

CRL

GLASS SCRATCH REMOVAL SYSTEM

Training Manual



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REMOVAL SYSTEM**

Training Manual



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Safety Instructions

Basic precautions are to be observed when using an electrical machine, including the following:

- **Read all instructions before using the scratch removal system.**
- **This machine has a polarized plug to reduce the risk of electric shock.** Always connect to a polarized outlet, which has the left slot wider than the right. The plug fits in a polarized outlet only one way. If the plug does not fit the outlet, reverse the plug. If it still does not fit, contact a qualified electrician to install a proper outlet. Do not modify the polarized plug to fit a non-polarized outlet or extension cord. Unplug from the outlet when not in use and before performing maintenance.

To reduce the risk of fire, electric shock or injury:

- Always wear safety glasses, ear protection and a dust mask when polishing.
- Use of a Ground Fault Interrupter (GFI) is required in case of electricity coming in contact with water. To obtain a GFI, contact a local tool supplier.
- Do not leave polishing machine unattended when it is plugged in.
- Do not use polishing machine for any purpose other than described in this training manual.
- Use only included and/or recommended attachments with polishing machine.
- Do not use polishing machine with a damaged cord or plug.
- If polishing machine is not working correctly, has been dropped, damaged, or dropped into water, have it repaired by CRLaurence.
- Do not pull or carry polishing machine by cord, use cord as a handle, close a door on cord, or pull cord around sharp corners or edges. Keep cord away from heated surfaces.
- Do not unplug by pulling on cord of polishing machine. To unplug, grasp the plug, not the cord.
- Keep hair, loose clothing, fingers, and other body parts away from polishing machine openings and moving parts.
- Turn off all controls before plugging or unplugging polishing machine.

Save these instructions for future use.



Wrench



Temperature Chart



**Inspection Light and
IR Thermometer**

How Does the System Work?

After thousands of hours of research, development, testing, design, and fieldwork, the *CRL® Glass Scratch Removal System* was created. This system is uniquely different because it uses thermal energy (heat), chemical reaction (compound) and mechanical energy (shear force) to effectively eliminate scratches from glass without fixed abrasives.



Effective use of this system has been proven for eight years by leading glass manufacturers, distributors, and restoration experts worldwide.

Glass Identification

IMPORTANT: If the glass type is not clear, and/or an ASI “bug” is not printed in the corner of the glass, check with the manufacturer or local building codes. It is crucial to identify the type of glass to ensure the correct heat is applied during scratch removal according to the temperature chart. (See *Temperature Chart on page 27.*)

Following are types of glass and examples:

- **Laminated:** Laminated glass is made up of two or more glass sheets bonded together with an inner layer of plastic (PVB) or resin. In case of breakage, the interior layer holds the fragments in place. This glass is suited to areas where it is important to ensure the resistance of the whole sheet after breakage such as: windshields, shop-fronts, balconies, stair-railings or roof glazing.
- **Annealed:** Annealed or float glass, a term which comes from the production method for this type of glass, is perfectly flat, clear glass. When manufacturing this type of glass, the molten glass is “floated” onto a bed of molten tin. During the float glass process, the hot glass is gently cooled in the “annealing lehr,” which releases any internal stresses from the glass to enable further processing. Ninety percent of glass is manufactured this way.
- **Tempered (Toughened):** This type of glass is two or more times stronger than annealed glass. When broken, it shatters into many small fragments that prevent major injuries. Toughened glass is produced by applying a special treatment to ordinary annealed glass after it has been cut to size and finished. The treatment involves heating the glass so that it begins to soften (about 620° C) and then rapidly cooling it. This produces a glass that, if broken, breaks into small pieces without sharp edges.
- **Chemically Tempered (Chemically Hardened):** Chemically tempered glass is covered by a chemical solution, which produces a higher mechanical resistance. This glass has similar properties to thermal-treated glass. The product is not generally used for window glass, but more commonly seen in industries where thin, strong glass is needed.

- **Soft Coat:** This type of glass is coated in a secondary process known as sputter coating, usually to offer solar control benefits. These types of coatings generally require some additional care in handling and fabrication and must be used within an insulating glass unit.
- **Hard Coat:** A hard-coat or pyrolytic glass is coated during the manufacturing process at the molten glass stage. This type of coating offers a surface that is generally as durable as an ordinary glass surface, and therefore requires no special handling and, unlike soft coat, does not have to be used in an insulating unit.
- **Mirrored:** Mirrored glass is made of glass with a smooth, polished surface that reflects images. Depositing a coating of metal, mostly silver, on the surface of clear or body-tinted glass, is how antique mirrors were made. A layer of copper, which is in turn protected by a painted backing, usually protects this deposit. The silver gives the mirror its reflective properties.

Scratch Identification

Scratch identification can be difficult, but the more experience with the system, the better a user becomes at identifying scratch types.

There are a wide variety of scratches so it is not feasible to give an exact definition for every scratch. Following are general scratch categories:

- **Rub:** A thin or wide mark on the glass. It is barely felt with a finger, usually grayish, and generally caused by glass rubbing against glass or a flat metal surface. It is relatively easy to polish and requires the least amount of time; however, a rub can be deceiving and might require more time than anticipated. All rubs are addressed as viable jobs.
- **Light Scratch:** Usually a narrow scratch, can be felt with a finger, but does not stop a fingernail when dragged across it. It has the same degree of difficulty as a rub.
- **Average-to-Medium Scratch:** White can be seen in the scratch, usually indicating a greater depth than a rub or light scratch. An average scratch is often a combination of a rub and light scratch. It can be felt with a fingernail, and usually varies in depth. Medium scratches catch a fingernail. Both scratch types can be polished with great results. The time required is longer than a rub or light scratch.

- **Heavy-to-Deep Scratch:** Easily identified, it is a cut into the glass. It appears white, and upon close inspection, edges are rough or scalloped. It stops a fingernail. This scratch type is normally found where graffiti is carved into glass with carbide-tip tools, 80-grit or coarser sandpaper, or dull or broken razor blades. It requires the most time and effort, and although results are often good, returning the surface to its original condition might be cost-prohibitive depending on the replacement cost of the glass.

Getting Started

Note: Do not plug in the polishing machine until completely assembled.

To assemble the polishing machine:

1. Verify the components against the enclosed parts list.

Note: Contact CRLaurence immediately for missing components.

2. Fill the water bottle portion of the water feed system approximately half full.
3. Insert the spray tip into the spray post.



Insert spray tip into the spray post



Spray tip inserted into spray post

4. Insert the water feed syringe mount into the polishing machine.
Insert the syringe into the mount.



Insert syringe mount into the polishing machine

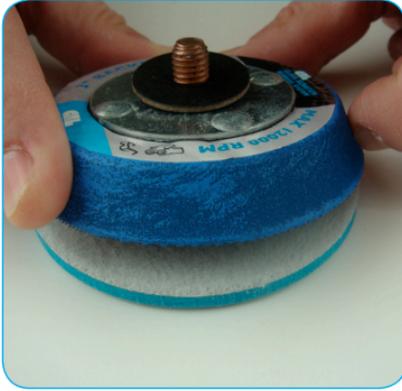


Attach syringe to the syringe mount



Tighten the lock screw

5. Determine the disk size per the glass and scratch type. (See *Glass Identification, Scratch Identification and How to Use the Scratch Removal System* beginning on page 4.)
6. Place the disk face down on a clean, flat surface to prevent contamination.



**Attach backer pad to
polishing disk**

7. Center the backer pad onto the adhesive side of the disk and press down firmly.



**Backer pad
attached
to disk**

Note: When mounting disks have been stored in a cool environment, it is advisable to warm the backer pad and disk to room temperature before attaching for better adhesion.

Note: If using a Pressure-Sensitive Adhesive (PSA) disk in place of Quick Fit Velcro, remove the backer pad from the carrying case, and with a lint-free cloth, clean the surface of the backer pad with denatured alcohol to remove oils or debris that might affect the adhesion of the disk to the pad surface. Bend the edge of the backer pad and disk back to securely adhere them together. (Also do this with new backer pads, and when attaching a new disk to the backer pad.)

8. **Optional:** Attach the water feed extension if using a larger than 2" disk.
9. Screw the backer pad into the polishing machine and hand-tighten.

IMPORTANT: Do not start the threads by hand and turn on the polishing machine to finish insertion. It causes the backer pad to get stuck in the machine.

10. Attach the water bottle holder to the belt clip or suction to the glass.



**Fully assembled
water feed system**

11. Read and follow the steps in *Practicing Scratch Removal* on page 11.

Practicing Scratch Removal

IMPORTANT: It is required to use the following practice routine before performing scratch removal at a job site.

To ensure success, the disk must be flat on the glass and moving in a parallel direction with the scratch. Concentric circles of compound appear on the glass, which is an indicator of good progress.



Circular compound patterns on glass

This practice exercise helps identify scratches and severity, and therefore, how long each type takes to remove on the job.

To practice scratch removal:

1. Obtain a piece of flat, annealed (window) glass at least 12" x 15".
2. Wearing a glove put three scratches in the glass within a 2-inch-wide space, each 6-7 inches long, and increasing in severity.
 - **First Scratch:** Use a dry scouring pad, such as Scotch-Brite®, normally used to clean pots and pans. Fold it in half, and rub up and down on the glass three-to-four times for a length of 6-7 inches. This type of scratch is commonly found on flat and auto glass, and is similar to light masonry or light razor scratches on flat glass.



Scouring pad scratch

- **Second Scratch:** Use 220-300 grit sandpaper and repeat the process for the first scratch. This scratch is similar to heavier masonry, stucco, sandpaper, or razor scratches.



Sandpaper scratch

- **Third Scratch:** Use a piece of glass and hold it at a 45° angle so that the corner of the glass can scratch the target glass. Use heavy pressure and drag the scratching glass about 6-7 inches. This is similar to glass-on-glass, ladder, or tool scratches.



Glass-on-glass scratch

3. Read and follow the steps in *How to Use the Scratch Removal System* on page 15.
4. Using the *Practice Scratch Removal Worksheet* (pages 40-41), make notes about progress on each of the scratches after five minutes of polishing, such as how long you have been working on it and how much of the scratch has disappeared.
5. Continue polishing for several more five-minute sessions, taking more notes, until all practice scratches have been worked. (*Some types of scratches can take 30 minutes or longer.*)

Note: By this time, you should have a good idea of what the system can do in a fixed time period on this type of glass with different scratch types.

Note: Deep and narrow scratches are the most difficult. "Rubs" are generally shallow and wide, and can be removed more rapidly. Scratches with shattering along the edges, or gouges, are not removable with the polishing system. Look at them with a strong magnifier, if needed.

Note: Practice on easier scratches at first to learn the proper techniques. After easier ones are mastered, move onto the more difficult ones keeping in mind that time is money.

Reading Progress

Patience and technique determine the remaining time to finish scratch removal. As a general guideline, the following show how to judge that 60-70% of a scratch has been removed:

- The scratch started as a solid line and is now a broken line.
- The scratch started as a solid line, no longer drags a fingernail, and has little or no depth.
- The scratch is shorter at one or both ends.

Note: The disk gets impacted with compound and after 20 minutes becomes less efficient. Clean the disk roughly every 15-20 minutes and reload it.

Common Problems

Following are common problems when removing scratches:

- Too much compound, which clogs the scratch and disk.
- Too much water, which wastes compound and prevents building enough heat.
- Running the disk on edge, which will ruin the disk.
- Not building enough heat, which slows down progress.
- Building too much heat, which can “bake” the compound on the glass, or break the glass.
- Misreading the scratch slows progress.

Practice Scratch Removal Worksheet

See Exhibit A in back of manual on pages 40-41.

How to Use the Scratch Removal System

Before removing a scratch, it is important to determine the type of glass and scratch (see *Glass Identification and Scratch Identification* on pages 4-6). Based on these two factors, the disk size and required heat, per the temperature chart, can be determined.

Auto Glass

Automotive glass is designed for an automobile, such as a windshield, side, or rear glass. Wiper rubs, tree branches, ice scrapers, or handling damage are the usual cause of auto glass damage.

Following are the supplies:

- 2" automotive paint grade masking tape—it is more durable than regular masking tape.

IMPORTANT: Do not use duct tape. It is hard to clean up and might take paint off a painted surface.

- A painter's drop cloth or plastic sheeting.
- A reusable Scratch Dam is also available. It restricts splattering of polishing compound outside the scratch area. It is easy to tape to the glass and takes less time to set up and clean up than plastic sheeting. To clean, just rinse off dry polishing compound with water.



Auto glass scratch repair with Scratch Dam

- Compound does not stain but absorbs into porous materials unless precautions are taken. Tape, or a Scratch Dam, eliminate extensive cleanup after job completion.
- "Pits" in the windshield absorb compound, and do not polish out.

Types of Auto Glass

IMPORTANT: Make sure that the scratched auto glass does not have before- or after-market tinting. If so, it might affect whether or not the scratch can be removed using this system. If in question, contact the glass dealer or manufacturer.

Following are types of auto glass, installed or uninstalled:

- **Laminated** – windshield
- **Tempered** – side, back or roof

Note: Side, back or roof auto glass is normally tempered but sometimes laminated. If the glass type is not clear, and/or an ASI "bug" is not printed in the corner of the glass, check with the manufacturer or dealer.

Disk Sizes for Auto Glass

Disk size is determined by many factors, including type of scratch, scratch depth and location, type of glass and the operator's experience.

When working on auto windshields, it is important to avoid any distortion that might be a distraction to the driver. This does limit the severity of the damage that can be repaired, especially in the driver's line of sight.

The smaller the disk diameter, the more aggressive the action will be. Therefore, a larger diameter disk may be required in some instances. For example, instead of using a 2" disk in the area directly in front of the driver, a 4" or 6" disk may be a better choice.

Windshields are fabricated from annealed glass, which is softer than tempered (hardened) glass such as that found in side and rear

windows. A larger diameter disk will be less likely to distort the glass. It is important to note that it may also require more time to remove the scratch when using a larger disk.

Some technicians find the 2" disk more difficult to use when first learning the process. It is recommended that new technicians start with the 4" or 6" disk and move to the 2" after extensive practice.

For numerous very light scratches that can be removed quickly, a larger diameter disk can be used to cover more surface area at once.

Installed Auto Glass Preparation

To prepare the work site for installed auto glass:

1. Stand on a step stool or ladder (for trucks), and place a drop cloth or painter's plastic over the auto doors and areas needing protection.
2. Wash the glass with glass cleaner, and remove any manufacturing debris.
3. Identify the scratch type. (*See Scratch Identification on page 5.*)
4. Place painter's plastic (1 mil) over the scratched area and cut a hole with a 6" clearance around the work area.

– OR –

1. Form a "dam" with the sheeting by unfolding and taping it to the glass, or form a "doughnut" with a moist towel, around the scratch or scratches.
2. Read and follow the steps in *Removing a Scratch* on page 23.

Note: When operating the polishing machine, either drape the power cord over a shoulder or through a rope clip attached to a belt. It minimizes the chance of the power cord scratching the finish of the automobile.

Uninstalled Auto Glass Preparation

To prepare the work site for uninstalled auto glass:

1. Place the glass on a rack or polishing station, making sure it is stable.
2. Wash the glass with glass cleaner.
3. Identify the scratch type. (See *Scratch Identification* on page 5.)
4. Form a “dam” with the sheeting by unfolding and taping it to the glass around the scratch or scratches.
5. Read and follow the steps in *Removing a Scratch* on page 23.

Auto Glass Cleanup

To clean up after auto glass scratch removal:

1. Wash the glass in its entirety with glass cleaner.
2. De-mask the glass and unwrap the vehicle.
3. Clean the glass again.
4. Follow component maintenance recommendations.
(See *Maintenance* on page 28.)

Flat Glass

Flat glass is architectural, such as residential or commercial windows and doors. Ladders, window cleaning tools, sandpaper, stucco, masonry, or handling are the usual causes of flat glass damage.

Following are the supplies:

- 2" automotive paint grade masking tape—it is more durable than regular masking tape.



Fold tape in half lengthwise and adhere top length to surface.



Repeat and place new tape directly beneath original tape, adhering two exposed edges together. Repeat to form square.



Fully formed scratch dam.

IMPORTANT: Do not use duct tape. It is hard to clean up and might take paint off a painted surface.

- A painter's drop cloth or plastic sheeting.
- A reusable Scratch Dam is also available. It restricts splattering of polishing compound outside the scratch area. It is easy to tape to the glass and takes less time to set up and clean up than plastic sheeting. To clean, just rinse off dry polishing compound with water.

Note: Compound does not stain but absorbs into porous materials unless precautions are taken. Tape and plastic sheeting, or a Scratch Dam, eliminate extensive cleanup after job completion.

- Extension cord
- Ladder
- Garbage can
- Lint-free paper towels

Types of Flat Glass

Following are types of flat glass:

- **Laminated** – safety or hurricane
- **Tempered** – door, windows or sliding door
- **Annealed** – normally any other type than laminated or tempered

Note: If the glass type is not clear, and/or an ASI "bug" is not printed in the corner of the glass, check with the manufacturer or local building codes.

Disk Sizes for Flat Glass

Use a 4" disk for most scratches on annealed or laminated glass.

Installed Flat Glass Preparation

To prepare the work site for installed flat glass:

1. Wash the glass with glass cleaner.
2. Identify the scratch type. (See *Scratch Identification* on page 5.)
3. Form a “dam” with tape around the scratched area, keeping 6” around the scratch itself.

IMPORTANT: When working indoors, be aware of items that might be affected by spray, such as draperies, carpeting and furniture. Cut a larger sized plastic piece, and use a drop cloth and/or protective booties, to protect the homeowner’s belongings.

4. Read and follow the steps in *Removing a Scratch* on page 23.

Note: When constructing a dam for flat glass, build it four-sided (see photo on page 19) to retain more compound. When working on a horizontal surface, water collects on the glass closest to the scratch so there is more potential for spray to hit unwanted areas. Make sure that there is a sufficient dam to protect the surrounding area.

Uninstalled Flat Glass Preparation

To prepare the work site for uninstalled flat glass:

1. Place the glass on a rack or polishing station, making sure it is stable.
2. Wash the glass with glass cleaner.
3. Identify the scratch type. (See *Scratch Identification* on page 5.)
4. Cut a large enough plastic sheet (4 mil) from the roll.
5. Form a “dam” with the sheeting by unfolding and taping it to the glass around the scratch.
6. Read and follow the steps in *Removing a Scratch* on page 23.

Flat Glass Cleanup

To clean up after flat glass scratch removal:

1. Wash the glass in its entirety with glass cleaner.
2. Remove the dam.
3. Clean the glass again.
4. Follow component maintenance recommendations.
(See *Maintenance* on page 28.)

Specialty Glass

Specialty glass is generally any other type than auto or flat. Cleaning tools, door rubs or sharp objects are the usual cause of specialty glass damage.

Types of Specialty Glass

Following are types of specialty glass:

- **Curved** – storefront
- **Mirrored** – mirror
- **Heat-rated** – fire-rated
- **Tempered** – shower door
- **Iron-rich** – 1" thick

Note: If the glass type is not clear, and/or an ASI "bug" is not printed in the corner of the glass, check with the manufacturer or local building codes.

Disk Sizes for Specialty Glass

Use a 2" disk for tempered or heat-treated glass, and a 4" disk for mirrors. Otherwise, the correct disk size normally depends on the curve of the glass. Contact CRLaurence for a recommendation.

Specialty Glass Preparation

To prepare the work site for specialty glass:

1. Wash the glass with glass cleaner.
2. Identify the scratch type. (See *Scratch Identification* on page 5.)
3. Cut a large enough plastic sheet from the roll.
4. Form a “dam” with the sheeting by unfolding and taping it to the glass around the scratch.
5. Read and follow the steps in *Removing a Scratch* on page 23.

Specialty Glass Cleanup

See *Flat Glass Cleanup* on page 22.

Removing a Scratch

WARNING: Always wear safety glasses and ear protection when polishing.

The scratch removal system is designed to work with light pressure at high Revolutions Per Minute (RPM). If there is a dramatic change in the sound of the polishing machine, it is likely that excessive pressure is being applied, and the process slows considerably. The weight of the polishing machine, with about 20 pounds of pressure, is sufficient to polish out scratches.

Note: Twenty pounds of pressure is not as heavy as it seems.

Note: Users who have worked with cerium oxide slurry with a felt wheel must understand that this system is different. Allow the compound and machine to do the work. It is not designed to work with excessive pressure.

Note: If needed, a spray bottle can be used in place of the water feed system. Hold the machine in a relaxed fashion with the thumb of the other hand on the back applying pressure. If holding the machine too tightly, exhaustion can occur.

Note: If the machine begins to wobble from side to side, often caused by the disk not being flat on the glass, squeeze the handle slightly with the little finger. The slight squeeze cants the machine without raising the disk off of the glass.

IMPORTANT: Do not raise an edge of the disk from the glass. It results in the disk burning on its edge, which eventually destroys the disk.

To prepare for scratch removal:

1. Pressurize the water feed by pumping 15-20 times.
2. Outline the scratch area on the opposite side of the glass with a black felt-tipped marker.

Note: When polishing a windshield, use a grease marker or small pieces of tape to outline the scratch. (Markers can adversely react with tinting on the inside of the windshield.)

Note: Do not mark glass that has been tinted with after-market materials.

3. With a clean spatula, mix the jar of compound to distribute moisture.
4. Place 1 tablespoon of compound into the mixing container.
5. Close the compound jar and store upside down in the carrying case.
6. Moisten the disk slightly with water.

7. With the spatula, “butter” $\frac{1}{4}$ - $\frac{1}{2}$ teaspoon of compound in a thin layer evenly across the disk surface, working it into the disk. Put any excess back in the mixing container.

Note: When applying compound to a new disk, load the disk more frequently until the disk has become absorbed with compound.

Note: Too much compound hinders scratch removal. A paper-thin layer or less works best.

8. Scrape excess compound from the disk and return to mixing container.

To remove a scratch:

1. Plug the polishing machine into the outlet.
2. Spritz a little water onto the scratch.
3. Place the disk flat on the surface and turn on the machine.
4. Lock the trigger, enabling the hand to relax, while moving the machine back and forth parallel with the scratch.
5. Using light, even pressure, continue moving the machine briskly in the same direction as the scratch.
6. Check the infrared thermometer and temperature chart to verify correct heat for the glass type. (See *Temperature Chart* on page 27.)

Note: If the scratch runs vertically, work the disk up and down. If horizontal, work side-to-side.

Note: If a disk becomes burnt or glazed during operation, clean it with a stiff, nylon-bristled fingernail brush. When the disk is dry, clean it by brushing as if polishing a shoe. Clean disks every 15-20 minutes of use.

Note: Replace disks immediately if they come off, are dropped onto a dirty floor or the ground, or if signs of contamination are prevalent when polishing. (See *Contamination Prevention on page 29.*)

7. Continue steps 5 and 6 until the scratch is removed.

Note: The former scratched area is now less porous than the rest of the glass. Polishing the entire surface creates better-than-new uniformity; however, the system is not designed to remove "pits", which often trap compound. Since the compound is hydrophilic, remove it using a soft brush and water.

8. Follow cleanup steps for the glass type. (See *Auto Glass, Flat Glass or Specialty Glass Cleanup on page 18 or 22.*)

Note: If the motor speed bogs down, too much pressure is being applied.

Note: When the compound clears out so the glass can be seen, spritz it with water. For example, when working on a one-foot scratch, pull the trigger on the water feed one complete pull while spraying water from one end of the scratch to the other.

Note: If additional compound does not release from the disk when applying water to the glass, add more compound. To do so, spread a small amount of compound from the mixing container onto the disk and start polishing again.

Note: More compound does not mean faster results so apply sparingly. Excessive compound is only sprayed away from the scratch and results in waste and increased cleanup.

Temperature Chart

The system is designed to run hot, but too much heat creates distortion and can cause disk failure; however, using too much water keeps the glass too cool to get optimum performance from the system. Remove the disk from the glass frequently to check the glass temperature with the infrared thermometer. Following are the recommended temperature ranges for various types of glass:

IMPORTANT: Operating disks above 175° F will cause disk failure. This is a misuse of product and will not be covered under warranty.

TYPE OF GLASS	TEMPERATURE
LAMINATED WINDSHIELD & HURRICANE GLASS	115° – 135° F
TEMPERED GLASS	155° – 175° F
ANNEALED GLASS (NEAR EDGES)	115° – 130° F
ANNEALED GLASS CENTER (4" FROM EDGE INWARD)	135° – 155° F
MIRRORS AND ANNEALED GLASS NEAR EDGE	110° – 125° F

Maintenance

WARNING: Always unplug the polishing machine before performing maintenance.

To ensure the best performance from the polishing machine and its components, follow these maintenance tasks after use and before returning to the carrying case:

- Clean the polishing machine and cord with a damp cloth.
- Clean the disks with a nylon-bristled brush and store in plastic bags.
- Store disks at 50% relative humidity and 50-70° F to extend life of the adhesive.

Note: Disks are to be changed after 15-20 hours of operation.

- Cover backer pads with attached disks with a plastic bag, or remove from the machine and place in a plastic bag, to prevent contamination.
- Close the jar of compound tightly and store upside down so moisture seeps upward to the lid.

Note: The compound has an indefinite shelf life. It is common for compound stored for an extended period to settle and compress. If liquid is present, simply remix the liquid back into the compound. If the compound becomes completely dry or loses its paste-like consistency, add a small amount of water and mix. Repeat this step as necessary to return compound to its original, paste-like consistency.

- Discard leftover compound from the mixing container and clean thoroughly.

Note: Always start a job with a clean mixing container to avoid contamination.

- Empty the water bottle and water feed after relieving pressure, and dry with a clean cloth.
- Clean the spatula with water and a clean cloth.
- Replace the machine brushes when needed.
- Replace thermometer batteries when needed.

Contamination Prevention

When a disk is contaminated, circular swirls can be seen in the glass. The swirl appears as a series of fine, “micro scratches” that are thin and usually shallow. It normally results from carelessness in site preparation, or in material use and storage, so it is important to be proactive, and practice clean working habits.

Following are possible causes of contamination:

- Compound container is left open for an extended time period.
- Polishing machine is placed disk down on a contaminated surface.
- Spatula is left on a contaminated surface.
- Disk is left uncovered for an extended time period.

Note: Spray the disk thoroughly prior to use when left unused for more than a few moments.

- Dust or dirt is blown onto the glass.

Note: When working outside, windblown debris can cause contamination. If so, delay the job until conditions improve.

- Dust or dirt from hands or apron stick to the glass.
- Work site preparation is insufficient.

Correcting Contaminated Components

To clean a contaminated disk:

1. Rinse it thoroughly to release the foreign particles.
2. Test the disk and compound on clean scrap glass to check for success.

Note: If not, replace the disk and thoroughly clean the work area before starting again.

To eliminate contaminated compound:

1. Throw the compound away.

Note: The compound is organic, so it is biodegradable and environmentally safe.

2. Clean the mixing container.
3. Thoroughly rinse the disk.
4. Test the disk and compound on clean, scrap glass to check for success.

Note: If not, replace the disk and thoroughly clean the work area.

Troubleshooting

PROBLEM

Compound is splattering off the disk before starting the repair.

POSSIBLE CAUSES

The machine was turned on before placing on the glass.

REMEDY

Put the disk on the glass before starting the motor to avoid splatter.

PROBLEM

The disk is coming off the backer pad.

POSSIBLE CAUSES

The disk was not correctly attached to the backer pad.

REMEDY

Remove the disk, place face down on a clean surface, center the backer pad over the adhesive side of the disk, press down firmly, and bend the disk edges over the pad.

PROBLEM

The disk is dry before adding compound.

POSSIBLE CAUSES

Water was not applied to the disk.

REMEDY

Moisten the disk slightly using the water feed system or spray bottle.

PROBLEM

The backer pad is screwed into the polishing machine too tightly.

POSSIBLE CAUSES

The backer pad was over-tightened into the machine.

REMEDY

Unscrew the backer pad, place back into the machine, and hand-tighten only.

PROBLEM

The polishing compound is too thick.

POSSIBLE CAUSES

- Not enough water was added.
- Liquid has evaporated due to exposure and/or weather conditions.

REMEDY

The compound is water-soluble so add water to thin it to a toothpaste consistency.

PROBLEM

There is too much compound on the disk.

POSSIBLE CAUSES

Too much compound was applied to the disk.

REMEDY

Using the edge of the spatula, wipe off all excess compound. It takes very little to do the job; a paper-thin layer is plenty. *(Too much compound slows or stops repair progress.)*

PROBLEM

There is extensive cleanup after the job.

POSSIBLE CAUSES

A sufficient "dam" was not constructed before starting the job.

REMEDY

Take precautions against splattering the compound by building an appropriate dam.

PROBLEM

The scratched area is too dry.

POSSIBLE CAUSES

Not enough water was applied to the scratched area.

REMEDY

Spritz a little water onto the scratch. *(There should be approximately 1 "pull" of the water feed for every 20 seconds of polishing.)*

PROBLEM

Circular swirls appear on the glass.

POSSIBLE CAUSES

- Contamination of the work area.
- Contamination of the compound.
- Contamination of the disk.

REMEDY

- Clean the work area.
- Discard compound from the mixing container, clean the jar, and add new compound.
- Clean the disk with a brush.

PROBLEM

The backer pad is screwed into the polishing machine too tightly.

POSSIBLE CAUSES

The backer pad was over-tightened into the machine.

REMEDY

Unscrew the backer pad, place back into the machine, and hand-tighten only.

PROBLEM

The disk is impacted with compound

POSSIBLE CAUSES

Too much compound has saturated the disk.

REMEDY

Clean the disk every 15-20 minutes.

PROBLEM

Jobs are taking longer than expected.

POSSIBLE CAUSES

- More practice is needed.
- It is cheaper to replace the glass than to repair it.

REMEDY

- Follow the practice routine to better understand the types of scratches and the length of time for removal. Patience and practice are keys to success.
- Recommend that the glass be replaced instead of repaired.

PROBLEM

The glass is too hot.

POSSIBLE CAUSES

Too much pressure is being applied to the glass. (*Fingers should be able to lie on the work area without burning them.*)

REMEDY

- Remove the machine from the glass so it can cool down. Stop and check the heat every few minutes.
- Clean the disk with a stiff-bristle nylon brush every 15-20 minutes.

PROBLEM

There is too much compound in the mixing tub.

POSSIBLE CAUSES

More than a tablespoon was added to the mixing container.

REMEDY

Remove enough compound to leave approximately 1 tablespoon of compound.

PROBLEM

The scratch is not disappearing right away.

POSSIBLE CAUSES

The polishing machine is not lying flat on the glass.

REMEDY

Build more heat by making sure that the disk is lying flat on the glass.

PROBLEM

There is not enough compound on the glass.

POSSIBLE CAUSES**REMEDY**

Spritz more water on the disk.

PROBLEM

Holding the water feed system is exhausting.

POSSIBLE CAUSES

The water spray bottle is not being held correctly.

REMEDY

Hold the water spray bottle in the left hand with the thumb on the back of the motor. *(If left-handed, reverse the position.)* Find a natural, relaxing position for the right hand to avoid fatigue.

PROBLEM

Pressure on the machine seems too light to remove a scratch.

POSSIBLE CAUSES

Not enough pressure is being applied to the glass.

REMEDY

After one minute of light pressure, apply more pressure until motor begins to labor slightly.

If the remedies do not solve the problem, or additional support is needed, call CRLaurence Systems at 800.421.6144.

Warranty

CRL® Glass Scratch Removal System Lifetime Warranty

Thank you for your purchase of the CRL Scratch Removal System.

The items in the CRL Scratch Removal System are warranted for one year from the date of purchase to the original purchaser against defects in materials and workmanship. In the event of failure of this product to conform to this written warranty, please call C.R. Laurence Co., Inc. Glass and Glazing Technical Support at 800-421-6144, ext. 7720.

After going through the trouble-shooting procedures and determining that there is a defect, you will receive an RA#.

Carefully package the defective item from your CRL Scratch Removal System by itself, with no other items, and return it to the address listed below, freight prepaid, along with the following:

- Your name, business name, address and phone number
- Your CRL Account Code
- Your RA#

C.R. Laurence Co., Inc.
2503 E. Vernon Avenue
Los Angeles, CA 90058-1897

We recommend that the package be insured against loss or in transit damage. We cannot be responsible for any loss due to shipping.

This warranty applies only to the original registered purchaser.

Damage to any item in your the CRL Scratch Removal System resulting from tampering, accident, abuse, negligence, unauthorized repairs or alterations, or other causes not related to problems with materials or workmanship are not covered in this warranty. This warranty does not cover normal wear. Use of polishing compounds or other products that are not provided by C.R. Laurence Co., Inc. for the CRL Scratch Removal System will void this warranty. Repairs made that are not covered under this warranty will be charged at regular factory prices.

C.R. Laurence Co., Inc. makes no other warranty of any kind whatever, expressed or implied, and all implied warranties of fitness for a particular purpose which exceeds the above mentioned obligation are hereby disclaimed by C.R. Laurence Co., Inc. and excluded from this warranty.

This warranty gives you specific legal rights and you may also have other rights that vary from state to state. The obligation of the warrantor is solely to repair or replace the product. The warrantor is not liable for any incidental or consequential damages due to any such alleged defect. Some states do not allow the exclusion or limitations of incidental or consequential damages, so the above limitations or exclusions may not apply to you.

Re-Ordering Information

TO ORDER ITEMS

TOLL FREE PHONE 800.421.6144

TOLL FREE FAX 800.262.3299

INTERNATIONAL CALLS 323.588.1281

INTERNATIONAL FAX 323.581.6522

ONLINE www.crlaurence.com

EMAIL glazing@crlaurence.com

MAIL 2503 E. Vernon Avenue
Los Angeles, CA 90058-1897

Replacement Parts and Supplies

CAT. NO.	DESCRIPTION	UNIT
SRS1	Complete System	Each
SRS1PC	Polishing Compound	Pack
SRSVPB2	2" (51mm) Velcro Backer Pad	Each
SRSVPB3	3" (76mm) Velcro Backer Pad	Each
SRSVPB4	4" (102mm) Velcro Backer Pad	Each
SRSPSB6	6" (152mm) PSA Backer Pad	Each
SRSVPD2	2" (51mm) Polishing Disk	3/Pack
SRSVPD3	3" (76mm) Polishing Disk	3/Pack
SRSVPD4	4" (102mm) Polishing Disk	3/Pack
SRSPSA6	6" (152mm) Polishing Disk	3/Pack

MATERIAL SAFETY DATA SHEET

SCRATCH POLISHING COMPOUND

FILE NO.: SCRCOMPOUND5002

MSDS DATE: 7/25/07

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Scratch Polishing Compound

SYNONYMS:

PRODUCT CODES:

DISTRIBUTOR: C.R.Laurence Co., Inc.

ADDRESS: 2503 E. Vernon Ave., Los Angeles, CA 90058-1897

CHEMTREC PHONE: (800)424-9300, International (703)527-3887

CHEMICAL NAME: NA

CHEMICAL FAMILY: NA

CHEMICAL FORMULA: NA

PRODUCT USE: Scratch Removal from glass

PREPARED BY: Randy Mackey

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT: Not Disclosed – Trade Secret

CAS NO.

% WT

% VOL

SARA 313 REPORTABLE

Trade Secret

>60

>60

NA

INGREDIENT: Lanthanum Oxide

CAS NO.

% WT

% VOL

SARA 313 REPORTABLE

1312-81-8

<40

<40

NA

INGREDIENT: Neodymium Oxide

CAS NO.

% WT

% VOL

SARA 313 REPORTABLE

1313-97-9

<40

<40

NA

OSHA PEL-TWA:	ppm NA	mg/m³ 5 mg/m ³ Respirable Fraction 15 mg/m ³ Total dust
OSHA PEL STEL:	NA	NA
OSHA PEL CEILING:	NA	NA
ACGIH TLV-TWA:	NA	NA
ACGIH TLV STEL:	NA	NA
ACGIH TLV CEILING:	NA	NA

MATERIAL SAFETY DATA SHEET

SCRATCH POLISHING COMPOUND

FILE NO.: SCRCOMPOUND5002

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SECTION 3: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW: Dusts in high concentration may cause skin, eye, and respiratory track irritation.

ROUTES OF ENTRY: Eye, Inhalation, Skin, Ingestion

POTENTIAL HEALTH EFFECTS

EYES: Slightly irritating, may cause foreign body irritation only.

SKIN: Non irritating, skin absorption not likely.

INGESTION: Low acute oral toxicity

INHALATION: Low acute inhalation toxicity, may cause wheezing, upper respiratory tract irritation.

ACUTE HEALTH HAZARDS: NA

CHRONIC HEALTH HAZARDS: Prolonged contact (breathing of product dust) may cause chronic bronchitis

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:

Inhalation of product may aggravate existing chronic respiratory problems such as asthma, emphysema, or bronchitis.

CARCINOGENICITY: This product does not contain any ingredient designated by IARC, NTP, ACGIH, or OSHA as probable or suspected human carcinogens.

OSHA:

ACGIH:

NTP:

IARC:

OTHER:

SECTION 4: FIRST AID MEASURES

EYES: Rinse particulate mater from eye. Seek medical attention if irritation develops or persists or if visual changes occur.

SKIN: Wash with plenty of soap and water. Seek medical attention if irritation develops or persists.

INGESTION: If victim is conscious and alert, give 1-2 glasses of water to drink. Do not give anything by mouth to an unconscious person. Seek medical attention. Do not leave victim unattended.

INHALATION: If respiratory irritation or distress occurs remove victim to fresh air. Seek medical attention If respiratory irritation or distress continues.

MATERIAL SAFETY DATA SHEET

SCRATCH POLISHING COMPOUND

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MSDS DATE: 7/25/07

NOTES TO PHYSICIANS OR FIRST AID PROVIDERS: All treatments should be based on observed signs and symptoms of distress in the patient. Consideration should be given to the possibility that overexposure to materials other than this product may have occurred. Treat symptomatically. No specific antidote available.

SECTION 5: FIRE-FIGHTING MEASURES

FLAMMABLE LIMITS IN AIR, UPPER: NA (% BY VOLUME) **LOWER:**

FLASH POINT: NA **F:** **C:** **METHOD USED:**

AUTO IGNITION TEMPERATURE: NA **F:** **C:**

NFPA HAZARD CLASSIFICATION

HEALTH: 1 **FLAMMABILITY:** 0 **REACTIVITY:** 0 **OTHER:**

HMIS HAZARD CLASSIFICATION

HEALTH: 1 **FLAMMABILITY:** 0 **REACTIVITY:** 0 **PROTECTION:**

EXTINGUISHING MEDIA: Not combustible. Use extinguishing media suitable for surrounding fire.

SPECIAL FIRE FIGHTING PROCEDURES: Fire fighters should wear NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing.

UNUSUAL FIRE AND EXPLOSION HAZARDS: Not combustible

HAZARDOUS DECOMPOSITION PRODUCTS: None known

SECTION 6: ACCIDENTAL RELEASE MEASURES

ACCIDENTAL RELEASE MEASURES: Wear appropriate protective gear for the situation. See personal protection information in section 8. Scoop up material and place in appropriate closed container. Clean up remainder of spill with water.

SECTION 7: HANDLING AND STORAGE

HANDLING AND STORAGE: Avoid direct or prolonged contact with skin and eyes, avoid breathing dusts. When used during glass polishing, the compound becomes alkaline (pH > 8.5) following the hydrolysis of the glass. It is strongly recommended that gloves and safety glasses with side shields be worn to prevent contact with the skin and eyes during polishing.

MATERIAL SAFETY DATA SHEET

SCRATCH POLISHING COMPOUND

FILE NO.: SCRCOMPOUND5002

MSDS DATE: 7/25/07

OTHER PRECAUTIONS: Store in closed containers.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Where engineering controls are indicated by use conditions or potential for excessive exposure exist, the following traditional exposure control techniques may be used to effectively minimize employee exposures; general area dilution exhaust ventilation, wet processing methods to reduce dust generation.

VENTILATION: General area dilution exhaust ventilation

RESPIRATORY PROTECTION: When respirators are required, NIOSH/MSHA approved equipment based on actual or potential air born concentrations and in accordance with the appropriate regulator standards and/or industrial recommendations. Under normal conditions, in the absence of other air born contaminants, the following devices should provide protection from this material up to the conditions specified by the appropriate OSHA, WHMIS, or ANSI cartridge/canister approved for use against dusts, mists, and fumes.

EYE PROTECTION: Eye and face protection requirements will vary dependent upon work environment conditions and material handling practices. Appropriate ANSI Z87 approved equipment should be selected for the particular use intended for this material. It is generally regarded as good practice to wear, at minimum, safety glasses with side shields when working in industrial environments.

SKIN PROTECTION: Skin contact should be minimized through use of gloves and suitable long-sleeved clothing (i.e. shirts and pants). Consideration must be given both to durability as well as permeation resistance.

OTHER PROTECTIVE CLOTHING OR EQUIPMENT:

WORK HYGIENIC PRACTICES: Personal hygiene is an important work practice exposure control measure and the following general measures should be taken when working with or handling this material:

1. Do not store, use, and/or consume foods, beverages, tobacco products, or cosmetics in areas where this material is stored.
2. Wash hands and face carefully before eating, drinking, using tobacco products, applying cosmetics, or using the toilet.
3. Wash exposed promptly to remove accidental splashes of contact with this material.

EXPOSURE GUIDELINES: See section 2.

MATERIAL SAFETY DATA SHEET

SCRATCH POLISHING COMPOUND

FILE NO.: SCRCOMPOUND5002

MSDS DATE: 7/25/07

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Light blue. **ODOR:** Slight. **PHYSICAL STATE:** Paste

pH AS SUPPLIED: NA **pH (Other):** NA
BOILING POINT: NA **F:** **C:**
MELTING POINT: NA **F:** **C:**
FREEZING POINT: NA **F:** **C:**
VAPOR PRESSURE (mmHg): NA @ **F:** **C:**
VAPOR DENSITY (AIR = 1): NA @ **F:** **C:**
SPECIFIC GRAVITY (H₂O = 1): 6.8 @ **F:** 68° **C:** 20°
EVAPORATION RATE: **BASIS (=1):** NA
SOLUBILITY IN WATER: Soluble **PERCENT SOLIDS BY WEIGHT:** NA
PERCENT VOLATILE: BY WT/ BY VOL @ NA **F:** **C:**
VOLATILE ORGANIC COMPOUNDS (VOC): None
 WITH WATER: LBS/GAL WITHOUT WATER: LBS/GAL
MOLECULAR WEIGHT: NA
VISCOSITY: NA @ **F:** **C:**

SECTION 10: STABILITY AND REACTIVITY

STABLE

XX

UNSTABLE

STABILITY: This material is stable under normal handling and storage conditions described in SECTION 7.

CONDITIONS TO AVOID (STABILITY): Dusting conditions.

INCOMPATIBILITY (MATERIAL TO AVOID): Strong acids.

HAZARDOUS DECOMPOSITION OR BY-PRODUCTS: None.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID (POLYMERIZATION): None

SECTION 11: TOXICOLOGICAL INFORMATION

TOXICOLOGICAL INFORMATION: No test data for this material.

SECTION 11 NOTES: This product does not contain any substances that are considered by OSHA, NTP, IARC, or ACGIH to be probable or suspected human carcinogens.

SECTION 12: ECOLOGICAL INFORMATION

ECOLOGICAL INFORMATION: NOEC – No Effect Concentration, >100mg/l/96hr. fish

MATERIAL SAFETY DATA SHEET

SCRATCH POLISHING COMPOUND

FILE NO.: SCRCOMPOUND5002

MSDS DATE: 7/25/07

SECTION 13: DISPOSAL CONSIDERATIONS

WASTE DISPOSAL METHOD: Chemical additions, processing, or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate, or otherwise inappropriate. Please be advised that State and Local requirements for waste disposal may be more restrictive or otherwise different from federal laws and regulations. Consult State and local regulations regarding the proper disposal of this material.

RCRA HAZARD CLASS: Not listed

SECTION 14: TRANSPORT INFORMATION

U.S. DEPARTMENT OF TRANSPORTATION

PROPER SHIPPING NAME: Not regulated

HAZARD CLASS: **ID NUMBER:**

PACKING GROUP: **LABEL STATEMENT:**

WATER TRANSPORTATION

PROPER SHIPPING NAME: Not regulated

HAZARD CLASS: **ID NUMBER:**

PACKING GROUP: **LABEL STATEMENTS:**

AIR TRANSPORTATION

PROPER SHIPPING NAME: Not regulated

HAZARD CLASS: **ID NUMBER:**

PACKING GROUP: **LABEL STATEMENTS:**

OTHER AGENCIES:

SECTION 15: REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

TSCA (TOXIC SUBSTANCE CONTROL ACT): Not listed

CERCLA (COMPREHENSIVE RESPONSE COMPENSATION, AND LIABILITY ACT): Not listed

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT): Not listed

311/312 HAZARD CATEGORIES: Not listed

313 REPORTABLE INGREDIENTS: None

STATE REGULATIONS: None

INTERNATIONAL REGULATIONS: None

MATERIAL SAFETY DATA SHEET

SCRATCH POLISHING COMPOUND

FILE NO.: SCRCOMPOUND5002

MSDS DATE: 7/25/07

SECTION 16: OTHER INFORMATION

OTHER INFORMATION: Additional Hazard Rating Systems: NA

PREPARATION INFORMATION: Prepared By: Randy Mackey, Products Manager, R&D Manager

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