Cerakote™ Firearm Coatings are designed for professionals and should be applied by NIC-trained applicators and coating professionals with proper training and equipment. This training manual is intended to be used as a supplemental guide for certified and professional applicators ONLY. It is critical to follow all instructions in this manual. If for any reason you are not willing to, or cannot follow the steps in this manual, do not attempt to coat any product using Cerakote™, or any other NIC product. If you have any questions, please contact NIC Industries.

Thank you

Cerakote Firearm Coatings
A Division of NIC Industries, INC.
866-774-7628
www.CerakoteGunCoatings.com
Disassemble:

Completely disassemble the firearm.

Detail strip your firearm. If you are unfamiliar with this level of disassembly have a certified gunsmith perform the disassembly and reassembly.

Take a photograph of all the parts received. Make note of the substrate type on each piece (i.e: Steel, Aluminum, plastic, composite, polymer, etc.)
Degrease:

Soak each part for 10-15 minutes in a non-water based degreaser such as Brake-Kleen® (NIC Part # SE-174) or acetone. Spraying is not sufficient; soaking is required. Allow parts to air dry after soaking.

From this point on it is critical to avoid touching the parts with your bare hands. Use powder-free latex style gloves to handle the parts.
Surface Prep:

Begin by plugging the bore at both the chamber and the muzzle end of the barrel prior to blasting. Grit blast the parts with #100 to #120 grit aluminum oxide or garnet sand at 80 to 100 psi. Strive for an even blast pattern over the surfaces of the parts. Lightly blast (30-40 psi) non-metal parts such as: wood, plastic or polymer.

**TIP:**
- If the part’s surface is still shiny after blasting, you haven’t blasted enough.
- If you use too coarse of grit, the microscopic valleys on the part’s surface will be too deep for the 1.0 mil (.001”) coating to completely fill while covering the corresponding “peaks” sufficiently to assure a satisfactory coating.
- Don’t use sand that has been previously used to clean dirty, greasy or oily parts. Doing so will contaminate your parts.

**CAUTION:**
- If you use #120 grit, be sure the grit does not wear out as you are using it. #120 is pretty fine at the start, and will wear to an ineffective dust.
- **Do not** use glass beads. Glass beads dimple the surface rather than etching it, and will not yield a sufficient blast profile for optimum coating adhesion.
**Phase 4: Racking/Masking**

Racking:

Hang or otherwise fixture your parts so that you can access all the surfaces of each part with your HVLP gun.

*REMEMBER TO ALWAYS WEAR POWDER-FREE, LATEX-STYLE GLOVES.*

Correct Racking Techniques

- AR 15 Lower Receiver
- Remington 700 Receiver
- Stripped Springfield 1911 Frame
- Welding wire used to suspend parts
Recommended Masking & Racking Supplies:

The following products can be purchased at www.CerakoteGunCoatings.com

**Cerakote Starter Racking, Masking and Camo Kit:**
Great starter kit with a starting quantity of racking, masking and camo products. NIC part # SE-175

Kit Includes
- Various high temp plugs for nearly any caliber barrel
- A variety of metal hooks for most racking situations
- A small spool of racking wire
- Three sizes of netting for overlay camo patterns
- Various clamps for holding netting in place

**High Heat Tape:**
Used for masking areas where coating is not desired. Available in sizes 1/4” to 4”
NIC part # SE-121 through SE-127
Gas-Out:

After parts are racked, heat the parts in the oven at 250 degrees Fahrenheit (F) for 30 minutes to drive off any remaining solvents or contaminants.

Remove the parts from the oven and allow them to cool. If you see any “wetness,” or other indication that oil was driven out of the part, re-clean by soaking in the degrease tank and reheat for an additional thirty minutes. Any contamination from this point onward will result in a less than satisfactory finish. Be careful, and take your time. If further degreasing is required, repeat as necessary until no wetness (oil) is visible.
Selecting The Right Cerakote Series for the Application.

**Cerakote™ H-Series:**
H-Series is the most durable of the standard Cerakote™ product and provides the best performance in hardness, wear, scratch resistance, adhesion and rust resistance. It can withstand temperatures up to 400 degrees F and comes in over 60 colors. H-Series is a thermal cure finish and therefore should not be applied to optics and other items or substrates which cannot be cured at the required temperatures. (See cure schedule table, Page 16.)

**Cerakote™ C-Series:**
C-Series should **ONLY** be used for high-temp applications up to 1700 degrees F, such as suppressors and machine gun barrels. C-Series is available in a wide range of colors to match the overall finish requirement of the firearm or weapons system. C-Series is used to coat scopes and other optics, as well as fiberglass, polymer and other substrates which cannot be thermally cured.
Coating Preparation:

Prepare the Cerakote for application. Begin by shaking the bottle until the coating is completely mixed, then shake some more for good measure. Determine how much Cerakote you intend to use before mixing (see table 1 pg. 10) Pot life for mixed Cerakote is approximately two hours in an open container, and as much as four hours in a closed container. Consequently, mix only what you intend to use, to avoid wasted coating. (see usage chart pg. 10)

1.) Pour the desired quantity of Cerakote into the graduated cylinder.
2.) Add hardener. Use table 1 pg. 10 to determine Cerakote to hardener ratio for finish type.
3.) Mix thoroughly with a stir stick.
4.) Pour mixed coating through a disposable automotive type paint filter, or a reusable filter shown (NIC Part # SE-139)
Coating Preparation Continued:

**NOTE:** If the proportions of Cerakote to Hardener are incorrect, or the combination of Product and Hardener are not thoroughly mixed, the final product will be splotchy at best because the coating mixture was uneven, and your work will be wasted.

Table 1

<table>
<thead>
<tr>
<th>Cerakote / Hardener Ratio</th>
<th>Matte Finish</th>
<th>24:1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satin Finish</td>
<td>18:1</td>
<td></td>
</tr>
<tr>
<td>Semi Gloss</td>
<td>16:1</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 (18:1 Ratio)

<table>
<thead>
<tr>
<th>Cerakote / Hardener Ratio Usage Chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Firearm</td>
</tr>
<tr>
<td>------------</td>
</tr>
<tr>
<td>Pistol</td>
</tr>
<tr>
<td>Rifle</td>
</tr>
</tbody>
</table>

**Read and follow the instructions that come with the color(s) you are using. Some Product to Hardener ratios are different depending on the color used.**
**Phase 7: Spraying**

Spraying

**CAUTION:**
Spray in a well-ventilated area, wear a respirator, protective gloves and safety glasses. Refer to the MSDS for additional safety and handling information

**Final Checklist Before Spraying:**

- Plug or mask off all parts that are not to be coated. Remember Cerakote is applied at .001” which is very thin, most areas do not require masking, however, if you are unsure, contact NIC for assistance.

- Ensure all parts to be coated are hung securely, ensuring parts do not touch anything during the application process

- Do not coat springs as it is not recommended to heat springs during the curing process.

- Plug the bore to prevent overspray inside the bore.

**PRACTICE:**

Practice spraying on a piece of metal before going on to your final project. A particularly good exercise is to spray and cure a few machine screws and matching nuts. You should be able to screw the nut onto the machine screw without difficulty. If you can’t, you may be spraying too heavily.
Recommended Mixing & Spraying Supplies
NIC recommends the following products for the best results during the coating prep and application process

Graduated Cylinder:
NIC Part # SE-147A (100 ml) or NIC Part # SE-147B (50 ml) Depending on coating volume.
NIC suggests using a 100M/L graduated cylinder for accurate ratio measurements of Cerakote to hardener.

IWATA LPH-80:
NIC Part # SE-138
• Miniature, center post gravity feed spray gun is a full-featured HVLP gun with spray characteristics similar to Iwata’s popular RG-3 gun.
• Using only 1.8 cfm at 13 psi, this low-air-consumption gun provides high atomization with precise control of the spray pattern and a minimum of overspray.
• Features adjustable spray pattern from round to full-fan shape.
• A stainless-steel nozzle, paint passage and heat-tempored needle ensure long-lasting, peak-performance spraying.
• Uses the reliable and easy-to-service cartridge-style “air-valve” set, which can be serviced outside the gun and easily placed back into the gun body.
• Its 4 oz. (110 ml) stainless-steel gravity cup is center-mounted and rotates, allowing for spraying horizontally, vertically or underneath surfaces.
• Unlike siphon-feed guns, this gravity-feed cup will work with small amounts of paint without spitting
• Spray pattern is from 1/8” to 6” (0.3 cm to 15.24 cm)
Spraying Continued:

Blow off parts with dry compressed air to make sure there is no trapped media in holes or pockets. Sand or other media left behind will cause surface defects.

Start spraying in the most difficult area of each part, then progress and finish to the easier areas. This should help avoid runs and thin spots.
When spraying, strive for even coverage. You are seeking a **0.5 to 1.0 mil coating (0.0005” to 0.001”)**. Spray with sufficient volume that the Cerakote doesn’t “flash off” before the coating hits the part. When spraying, the part should appear wet but not so wet that it wants to run.

**TIP:**
- Do not spray with a wide pattern. Doing so may cause dry spray or a rough finish.

*Example of “wetting out” the part*
Spraying Continued:

After each part is coated, set it aside for about five to ten minutes. Cerakote will still be wet to the touch until it is oven cured.

If you touch any coated parts before curing, the coating will smudge and will have to be refinished.

“MISTAKES”
If a mistake is made during spraying, e.g., a run, don’t attempt to wipe down the part and re-spray. Instead, rinse the part with cleaning solvent or acetone to completely remove the uncured coating. Re-blast the part, dry in the oven, blow off, and re-spray.

Cleaning Up:
Clean your tools with acetone. Contact NIC with questions regarding cleaning solvent compatibility. Discard any unused “mixed” Cerakote according to local and state regulations. Do not return any unused “mix” to the bottle.
PHASE 8: CURING

Oven Cure:
Carefully move each part into the oven and cure at 250 degrees (F) for two hours. If you must hurry the process, curing for 45 minutes at 300 degrees (F) is an alternative cure schedule. If the part(s) being coated are heat sensitive, 150 to 180 degrees (F) for two hours will adequately cure plastic, polymer, wood and composite parts.

After curing is completed, remove the parts from the oven and allow the parts to cool. Once parts are cool enough to handle, the firearm can be reassembled.

**CAUTION**
If you are unsure as to the temperature stability of your parts, contact the manufacturer prior to oven cure.

<table>
<thead>
<tr>
<th>Material</th>
<th>Temperature</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Metal (Standard)</strong></td>
<td>250 Degrees F</td>
<td>2 Hours</td>
</tr>
<tr>
<td><strong>Metal (Quick Cure)</strong></td>
<td>300 Degrees F</td>
<td>45 Minutes</td>
</tr>
<tr>
<td><strong>Metal (Flash, when using stencils)</strong></td>
<td>180 Degrees F</td>
<td>15 Minutes</td>
</tr>
<tr>
<td>Wood, Plastic or Polymer</td>
<td>150-180 Degrees F</td>
<td>2 Hours</td>
</tr>
</tbody>
</table>

**TIP:**
- "Flashing" parts allows for partial curing at 180-200 degrees (F) for 15 minutes. This technique is used when applying and removing stencils.
Cerakote™ Firearm Coating Training Program

NIC Industries offers the only one-on-one training program for Cerakote™ Firearm Coating. With individual training, our instructors speak with the customers prior to the training course to custom design each class to meet the specific needs of each customer. Customers can apply any of NIC’s industry leading firearm coatings on their own parts, or parts supplied by NIC. Courses are taught at NIC’s training facility in White City, Oregon, or onsite*. While every class is custom tailored to meet each customer’s needs, below are topics typically covered in most courses.

**Training Topics**

- Metal Prep
- Out-gassing
- Racking Techniques
- Coating selection for various applications
- Basic to advanced ceramic application
- Proper curing techniques and schedules
- Problem solving and troubleshooting defects
- Proper equipment and operation
- Re-works
- Cost analysis
- Marketing

*Contact NIC for further information about on-site training at 866-774-7628.

**Class Location**

NIC Industries, Inc. is located at 7050 Sixth Street, White City, OR, 97503. White City is located in Southern Oregon approximately 5 miles from Medford, Oregon, and approximately 280 miles from Portland, Oregon.

**Transportation**

Rogue Valley International Airport (MFR) is located 6 miles from NIC and provides daily flights from several major west coast airports. All major rental car companies are located at the Rogue Valley International Airport.

**Lodging**

NIC has negotiated discounted rates with several hotels in close proximity to our facility. Information can be found at [http://www.cerakoteguncoatings.com/resource/downloads/](http://www.cerakoteguncoatings.com/resource/downloads/)
H-Series CERAKOTE™ Firearm Coatings

The unique formulation used for Cerakote™ firearm coating enhances a number of physical performance properties including: abrasion/wear resistance, corrosion resistance, chemical resistance, impact strength, and hardness. Each of these properties is rigorously tested to guarantee that Cerakote™ products remain at the forefront of the firearm coatings market. For this study, the performance properties of Cerakote™ H-146 Graphite Black were compared to the products of two firearm coatings competitors, denoted as C1 and C2. Each coating was evaluated on nine important aspects including performance and cost. These results are summarized in table 1, shown below, and a more extensive description is given in the following paragraphs.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Cerakote™</th>
<th>C1</th>
<th>C2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taber Abrasion Testing</td>
<td>Wear cycles per mil: 6000</td>
<td>Wear cycles per mil: 597</td>
<td>Wear cycles per mil: 418</td>
</tr>
<tr>
<td>(ASTM D4060)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrosion Testing</td>
<td>Corrosion-free at: 1000 hours</td>
<td>Onset of Corrosion: 100 hours</td>
<td>Onset of Corrosion: 45 hours</td>
</tr>
<tr>
<td>(ASTM B117)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pencil Hardness</td>
<td>9h</td>
<td>9h</td>
<td>7h</td>
</tr>
<tr>
<td>(ASTM D3363)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adhesion Cross-Cut Tape</td>
<td>5b</td>
<td>5b</td>
<td>5b</td>
</tr>
<tr>
<td>(ASTM D3359)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mandrel Bend</td>
<td>32%</td>
<td>32%</td>
<td>32%</td>
</tr>
<tr>
<td>(ASTM D522)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impact</td>
<td>160 inch-lbs</td>
<td>160 inch-lbs</td>
<td>140 inch-lbs</td>
</tr>
<tr>
<td>(ASTM D2794)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemical Resistance</td>
<td>Excellent</td>
<td>Excellent</td>
<td>Good</td>
</tr>
<tr>
<td>Theoretical Coverage</td>
<td>478</td>
<td>250*</td>
<td>321</td>
</tr>
<tr>
<td>(ft²/gal at 1 mil thickness)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost ($/ft²)</td>
<td>$0.62/ft²</td>
<td>$0.65/ft²</td>
<td>$0.99/ft²</td>
</tr>
<tr>
<td>VOC Compliance</td>
<td>VOC compliant in all 50 states</td>
<td>Non Compliant</td>
<td>Non Compliant</td>
</tr>
</tbody>
</table>

Table 1. Performance comparison of Cerakote™ H-146 to competitor firearm coatings, C1 and C2.

*Theoretical coverage if applied according to manufacturers specifications of 0.5 mil.

See all the test results at [http://www.cerakoteguncoatings.com/testing/](http://www.cerakoteguncoatings.com/testing/)
Taber Abrasion is a test using a weighted abrasive wheel that rotates at a constant speed to determine the resistance of finishes to abrasion and wear, as stated by test standard ASTM D4060. 7 competitive finishes including Cerakote™ H-146 Graphite Black were tested in accordance with ASTM D4060. Each finish was tested three separate times in order to validate the test result. Panel weights and mil thickness were measured prior to the start of each test to determine a wear rating. A 1000 gram weight was placed on a CS-17 Taber Abrasion wheels as required by ASTM testing standards for testing finishes. Panels were cycled until the Taber wheel wore through the finish to the steel substrate. Finishes that required more than 500 cycles to wear through to the substrate were stopped every 500 cycles for the Taber abrasion wheels to be cleaned. Cleaning the Taber wheels every 500 cycles is a requirement to ensure accurate results. Once the Taber wheel has breached the finish, the Taber abrader is stopped and a final weight is taken to determine the wear rating for each finish. Wear ratings are calculated by taking the weight of the test panel before abrasion and subtracting the weight of the test panel after abrasion and multiplying that by 1,000. That number is then divided by the number of cycles completed before the finish was worn through. The resulting number is the specified wear rating for that finish. Based on ASTM testing standard D4060, Cerakote™ Finished Strong by lasting nearly twice as long as the nearest competitive finish and 24 times as long as the furthest competitive finish.
Salt Spray (ASTM B117) Corrosion testing is used to evaluate the relative corrosion resistance of coated panels exposed to a salt spray or fog at an elevated temperature. Coated panels are placed in an enclosed salt spray chamber at a 15-30 degree angle and subjected to a continuous indirect spray of a neutral (Ph 6.5-7.2) salt water solution. The chamber/cabinet is kept at an operating temperature of 95F and fogging a 5% salt solution at the required 12ml/hr. Cerakote™ H-146 Graphite Black panels were checked for corrosion at specific intervals of 45, 160, 255, 385, 675, 850, 1000, 2000, 3000 and 3500 hours. At 3500 hours Cerakote™ H-146 was not corroded. This study shows that Cerakote™ preserves the life of a firearm in a corrosive environment longer than any competitive coatings.

Hardness, or Pencil Hardness (ASTM D3363), is measured by using different grades of pencil lead to cut through a coating surface. To conduct this test, a coated panel is placed on a flat, horizontal surface. A weighted trolley with the hardest pencil lead (9h) is placed on the panel and pushed away from the operator. The length of the stroke should be about 6.5 mm. This process is repeated until a lead is found that will not cut through the coating to the metal for a distance of at least 3 mm (this is the pencil hardness rating). This process is then repeated until a lead is found that will not cut nor scratch the coating (this is the scratch hardness rating). Cerakote™ H-146 Graphite Black finished strong with a 9h hardness rating, the highest hardness rating that can be achieved.
The ability of Cerakote™ H-146 to resist chemical attack was tested by dipping coated panels into a series of solvents to which the coating may be exposed during regular use and extreme conditions. The panels were placed in the solution and allowed to sit for 24 hours. Afterward, the samples were removed, analyzed and assigned a rank depending on the resistance to each specific chemical. The results of this test are shown in the table below.

The performance of Cerakote™ H-146 was classified as excellent for 14 of the solvent tests. This indicates that the coating was not affected following a 24-hour immersion in the solvents. The coating also showed good resistance to HCL and experienced only a slight change in texture after 24-hour immersion.

<table>
<thead>
<tr>
<th>SOLVENT</th>
<th>CERAKOTE™ H-146</th>
</tr>
</thead>
<tbody>
<tr>
<td>GUN CLEANER</td>
<td>★★★★★</td>
</tr>
<tr>
<td>WD-40</td>
<td>★★★★☆</td>
</tr>
<tr>
<td>BRAKE CLEANER</td>
<td>★★★★☆</td>
</tr>
<tr>
<td>DENATURED ALCOHOL</td>
<td>★★★★☆</td>
</tr>
<tr>
<td>LACQUER THINNER</td>
<td>★★★★☆</td>
</tr>
<tr>
<td>METHYL ETHYL KETONE</td>
<td>★★★★☆</td>
</tr>
<tr>
<td>ACETONE</td>
<td>★★★★☆</td>
</tr>
<tr>
<td>GASOLINE</td>
<td>★★★★☆</td>
</tr>
<tr>
<td>MINERAL SPIRITS</td>
<td>★★★★☆</td>
</tr>
<tr>
<td>PAINT STRIPPER</td>
<td>★★★★☆</td>
</tr>
<tr>
<td>5% HCL SOLUTION</td>
<td>★★★☆</td>
</tr>
</tbody>
</table>

★ ★ ★ ★ ★ = EXCELLENT CHEMICAL RESISTANCE
★ ★ ★ ★ = GOOD CHEMICAL RESISTANCE
★ ★ ★ = FAIR CHEMICAL RESISTANCE
★ ★ = POOR CHEMICAL RESISTANCE
★ = NO CHEMICAL RESISTANCE
DURABILITY

TEST: ASTM D2794

Impact Resistance (ASTM D2794) measures the resistance of organic coatings to the effects of rapid deformation (Impact). Impact resistance is measured by placing a coated panel in an universal impact tester. A standard weight is dropped a distance to strike an indenter that deforms the coating and the substrate. The indentation can be either an intrusion or an extrusion. By gradually increasing the distance the weight drops, (1 inch at a time) the point at which failure occurs can be determined by cracking or delamination of the coating. Cerakote™ H-146 Graphite Black was tested to have an impact strength measuring 160 inch-lbs which is the maximum the impact tester can measure.

FLEXIBILITY

TEST: ASTM D522

Flexibility, or Mandrel Bend (ASTM D522), testing is measured by placing a coated panel in a conical mandrel apparatus and bending the coated test panel over a conical shaped mandrel in order to assess the elasticity or resistance of a coating to cracking, elongation and/or detachment from the metal test panel in accordance with ASTM D522. The conical shape of the bending area allows the deformation of the test panel and examination of the elasticity range of a coating over any diameter between 3.1 mm and 38 mm in one single test. Cerakote™ H-146 Graphite Black was tested in accordance with ASTM D522 and exhibited excellent flexibility and no signs of cracking, elongation or detachment from the steel panel.
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Need Help?

At any point during the Cerakote application you have a question, please contact Cerakote Firearm Coatings at:

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White City, OR 97503

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Email: info@nicindustries.com
Web: www.CerakoteGunCoatings.com
Fax: 541-826-6372

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