TECHNICAL INFORMATION

Serial Number Restoration Equipment

Catalog Nos. MNR100, 284A, RAG500, RPR1006

INTRODUCTION

Removing identifying marks such as serial numbers from stolen property to keep the origin from being traced is common. The usual practice is to file or grind these marks from the surface of the item. In many cases, identifying marks may be restored even if the obliteration has penetrated deeply.

When the original identifying marks were punched into the metal, the metal's structure deep underneath the markings underwent changes. By treating the surface of the obliterated area, these identifying marks may be restored in many cases. To effect a restoration, an acid solution or gel is applied to the questioned area. This reagent attacks and removes the uncompressed area at a more rapid rate than it does the compressed area,

Nos. RAG500 and MNR100 Kits

100 HUNTER PLACE, YOUNGSVILLE, NC 27596 USA
Ph: (919) 554-2244, (800) 356-7311 • Fax: (919) 554-2266, (800) 899-8181 • Web: www.sirchie.com • Email: sirchieinfo@sirchie.com

eventually restoring the original identification marks to a point where they can be visibly interpreted.

The time required to develop obliterated numbers is dependent on the type of material being treated. Tool steels, for instance, are extremely hard and require a longer time. Other grades of steel, aluminum, and copper will etch more rapidly.

HAZARDS/SAFETY INFORMATION

- Before using this kit, consult the appropriate Material Safety Data Sheets (MSDS) found on our website at www.sirchie.com/support.
- Extreme care must be taken when working with acids. The minimum personal safety equipment should include latex or nitrile gloves, splash proof safety glasses/goggles, and a laboratory apron.
- Avoid contact with skin.
- Etching reagents are acids and will attack whatever surface they contact. If undesired contact occurs, acid neutralizer or baking soda paste should be used to neutralize these materials. After etching is complete, all surfaces that have been exposed to etching compounds should be neutralized using the Acid Neutralizer supplied in the kit. This also applies to any utensils that also may have been in contact with etching solutions.

PROCEDURE

NOTE: *Surfaces must be cleaned and polished prior to any restoration attempts/*

CLEANING—The area on the article suspected of having obliterated identification marks should be carefully cleaned using the Metal Surfacing Solution or Aluminum Surfacing Solution, as appropriate. Swab the area thoroughly to remove all dirt, oil, and grease. If the surface has been painted, the paint must be removed.

POLISHING—Polishing is the most important phase of the operation and must be performed with diligence. Your results will be proportional to the effort made here.

The area should first be filed smooth, removing all ridges and surface cuts. File enough to remove major ridges and gouges, but not so deeply as to remove all artifacts. (Mechanical or electrical polishers or grinders should not be used as heat generated will rearrange the molecular structure.) After the filing has rendered the area relatively smooth, use emery cloth to obtain a highly polished (mirror-like), scratch-free surface. The polishing time required depends largely on the hardness and granularity of the metal being treated. In any case, the area should have a smooth surface before etching is attempted.

This polishing operation is necessary because if you do not have a smooth surface to begin with, the reagent will not attack the material uniformly. Also, a mirror-like surface will eliminate the misconstruing of characters found in identification marks.

RAG1001 applied to pistol.

ETCHING—Various etching methods are listed on the following pages.

APPLICATION OF RESTORATION REAGENTS

Application of Liquid Etching Solutions NIS (Steel), NIA (Aluminum) and NIC (Copper)

CAUTION: *Etching reagents are acids and will attack whatever surface they are placed into contact with. Acid Neutralizer should be used to neutralize these materials. Use baking soda paste if acid neutralizer is not available.* ***NOTE:*** *Perform cleaning and polishing steps described previously prior to using any of the liquid reagents.*

1. Build a clay dam around the area to be treated. Be sure the clay adheres to the surface so that the etching solution does not seep under the clay dam.
2. Open the ampoule appropriate to the particular metal or alloy being treated.
3. Using the pipette, evacuate about half of the ampoule's solution.

RAG1001 for Restoration on Steel

- *1. After cleaning and polishing, apply a 1/8" (3mm) thick layer of RAG1001 with a wooden applicator spatula.*
- *2. Check periodically for the appearance of restored identification marks by sliding the etching gel to the side using the wooden spatula. Since grades of steel vary, the time required cannot be predicted.*
- *3. Etching gel will become extremely discolored with the base metal etched from the surface area being treated. If the etching process slows noticeably, replace with fresh gel.*

RAG2001 for Restoration on Aluminum

- *1. After cleaning and polishing, apply RAG2001 by swabbing with a cotton applicator pad.*
- *2. Apply a min. 1/8" (3mm) thick RAG2001 with a wooden applicator spatula.*
- *3. Allow it to sit for approx. 3 min. and wipe area free of gel residue using a cotton pad. As the freshly etched surface oxidizes, it will become fuzzy or mossy, and the numbers or other I.D. marks will begin to show. Observation must be made immediately after wiping.*
- *4. If the numbers are difficult to see, brush off "moss" and repeat procedure. Record the numbers as they appear and photograph. After numbers are recorded, wash surface thoroughly with water. Prevent surface from oxidizing further by smearing with a thin film of grease. WORKING TIME: 20 min.*

RAG3001 for Restoration on Copper

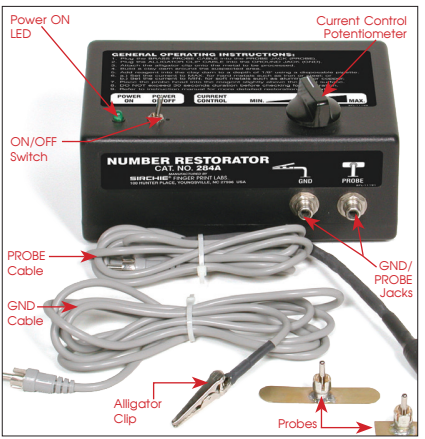
- *1. After cleaning and polishing, apply a min. 1/8" (3mm) thick layer of RAG3001 using a wooden spatula.*
- *2. Allow the gel to sit for approx. 3 min. and wipe the area free of gel and examine.*
- *3. If identification marks are not clearly apparent, rub the RAG3001 on the surface in a circular motion for approximately 30 seconds.*
- *4. Wipe the area clean and examine. If restoration has not been achieved, apply fresh gel and repeat procedures 2 through 4.*

NOTE: *After examination is complete using any of the reagents, dispose of used reagents in accordance with local, state and federal guidelines.*

4. Apply enough of the etching solution to completely cover the area surrounded by the clay dam.
5. Check, periodically, for the appearance of identification marks by removing the etching solution from within the dam using the disposable pipette. The solution will become extremely saturated with the base metal from the surface area being treated. If significant decrease in etching activity is noted, it may be replaced with new solution from the ampoule as required. The time required for the restoration of the identification marks cannot be calculated since materials vary so much in composition. Normally, the surface should be examined at 3 minute intervals.

USE OF NUMBER RESTORATION ACCELERATOR No. 284A

The restoration process can be accelerated by electrical means. The chemical attack on the metal surface provided by the various reagents releases metal ions into the reagent solution. These metal ions carry an electric charge and thus will be attracted to a plate with the opposite charge. The accelerator provides this electrically charged plate. Under the influence of the accelerator, metal ions leave the surface and travel to the charged probe of the accelerator where they are deposited. Probe heads accumulate metal from the surface being treated. These heads should be periodically wiped off with either a rag or cotton. After use, they may be rinsed off with water or lightly sanded to remove buildup.



No. 284A Kit and Components.

Accelerator Probe and Grounding Cables

Two cables are supplied with the accelerator:

PROBE CABLE—One end of the cable features an RCA-type plug while the other end is equipped with a female jack. Two base probes of different sizes are supplied, and each probe is equipped with a male plug for connection to the probe cable.

GROUNDING CABLE—This cable is equipped with a permanently attached alligator clip at one end and an RCA-type plug at the opposite end.

THE CONTROL PANEL of the 284A features a Power ON Lamp, Power ON/OFF Switch and Current Control Potentiometer.

Operation

Follow the operating instructions printed on the top plate of the accelerator unit. These instructions may be referred to when using the unit.

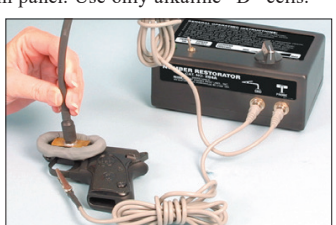
Battery Replacement

To replace the batteries, remove the four screws from the bottom panel. Use only alkaline “D” cells.

LIQUID ETCHING USING THE ACCELERATOR

NOTE: *Perform cleaning and polishing steps described previously prior to using the accelerator.*

1. Plug the Probe Cable into the Probe Jack. Connect the proper size brass probe.
2. Plug the Grounding Cable into the GND Jack.
3. Clip the alligator clip onto the metal being processed.
4. Build a clay dam around the area to be processed. The dam should be slightly longer than the probe (see inset).



284A is used to restore serial number of handgun.

5. Add reagent inside the dam to a depth of 1/8" with a disposable pipette.
6. Turn the Power Switch to ON. If the green indicator lamp does not light, switch the unit off and replace the batteries.
7. Set the Current Control as follows:
   - MAX for steel, iron and all very hard metals.
   - MIN for copper, aluminum, and other very soft metals.
   - Set in between MIN and MAX for metals of medium density and/or hardness.
8. Allow the Probe surface to contact the liquid reagent. DO NOT allow the Probe to touch the metal being processed. The amount of current flow will be determined by the Current Control setting and the number of metal ions in the etching solution.

Resultant photograph of the serial numbers restored *(NOTE: be certain to include a scale in photo).*

9. Do not exceed 30 seconds duration before checking for restoration.
10. Draw off the etching solution with the pipette and examine the surface for recovered numbers. If none are seen or only partially developed numbers are visible, reapply the reagent and accelerate for no more than 30 seconds.
11. After processing is completed, remove the reagent and dispose of according to local, state and federal regulations. Apply acid neutralizer to the metal being processed, photograph using a scale or record the numbers, and then flush the surface with running water.

MAINTENANCE

1. Keep the interior and exterior of kit clean by wiping it down with a damp cloth or paper towels
2. Clean the exterior of the No. 284A Accelerator. Wipe down accessories of the accelerator that may have contacted etching solutions with Acid Neutralizer, and then and then wipe down with a damp cloth or paper towel.
3. Replace batteries as needed with 4 ea Alkaline “D” Cells. To replace the batteries, remove the four screws located on the rear panel. Use only alkaline “D” cells.
4. No other maintenance is suggested for the accelerator. If it fails to operate in the specified manner, please contact Customer Support at the factory and secure a return authorization.

TROUBLESHOOTING

Should you perform a restoration attempt and it fails to produce any obliterated numbers consider the following factors:

1. The surface to be etched must have a mirror-like, highly polished finish. Clean the surface with the proper surfacing solution and re-sand the surface. The surface being examined must be perfectly smooth and level.
2. If restoration doesn’t occur after a reasonable number of attempts, the possibility exists that the metal surface was subjected to extreme heat from grinding, propane or acetylene torch or heli-arc welder. If this was the case it will be most often impossible to restore the original number.
3. If the accelerator fails to perform as specified and fresh batteries have been installed, please contact the factory.

References:

1. Serial Number Restoration, Kentucky State Police Handbook http://www.firearmsid.com/KSP%20Evidence%20Manual/Introduction.htm; April28, 2010
2. Iowa Dept. of Public Safety: Firearms and Tool mark Section, http://www.dps.state.ia.us/DCI/lab/firearms/restoration.shtml: April 28, 2010
3. Association of Firearms and Toolmark Examiners: http://www.afte.org/, April 28, 2010

COMPONENT DESCRIPTIONS	
RAG1001, RAG2001, and RAG3001 Reagents	*Use with steel, aluminum, copper, and their respective alloys. May be used with or without the 284A Number Restoration Accelerator.*
Metal Surfacing Solution	*Removes dirt, oil, grease, etc.*
Aluminum Surfacing Solution	*Use on aluminum only as a cleaning agent.*
Wooden Applicator Spatulas	*Use to apply reagents to surfaces.*
Liquid Etching Solutions	*Packaged in resealable glass ampoules labeled: NIS (Steel Reagent); NIA (Aluminum Reagent); and NIC (Copper Reagent).*
Metal File and Emery Cloth	*Use for polishing the surface to be treated.*
Latex Gloves	*Protect hands from the effects of reagents.*
Acid Neutralizer	*Neutralizes etching reagents that come in contact with the skin, clothing, or unintended surfaces. Follow by flushing the area with water.*
Cotton Balls	*Use in the application of surfacing solutions and removal of RESTOR-A-GEL®.*
Clay	*Confines the etching solution to the area that is to be treated.*
Disposable Pipette	*Use to evacuate Liquid Etching solution from the resealable ampoule and for applying Etching Solution to the area being treated. The pipette may also be used to remove Liquid Etching Solution from the area within the dam to observe development of obliterated numbers periodically.*
Plastic Collection Container	*Provided for the deposit of used RESTOR-A-GEL® under field conditions.*

PRODUCT DESCRIPTIONS

RESTOR-A-GEL® was developed to enable investigators to perform restoration in the field on any type of surface or metal. The gel consistency of the reagent permits application with a spatula to either a vertical or horizontal surface. No damming or tear-down of engine is required; applies just like grease. Gel reagents have 50% more concentration for minimum etching time; also can be used with No. 284A Accelerator.

RAG500 is a complete kit containing the necessary reagents to restore serial numbers and other identifying characteristics that have been destroyed—leaving no visible tracks. Obliterated marks on ferrous and non-ferrous metals can be restored to visibility with RESTOR-A-GEL® compounds.

MNR100 is a complete master kit for use in the field or lab, and permits the use of liquid etching reagents in resealable glass ampoules or the RESTOR-A-GEL® reagents. It includes all the necessary support equipment and the No. 284A Restoration Accelerator. Identifying marks on iron, steel, aluminum, copper and their alloys may be restored with ease using this kit.

284A is an electrolytic-acid etching accelerator for use in restoring obliterated serial numbers and other identifying marks that have been removed by filing or grinding. It operates from self-contained dry cell 1.5 volt "D" batteries for maximum portability and flexibility. Its simplified controls and improved circuitry reduces etching time from hours to minutes.

RESTO-PLAS™ is used to restore the original manufacturer's stamped serial numbers on most commercially available plastics, including items such as TVs and stereo equipment. Apply the special reagent to the surface, air dry, then apply direct heat with a hot air dryer. Ground off numbers pop up for easy recording and photographing. Each reagent test unit includes 4ml of plastic etching reagent in a resealable glass vial and 4 applicator swabs.

Notes:

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919-554-2244 • 800-356-7311

www.sirchie.com