleviate these concerns at a time when heightened efficiency is most essential.

ABOUT THE AUTHOR

Ross Rocklin is President of Rocklin Manufacturing, a thirdgeneration family business based in Sioux City, Iowa, since 1934. The company offers several products designed to boost productivity and lower costs in support of its core mission to Give Manufacturers an Edge. These products include: The Rocklinizer® Carbide Application Equipment, The MoldMender Micro Welder, The FlyMarker® Battery-Operated Marking Unit and The LaserEvo Fiber Laser

A PORTABLE COATING SOLUTION TO SOLVE SLUG PULLBACK

REPRINT FROM

MetalForming
Magazine

Rocklin Manufacturing, Sioux City, IA, introduces the Rocklinizer micro, a battery-operated portable system for applying the spark-deposition process, used to deposit a protective tungsten-carbide (WC) coating to tooling and prevent slug pullback--when slugs stick to the punch face and are pulled up from underneath the sheet being punched.

To permanently impregnate WC inside and on top of a punch and die button, shops can deploy the precisely controlled spark-deposition process to achieve tolerances within approximately 0.0001 in. The extremely hard coating (approximately Rc 70) can be added to the bottom 1/2 in. of a punch to prevent wear and galling and to retain sharpness. The coating also can be added inside the die button where the punch inserts, usually three or four 1/2-in. stripes on the wall of the round die button about 1/16 in. from the edge.

Shops can apply WC to worn or undersized punches and dies to reclaim desired tolerances. It also can be applied to new punches and dies to prevent wear before it occurs. Note: When selecting the amount of deposit required, take care to consider cutting-clearance allowance and component alignment.

Use the Rocklinizer micro to apply deposits from 0.0002 to 0.003 in.; other Rocklinizer models can apply deposits exceeding 0.007 in. Electrode material is deposited by adjusting the unit's LED power dial and triggering the handheld rotary applicator.



The unit's lithium-ion battery delivers 3 hr. of usage per charge. Alternatively, plug the 10-lb. unit in for continuous use. Unlike welding or metal spraying, the process does not generate appreciable heat and the electrode material will not separate or flake off.

After deposition, no heat treatment, grinding or other surface treatment is necessary.

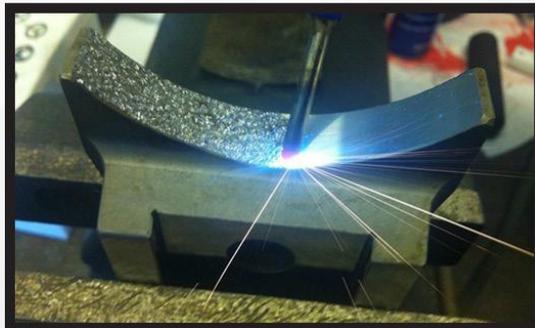
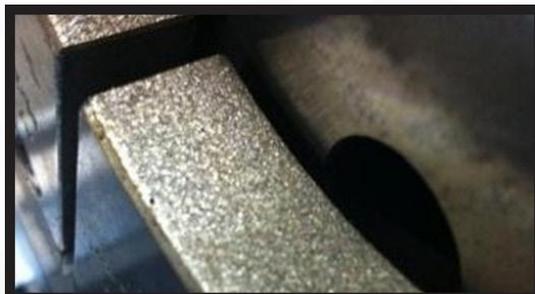
To illustrate the effectiveness of the process, an Illinois shop used it on a cluster punch with six 1/4-in. punches on staggered 3/8-in. centers. Before applying a protective WC coating, the cluster pulled six slugs on the first blank and 13 slugs on the second. It then applied the coating inside the die-bushing holes, which immediately cured the slug-pullback issue during a punching operation that required 93 hits creating 558 slugs. The die then ran 118 additional blanks for a total of 19,000 hits without pulling a single slug. And, the punch and die continued to show no wear, thanks to protection from the extremely hard tungsten carbide.

GET A GRIP

With The Rocklinizer Carbide Application Equipment

Deliver a long-lasting and robust gripping surface. Just “Rocklinize,” or deposit a precisely controlled amount of our tungsten carbide, Rockhard, or Griptite electrodes onto any ferrous metal, to “get a grip” on:

- ✔ TUBE/PIPE BENDING DIES
- ✔ COLLET S
- ✔ CHUCK JAWS
- ✔ CLAMP BLOCKS
- ✔ FEED FINGERS
- ✔ NON-SLIP FLOORING
- ✔ FORKLIFT FORKS
- ✔ SURGICAL INSTRUMENTS
- ✔ MANY MORE!



ROCKLINIZING FROM A TO Z

The Carbide Application Solution for Wear Resistance and Gripping

Where does the Rocklinizer® boost productivity and slash costs? Here are a few applications from A to Z!

- A. Aluminum die casting
- B. Bearings, blades
- C. Collets, clamps, chucks
- D. Drills, dies
- E. Extruding, end mills
- F. Forging, forming
- G. Glass processing molds
- H. Heat checking, hobs
- I. Inserts, injection molding
- J. Jaws
- K. Knives
- L. Lathes
- M. Molds, maintenance
- N. Non-slip flooring
- O. Overflows on dies
- P. Punches, progressive dies
- Q. Quality control
- R. Robot grippers, reamers
- S. Slug pull, shafts, surgical
- T. Tube bending, tools, taps
- U. Undersized dimensions
- V. Vents on die casting dies
- W. Wear surfaces
- X. X-axis automation
- Y. Y-axis automation
- Z. Zinc die casting



TITANIUM CARBIDE

TUNGSTEN CARBIDE

TUNGSTEN CARBIDE

ROCKHARD ELECTRODE

GRIPTITE ELECTRODE

CARBIDE APPLICATION EQUIPMENT

ROCKLINIZER[®] MADE IN USA



- ↑ MACHINE LIFE
- ↑ GRIPPING
- ↑ PRODUCTIVITY
- ↓ WEAR
- ↓ DOWNTIME
- ↓ COSTS
- ↓ INSPECTION TIME
- ↓ INVENTORY

INCREASE PRODUCTIVITY & REDUCE COSTS

Through our proven spark deposition process, the ROCKLINIZER[®] electronically applies Titanium Carbide (80 Rockwell C), Tungsten Carbide (70 Rockwell C), and Rockhard (60 Rockwell C) electrode material to metals, tools and dies. Material is impregnated both underneath and on top of the workpiece surface. Because no appreciable heat is generated, the temper of the workpiece is retained.

ROCKLINMFG.COM

WIDEST DEPOSIT RANGE

- .0001" to .010" and up
- Controllable within .0001"

FASTEST DEPOSIT SPEED

- Rotary applicator
- 5 sq. in. takes <1 minute

UNRIVALED EASE OF USE

- Digital readout
- Touch panel

100% PORTABLE

- 35 lbs (16 kg)
- Integrated air pump

TYPICAL APPLICATIONS

WHERE TO APPLY	APPLICATIONS	PROVEN RESULTS
 <p>PUNCHES & DIES</p>	PUNCHING, STAMPING, FORGING & EXTRUDING	Stop slug pull back, reduce galling, extend time between sharpenings
 <p>DIE CASTING</p>	DIE CASTING	Restore parting lines, prevent heat checking, soldering, seizing of cores, protect gates and runners
 <p>COLLETS, CHUCKS</p>	GRIPPING	Prevent slippage and restore tolerances on bending dies, collets, chuck jaws, pusher pads, etc.
 <p>BEARINGS</p>	MAINTENANCE	Restore tolerances on bearings, shafts, and other wear areas
 <p>KNIVES & SHEARS</p>  <p>SAWS</p>	KNIVES & BLADES	Increase life of cutting edges, produce self-sharpening effect
 <p>FORM TOOLS</p>  <p>TOOL BITS</p>	PERISHABLE TOOLS & DIES	Reduce wear on high speed steel and carbide tooling
 <p>DRILLS</p>  <p>TAPS</p>  <p>END MILLS</p>	MANY MORE WEAR & GRIPPING APPLICATIONS	Drills, taps, reamers, plastic composites, glass processing, medical devices, non-slip flooring, etc.



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ROCKLINMFG.COM

ROCKLINIZER[®]

MODEL 850

CARBIDE APPLICATION EQUIPMENT



APPLIES TUNGSTEN CARBIDE, TITANIUM CARBIDE AND ROCKHARD ELECTRODE MATERIAL TO METALS, TOOLS AND DIES

FEATURES

- Rotary Applicator
- Faster Application
- Digital Readout
- Touch Panel Controls
- Portable
- Deposits from .0002" to .007"

The end result of this surface treatment is to increase productivity and reduce costs.

When tools and dies remain in operation without replacement due to wear, there will be less: machine downtime, operator idle time, set-up, inspection time, and the expense of new or resharpened tools and dies.

These savings justify the purchase of the ROCKLINIZER.



CAPABILITIES

Deposits are available from .0002" to .007" in a single application, controllable within .0001" by machine setting. Typical deposits are obtained from ROCKLINIZING hardened tool steel.

Model 850 / 850E includes: power supply, rotary applicator, electrode package, and operating instructions. 110-120 volt ("E" Model 220-240 volt) 50-60 Hz, single phase A.C., 25lbs (11kg)

WHERE TO APPLY



PUNCHES & DIES



DIE CASTING



COLLETS, CHUCKS



BROACHES



CHASERS



FORM TOOLS



KNIVES & SHEARS



SAWS



HOBS



CUTOFFS



BEARINGS



CARBIDE INSERTS



DRILLS



TAPS



END MILLS



REAMERS



MILLINGS & THREAD ENDS



TOOL BITS

The ROCKLINIZER electronically applies electrode material by a spark deposition process. Material is impregnated both underneath and on top of the workpiece surface. Because no appreciable heat is generated, the temper of the workpiece is retained. ROCKLINIZING is applied to new or reground and resharpened surfaces.

TYPICAL APPLICATIONS

Punching, Stamping, Forging and Extruding: Stop slug pull back, reduce galling, extend time between sharpenings

Die Casting: Restore parting lines, prevent heat checking, soldering, seizing of cores, protect gates and runners

Gripping and Screw Machining: (i.e. bending clamps, collets, pusher pads, feed fingers, chuck jaws) Provide a suitable textured finish and restore tolerances

Perishable Tools and Dies: Reduce wear on high speed steel and carbide tooling

Maintenance: Restore tolerances on bearings, shafts, and other wear areas

Solid Carbides and Inserts: Surface seal and prevent chipping

Plastics and Composites: Improve fabrication operations including molding, machining, trimming, and protecting abrasive wear areas

Glass Processing: Molds, cut off tooling, glass handling equipment

Wood Industry: Saws, cutters, planer blades, and chipper knives

Paper Products: Die cutting knives and shear blades

The portable Rocklinizer allows wear prevention and maintenance to be easily performed in your plant.

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MADE IN USA

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BATTERY-OPERATED CARBIDE APPLICATION EQUIPMENT



Patent Pending

- ↑ MACHINE LIFE
- ↑ GRIP
- ↑ PRODUCTIVITY
- ↓ WEAR
- ↓ DOWNTIME
- ↓ COSTS
- ↓ INSPECTION TIME
- ↓ INVENTORY

GET A GRIP ON COLLETS & CLAMPS

RESIZE BEARINGS & SHAFTS

GRASP MEDICAL DEVICES

ELIMINATE SLUG PULL BACK

EXTEND LIFE OF CUTTING TOOLS



MINIMIZE WEAR & MAXIMIZE GRIP

Built on decades of proven technology, the Rocklinizer® micro is the first ever battery-operated carbide applicator. The completely portable unit deposits extremely hard and wear resistant material onto metals, tools, and dies to solve your greatest wear and gripping challenges.

PROVEN TECHNOLOGY:

The Rocklinizer impregnates extremely hard and wear resistant material onto metals, tools, and dies to extend machine life, minimize wear, optimize grip, and deliver immense cost savings.

GAME CHANGING PORTABILITY:

Bring the battery-powered, 10-lb. unit anywhere for up to 3 hours of use plus rapid recharge. Alternatively, you can operate it while plugged in for continuous use.

SIMPLICITY & PRECISION:

Adjust the LED power dial to deposit precise amounts of carbide from approximately .0002" to .003". It's that easy.

FLEXIBILITY:

Choose your desired hardness from Titanium Carbide (~80 HRC), Tungsten Carbide (~70 HRC), and Rockhard (~60 HRC) electrode options.

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