World-Wide
Technical Reference Guide

Finish Tips
and Techniques

STEINWAY & SONS

Boston PIANO
DESIGNED BY STEINWAY & SONS®

Essex PIANO
DESIGNED BY STEINWAY & SONS

the Family of Steinway Designed Pianos

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Finishing & Touch-up Procedures for Steinway, Boston and Essex Pianos

At Steinway & Sons we have developed a finishing procedure that highlights the natural woods and furniture cabinets of the pianos we create. The warmth and hues of both the opaque colors and natural wood finishes are showcased by the use of a nitrocellulose lacquer–finishing process. Lacquer is a preservation-grade coating, compatible with detail such as fine carving, and with the introduction of more exotic varieties of cabinetry woods beyond Mahogany and Black Walnut such as East Indian Rosewood, Kewazinga Bubinga, Figured Sapele, African Pommelé, etc., Steinway continues these traditional lacquering principals to enhance the natural characteristics of the wood tones, provide durability to the finished surfaces, and facilitate ease of repair.

Steinway lacquer (black or clear), matte bottom-coat (black or brown), and Steinway plate bronze (aerosol or powder) are available through the Steinway & Sons Parts Department which can be reached by telephone: 1-800-366-1853 or toll-free fax: 1-866-783-4692. Most other coating materials mentioned in this guide are available from Allied International Inc., telephone: 1-336-454-2000. With the introduction of the Boston piano we have also prepared repair and finish procedures for addressing the polyester and polyurethane finishes that are used on these instruments.

The Steinway & Sons Service Department has prepared this addendum to the Technical Service Manual as a guide to address repairs and maintenance of the finish. This guide is intended for use by those individuals who have basic knowledge, understanding and experience with finishing techniques and procedures. As added support, Steinway & Sons offers through its dealers a three-day finishing seminar as part of the Steinway & Sons C. F. Theodore Technical Academy Education Program. More information on this program is available through your Steinway dealer.

Steinway & Sons New York Pianos

A. The Steinway & Sons New York Finishing Process

To facilitate acceptable repair work it is important to understand the general methods, procedures and materials that Steinway uses to achieve its lacquer finishes. We've divided these processes into two categories; i.e., ebony and wood finishes.

1. Ebony-finish pianos

After the case has been properly prepared through sanding, finishing begins by filling the wood pores with filler. Steinway uses a McFadden black filler. After the filler has flashed (hazed over but not dried) the excess is removed by wiping across the grain with hemp or a hemplike material that will remove the filler from the wood surfaces but not pull it from the wood pores. Forty-eight hours after the filler has been wiped off, nitrocellulose lacquer is then sprayed. A total of four coats is applied using Wurdack high-gloss black lacquer (Steinway part #7728) to achieve an 8 to 9 mil coating thickness.

Steinway & Sons uses a special spray process to minimize VOCs[1] according to both OSHA[2] and the Environmental Protection Agency requirements for production work. Most small refinishing shops probably need to thin the lacquer down in order to spray when using a compressed air or the new HVLP[3] systems. This will mean spraying additional coats of lacquer to achieve the same mil thickness.

Coats are applied leaving one day drying time between spraying. Sanding is performed on every other coat. Total curing time after the fourth coat is roughly twenty days (this time can be lengthened relative to temperature or humidity conditions). Subsequent to the lacquer-curing process the final rubbing and polishing sequence starts as outlined later in this document.

2. Wood-finish pianos

The process for finishing wood grain is more involved due to the various steps of staining needed to enhance the grain characteristics and produce an even color throughout the instrument case. After all furniture and case parts have been properly prepared and sanded, a water-based stain mixture (which is dependent upon the particular species of wood and overall color desired) is applied.

Stains are produced by mixing various part combinations of water-based powders or concentrates (red, brown, yellow, black) with hot water. These stains (colors) are mixed together to get proper color-matching and applied over the wood case. The parts are left to dry about three to four hours after which the surfaces are padded with an alcohol/shellac mixture of 40% shellac (4-pound cut) with 60% alcohol. This treatment acts to seal the stain in the wood. The mixture is left to dry about twenty minutes prior to a sanding with 220-grit closed-coat paper.

The instrument is now ready to be filled. The filler color used depends on the color of the wood surface. Mahogany, Kewazinga Bubinga, Santos Rosewood, Red Cherry, African Cherry, Makore, and African Pommelé use a Mahogany-colored filler. Walnut, Macassar Ebony, East Indian Rosewood, and Koa use Walnut filler. Figured Sapele and Satinwood do not use any filler. Generally, reddish woods use Mahogany filler and brownish woods use Walnut filler. It should be noted that the filler used on the dark woods should not be lighter than the species of wood otherwise the wood pores show white (unless a pickled effect is desired).

1. volatile organic compounds / 2. Occupational Safety & Health Administration / 3. high-volume low-pressure

The paste filler is prepared to a loose paste by using a combination of mineral spirits and naphtha. Reducer is added to slow the drying process. Parts are wetted with filler and evened off with brushing. The filler is allowed to dry to the point where it creates a haze. The excess is removed using circular motions with a clean, dry close-knit rag or hemp to ensure the pores are filled. The parts should be allowed to dry overnight to ensure proper coloring and adhesion of the filler.

The parts are now ready for color-matching. Parts are placed together and wetted with mineral spirits to determine the need for additional coloring for blending and symmetry. Alcohol stains are prepared using colored aniline powders mixed with alcohol. Base colored powders include red, yellow, brown, black, and green. After applying the matching stain the parts are wetted again to insure a good color match. Custom-colored alcohol stains are used to do shading (using an airbrush) or to darken areas that are light.

IMPORTANT: When a damage occurs on the surface of the furniture it is usually corrected using alcohol-based stains unless the damage goes into the water-based veneer stains below the surface.

After proper color-matching, the topcoat finishing process begins using Wurdack high gloss clear lacquer (Steinway part #7724). A coat a day is sprayed until the finish reaches 8–9 mil thick (approximately four coats). Sanding is performed between every other coat and the final surface is allowed to cure for twenty days prior to final rubbing and polishing (this time can be lengthened as a result of cool temperature or high humidity conditions).

As stated above, Steinway & Sons uses a special spray process to minimize VOCs according to both OSHA and the Environmental Protection Agency requirements for production work. Small refinishing shops probably need to thin the lacquer down in order to spray using compressed air or HVLP systems. This will mean spraying additional coats of lacquer to achieve the same mil thickness.

B. The Steinway & Sons New York Lacquer Finishes

The theory behind rubbing finished surfaces is to eliminate orange peel as a result of the spraying process and even out the surface to produce an even sheen of the coated surface. A variety of sandpaper grits act to level and smooth out the surface and assure proper lacquer adhesion should an additional coat(s) of lacquer be needed. Sanding dulls the surface and rubbing or polishing with steel wool or Scotch-Brite™ pads cuts scratch lines into the lacquer surface, thereby breaking up the light that hits the surface. Light that hits the surface is reflected in many directions and different angles thereby giving the desired *Satin* gloss level.

A *High-Polish* finish removes all sanding and scratch patterns completely by the use of polishes and buffing pads. Light hitting this surface is reflected at (almost) identical angles to produce a mirror effect.

The *Satin-Lustre* finish is a surface gloss between the extremes of Satin and High-Polish. It is a glossy finish with a slight scratch pattern that adds depth and more dimension to the natural woods and opaque colors.

C. Steinway & Sons Final Polish Procedures

The following outlines the final polishing procedures and methods to achieve Steinway & Sons' Satin, Satin-Lustre, and High-Polish finishes. The process to achieve a final Satin finish is subsequent to any machining or block-sanding as a result of spraying over an entire surface or patching.

1. Satin finish

- Use dry steel wool, type 4-0 (0000), and rub in grain direction until you achieve an even scratch line. The lines should be as even as possible and cover the entire surface so that any glossiness from the lacquer is not visible. Use long straight strokes especially on large surfaces such as tops and rims.

  NOTE: If you are rubbing out a patch make sure your strokes go beyond the patched area and overlap the original finish surface.

- To assist in achieving the above detail, use a small amount of fine (4F) pumice. The pumice will act as grit and help cut through the lacquer. It is important not to press hard on the surface but let the steel wool and pumice do the work.

- When your scratch pattern is even and covers the designated surface proceed to rub, using a dry medium Scotch-Brite™ pad.

- The result of the above procedure should produce a rubbed surface with grayish hue. There should not be any shiny areas; which, when eliminated, will show that the entire lacquer surface has been rubbed.

CAUTION: **Be careful.** Too much rubbing can remove **all** the lacquer and produce what is termed a cut-through, which may even remove the wood stain and expose the raw wood below (in the worst case). To guard against cutting through, stop often during the rubbing process and look at your work. As you cut through the lacquer you may see a noticeable change or a lightening of the finish. This would be a warning that you are cutting through the lacquer surface and into the stained wood below.

Unfortunately, if you notice this effect you may have rubbed too far and will need to recoat the surface or even re-stain prior to recoating. Be sure that you start with a sufficient amount of repair material so that you have enough to work with.

- To finalize the Satin finish, continue using the medium Scotch-Brite™ pad with 3M Finesse-it™ Finishing Material and water mixture and fine pumice.

- To remove excess pumice and clean surface final rub with close-knit cheesecloth with water only.

2. Satin-Lustre finish

Satin-Lustre is a higher reflection of the finish with a slight even scratch line pattern in the surface. Too much polishing of the surface will eliminate the scratch lines and produce a mirror finish effect (High-Polish). Too little polishing will leave too many scratch lines and produce a Satin finish.

- Use wet-or-dry 4-0 steel wool with water and rub surface as necessary to even.
- Moisten fine Scotch-Brite™ pad and rub surface using a block behind the pad.
- Add small amounts of 4F pumice stone during the rubbing procedure if necessary.
- After reaching an evenly rubbed surface, polish with moistened buffing pad on a block while adding 3M Finesse-it™ Finishing Material polishing compound.

NOTE: All rubbing and polishing work should be performed using flat rubbing blocks. All rubbing and polishing strokes should be in line with the grain of the wood. You should maintain uniform pressure during the rubbing and polishing processes.

3. High-Polish finish

The High-Polish finish produces a mirror finish. All scratch patterns are completely removed from the surface.

- Block sand in alternating directions with 400, 500, then 600 Wetordry™ sandpaper using light petroleum oil (rubbing oil) and mineral spirits (approximately 50/50 solution) as a lubricant. Steel wool is not used in the procedures for achieving the high polish.
- The above process should produce a completely flat and level lacquer surface.
- After cleaning the surface, moisten a buffing pad on a block with water and hand-rub the surface with fine-grit polishing compound (Menzerno paste or Dupont 606 or Ruthlo W-5040).
- Go over the surface again, this time using a buffing wheel and the fine-grit polishing compound.
- Do a final buffing with a moistened buffing pad on wheel while applying 3M Finesse-it™ Finishing Material polishing compound as needed.
- Clean off surface with 3M Imperial™ Hand Glaze or Old North Manufacturing Luxon™ Deluxing Wax.

D. Steinway & Sons Lacquer Repair Guidelines

One of the benefits of the lacquer finish is the ability to facilitate repair work. Most all furniture repair work falls into one of three categories:

1. damage to the finish surface only;
2. damage through the finish surface and color-matched stain below;
3. damage through the top finish, color-matched layer, through the sealer and base stain including damage to the wood itself.

a) Finish Surface Damage

In these situations the lacquer finish most probably has sustained scratches, dents and possible damage but the extent does not go beyond the lacquer surface. In most instances re-rubbing out the scratches

with sandpaper, Scotch-Brite™ pads and/or steel wool of varying grits (dependent upon the depth of damage) will be enough to repair the surface.

When repairing damage to the "finish" only, there are several approaches that can be taken. The sheen level of the existing finish and the extent of the damage will determine the type of, or approach to the repair.

1) Satin finish

a. *Burn-in*

A "burn-in" should be used when a small chip, nick or scratch has occurred that has not damaged the underlying wood or stain. First, clean the area of any loose lacquer chips and dirt. Then burn-in the affected area. Lay in the minimum amount of bum-in material necessary so as not to make the repair too high in relation to the surrounding surface. Making burn-ins too high is the most common mistake. It usually results in cutting through the surrounding finish and making things worse. Once the burn-in is complete it must be leveled off. Use a mixture of rubbing oil and mineral spirits (50/50 mix) as a lubricant and sand the area with 360–400 grit paper backed with a block of cork or softwood.

Once the burn-in is leveled it is now necessary to match the sheen of the finish. Use a combination of pumice, 4-0 steel wool, Scotch-Brite™, cheesecloth, with water as a lubricant. Experimentation with these different materials will determine which to use in any particular situation.

b. *Doty* (dōdee)

"Doty" is another name (used in the Steinway factory) for heavy lacquer. Doty is made by letting lacquer stand (covered with a close-knit cheesecloth to keep out dust) to thicken. Once the desired thickness is achieved the lacquer should be transferred to a container with a tight lid to maintain the lacquer's consistency. This is the same lacquer used for finishing the piano. Doty is made when the lacquer reaches the consistency of honey. Doty was used extensively before burn-ins became fashionable. Doty should be used when a burn-in would be too large or visible, such as on a large flat surface (top, side of case, etc.).

To perform a doty repair follow the same instructions for a burn-in but instead of using the burn-in stick apply a small amount of doty to the affected area and allow to dry overnight or longer if possible. Use only enough to fill the damaged area, again being cautious not to use too much. Level and sheen the surface as outlined above.

c. *Lacquer*

Occasionally the damage will be small enough to use a small amount of standard-viscosity lacquer for the repair. Follow the same directions above for doty but use standard-viscosity lacquer in place of the doty. All other directions as listed above still apply.

2) Satin-Lustre

When working with the Satin-Lustre finish, burn-ins are less effective as a repair procedure. Doty is the preferred method of repair. Follow the directions listed above for dotying (b). Burning-in should be avoided on Satin-Lustre finishes except in the most inconspicuous places.

The repair of Satin-Lustre differs from Satin in the reproduction of the sheen level. It is for this reason that burning-in should be avoided. Leveling of an inconspicuous burn-in or doty should be performed as mentioned above but use finer grits of sandpaper (from 400–500 with 500 being preferred) as the final sanding. Use a critical eye when leveling the repair and follow the directions in section *C. Steinway & Sons Final Polish Procedures, 2. Satin-Lustre finish* for achieving the proper sheen level.

3) High-Polish

The High-Polish finish is the most difficult to repair and achieve sheen level. In all repairs only use the doty procedure. Allow additional drying time for the repair and doty. Leveling of the repair is outlined in the following:

a. Depending upon the outcome of the doty application either 360 or 400 sandpaper should be used to begin the leveling process of the repair. Since the goal for a High-Polish finish is **not to have any scratch pattern,** the direction of your sanding pattern is not important. What is important is to alternate your sanding direction 90 degrees with each graduation of sandpaper grit (ex. 400 to 500 to 600) and to increase the length of your stroke beyond the repair to avoid creating a hollow in the surface. Alternating your sanding strokes allows you to see that you have eliminated all scratch patterns from the previous sanding. Look carefully for this elimination especially when using the finer grits of sandpaper as it will be very difficult to see especially if you were to sand in one direction only, hence the 90-degree sanding pattern.

b. Continue sanding as described using 500- then 600-grit sandpaper until the repair is level.

c. Clean the area with a wet cheesecloth making sure to remove all grit and foreign material left from the sanding.

d. Using a tightly wrapped, tightly woven cheesecloth (cotton cloth also works well) and a high-quality **rubbing** compound (3M), polish the surface using a circular motion until an even shine is achieved. Clean off any remaining compound using water and cheesecloth.

e. Using new cheesecloth as described in “d” apply a high-quality **polishing** compound (3M) and polish again using a circular motion until you have attained the desired sheen level that matches the original piano finish. Clean off any remaining residue using a new piece of cheesecloth and water.

f. Finish using 3M Imperial™ Hand Glaze or Old North Manufacturing Luxon™ to finish off the repair.

g. Final polish can be accomplished using a buffing machine with a lamb's wool polishing bonnet. Refer to the instructions listed on page 5, item 3.

Steinway & Sons Hamburg and Boston Pianos

This section of the finish manual is to provide information concerning the finishes used on both Steinway Hamburg and Boston grand and upright pianos. The information provides insights into repairs of both the High-Gloss and Satin finishes and the availability of materials and kits to facilitate these procedures. Polyester repair kits and materials are available through Allied International, Inc.

A. Boston Piano Finishes

Before attempting any finish repair it is very important to determine the type of finish you will be addressing. Boston pianos use a combination of both polyester and polyurethane finishes. The following lists the use of these finishes and on what types of pianos.

1. High-Gloss pianos

   All Ebony, White, Ivory, Mahogany and Walnut pianos in High-Gloss finish use an all-polyester process. This process uses only polyester and polyester as a topcoat material only.

2. Satin finish—grand pianos

   These grand pianos include Ebony, Walnut, and Mahogany finishes. The chart below shows where the different finish materials are used.

Satin Finish—Grands	**Undercoat**	**Mid-coat**	**Topcoat**
Ebony	polyester	—	polyurethane
Walnut	polyurethane	polyester	lacquer
Mahogany	polyurethane	polyester	polyurethane

3. Satin finish—upright pianos

   All Ebony, Mahogany, Walnut, and Oak upright pianos in Satin finish use a polyurethane undercoat, polyester mid-coat, and a polyurethane topcoat.

B. Steinway Hamburg Piano Finishes

Steinway & Sons Hamburg produces two types of finishes. One is called *Open Pore,* which is commonly used in conjunction with natural wood, and the other is *High-Gloss,* usually finished in black.

C. Repair Procedures (Steinway Hamburg, Boston, and Essex Pianos)

The method for repairing these finishes is dependent on the severity and extent of the damage. The following represents an overview of a possible series of damages one may encounter with each subsequent damage requiring more work and attention.

1. Hamburg Steinway Open-Pore finishes

These are nitrocellulose lacquer–based. Damages such as scratches and pressure marks that affect the veneer but which have not gone too deeply into the finish can usually be ironed out.

Placing a clean white moist cloth over the compression and moving a hot iron over the cloth can facilitate these repairs. If the compression is old it might be necessary to prick the wood surface with a thin needle to allow moisture to soak in better and raise the crushed grain wood fibers. Check very carefully to insure that the veneer does not lift from the surface.

After treating the surface you will need to sand (raised grain), re-stain and refinish (with nitrocellulose topcoat) as well as final rubbing with steel wool (000 or 0000).

Small holes can be filled with shellac then sanded and touched up with a spirit-soluble stain. The surface should be finished with *Ballenmatine* and final-rubbed using steel wool to maintain the same degree of surface brilliance.

2. Boston Piano Satin finish repairs

a) Description

Repairs to a Satin finish are similar to a polyester finish, except for differences in sanding/polishing procedures.

b) Procedures

At the 400 sanding grit level, sand in the direction of the Satin scratch pattern. Repeat this procedure while moving up to a 600-grit sandpaper, then again with wet 600-grit paper until all sandpaper scratches are removed. Clean the area thoroughly.

Using steel wool (4-0) and rubbing in the direction of the grain, emulate the same Satin effect like the surrounding finish.

3. Hamburg Steinway, Boston, and Essex Piano High-Gloss finishes

1) *surface scratches:* These are usually addressed by simply buffing using a polishing compound.

2) *heavy scratches:* Requires sanding prior to buffing to remove deeper grooves.

3) *punctures and/or gouges:* The process for repair would include filling the damage, sanding, then buffing.

4) *case damage:* In this sequence the repair requires fixing the physical damage, filling as necessary, with subsequent sanding and buffing.

a) surface scratches

1. Description

Surface scratches can usually be removed by simply buffing with one or more polishing compounds. This type of scratch has the appearance of a hair or dust particle on the surface of the piano with its color being the same as that of the surrounding area. Use the finest compounding abrasive that will do the job. The compounds may be applied by either hand or by machine (buffing). Final polishing should be done with a lamb's wool polishing bonnet.

2. Procedure

Apply a small amount of the appropriate buffing compound to the repair area. Keep the buffer moving to avoid burning or changing the surface finish characteristics. Work in an arc across the lines left by the compounds in order to feather the repair area into the rest of the finish. Take care when working at or near edges to prevent cutting through the edge surface. Repeat this process with progressively finer compounds. Using a soft cloth, polish the area by hand to remove any remaining swirl marks left by the previous buffing process.

b) heavy scratches

1. Description

Heavy scratches are still surface scratches because they are still shallow when compared to the overall depth of the polyester finish. They will appear as a visible gray line on the surface.

2. Procedure

A flat wooden block should be fabricated to approximate the size of the damaged area. A wooden sanding block helps contain the repair area and keeps the sanding motions in the same plane as the surface area being repaired. Start by using dry 400-grit sandpaper to remove scratches. Use an orbital direction when sanding in these early stages to avoid cutting a groove in the finish. Sand the area slightly larger than that of the actual damage.

Next, using 600-grit sandpaper start a straight-line pattern of sanding perpendicular to the scratches left by the 400-grit paper. Again, use the 600-grit paper but this time wet (add water to the surface or paper) sanding in a direction perpendicular to the sanding pattern of the dry 600-grit paper. As you increase the sandpaper grits (e.g. 400–600) continue to sand in a direction perpendicular to the prior sanding pattern.

Finally, use 800-grit paper wet. Observe the same precautions in sanding as when buffing (stated above) when working near edges. When finished, brush and clean the repair area prior to buffing to assure that new scratches are not created. Finish the repair as stated in item a-2.

c) punctures and/or gouges

1. Description

Punctures and/or gouges penetrate the surface of the finish. Fracture lines may or may not radiate from the area of impact.

2. Procedure

The irregularly shaped damage area must first be modified into a smooth, even symmetrical shape by using a knife or chisel. It is extremely important that the sides of the damaged finished be beveled at approximately a 45-degree angle while making sure that there are no shiny surfaces inside the area to be filled. The reason for this procedure is to assure good adhesion and bonding of the repair material to the bottom and sides of the repair. Take care not to extend the area of damage and make sure all debris is cleaned out by using a brush.

Determine the amount of polyester material will be required to effect the repair, mix and prepare the patch material following the instructions included with the repair kit. Apply the polyester to the damage in small amounts being sure to break up any bubbles that might develop. Continue to fill the area until it overflows the damage area slightly. For repairs in the vertical or in corners, use masking tape to hold and fill the material. After the filling is complete allow the repair to cure for as long as possible (overnight or longer is preferred). **NOTE:** Forced-air drying is not recommended.

Apply masking tape on two sides of the filled area. To minimize sanding use a very sharp knife, chisel, scraper or razor blade to shave away the overflowed polyester material to the level of the masking tape. Remove the masking tape. Should any voids or openings exist between the repair and sides you will need to repeat the filling process in those areas by first roughening up the areas to be refilled. If there are no voids, follow the procedures for repair of heavy scratches as outlined in item b-2.

d) <u>case damage</u>

1. Description

If the damage to the finish is severe as to actually damage the wood underneath then repairs to the substrate will need to be facilitated prior to working on the finish. It is always preferable to use polyester liquid, even for a deep fill, whenever possible. When it is necessary to form large repair areas that need to be shaped prior to finishing, conventional repairs with wood inlays, or in some cases automotive materials such as body fillers and putty may also yield satisfactory results. Case damage to wood grain pianos will need a matching stain to match the color of the grain and piano furniture.

2. Procedure

Thoroughly clean the damaged area of any wood chips, splinters and debris. Enlarge the repair area to make the damage more symmetrical. Effect the wood repair (including any staining) just below the surface with the selected repair material (wood, veneer, body fillers, putty). Assure that any of the filler material above the wood repair is void of any bubbles or hollows.

After the repair material has properly cured use a sharp knife, scraper, chisel, or razor blade to remove any material surrounding the top edge of the repair area, otherwise it will show up under the subsequent polyester repair material.

Using 400-grit sandpaper roughen the filler repair patch to provide the polyester a surface for good adhesion. Prior to applying the polyester patch make sure the area is brushed clean of any residue. Refer to and follow the steps outlined in item c-2 for completing finish repairs.

Extra information about Steinway Hamburg High-Gloss piano repairs

Hamburg recommends using polyester repair kits from:

Heinrich Koenig & Co
Postfach 148
An der Rosenhelle 5
61138 Niederdorfselden

Germany

telephone: 0610153600
fax: 06101536011
e-mail: info@heinrich-koenig.de

The advantage of this material is that it dries quickly and can be worked shortly after application.

For pressure mark areas start by removing any and all loose topcoat. This can be done by using a knife to create a crater-shaped rim around the damage. Remove all dust and foreign matter from the site (you can dab hardener to the area to remove dust). Mix the polyester repair material according to the directions and assuring a 10:1 ratio of material to hardener. Let the material thicken and apply to the surface assuring that it extends beyond the repair area to create an elevation.

Allow the material to dry at least twelve hours. If repairing a vertical surface it will be necessary to apply several coats to build up the necessary body and prevent runs. Provide a perimeter using adhesive paper to surround the damaged area and area that will be sanded. Use 220, 360, 400, and finally 600 grit sandpapers making sure to sand in 90 degree patterns from grit to grit. Make sure you use a block to prevent creating dips in the repair surface.

Proceed to buff the surface with a *molleton* disc and a No. 3 wax (red). After all sanding marks have been removed continue to buff with a *flannel* disc using No. 6 wax (yellow). Finish polishing the area with a yellow sponge and No. 4 wax. Any residual wax can be removed with *Glaccit No. 71-0103* which will leave a clear surface. Black polyester *Glasurit No. HM 33-9408* along with *Hardener SC 48-0306* should be used for these black repairs. Very large areas of damaged polyester surfaces cannot be repaired in this manner. In these cases the only remedy is to sand off and re-spray the damaged area.

D. Boston Grand Plate Finish Repair

1. Description

There are instances when it will become necessary to facilitate a plate repair and/or finish. The following documents the procedures involved in these repairs. It is important to note that the gold finish used on the grand is different from that used on the uprights.

2. Procedures

a) materials

The following lists the materials needed to repair the finish on a Boston grand piano plate.

- 400-grit Wetordry™ sandpaper
- 500-grit Wetordry™ sandpaper
- Masking tape (if required)
- Epoxy filler
- "Boston Grand Gold" lacquer spray (can)

Boston grand gold lacquer is available in eight-ounce aerosol cans. There is no need for an air gun to spray the material.

b) repair method

1. The area on the plate to be repaired may have to be filled depending upon the severity of the cosmetic damage to the finish of the plate. When appropriate, use an appropriate epoxy filler, such as those used in fine auto body repair. Allow the filler to dry thoroughly. Sand the filled area with 400- and 500-grit Wetordry™ sandpaper using water as a lubricant as necessary. Dry the filled area completely.

2. Spray out some of the gold lacquer onto a piece of clean cardboard. Using a brush, pick up some of the lacquer off the cardboard and brush it on the repair area making sure to completely cover the epoxy fill. This will establish a foundation to better match the color of the repair area with the surrounding finish on the plate.

3. In order to create a good look to the repair it will be necessary to define the area that will be sprayed. Locate and establish some defining lines on the plate, such as the edges of the bars or the edges of the plate around the repair area. This is important to assure proper matching of color and appearance between the repair area and the surrounding area on the plate. Use masking tape to define the boundaries of the repair area to be sprayed.

4. Spray the gold lacquer onto the repair area while holding the can six to ten inches from the surface of the plate. The gold lacquer has to be "feathered in" to match the color and appearance of the rest of the plate. To achieve a proper coverage, color, and appearance, carefully build up the color by spraying light coats onto the repair area. Allow each coat to “tack off” (dry to the touch) before applying another coat.

E. Steinway & Sons Plate Repair Procedures

The above listed instructions may be used for the repair of Steinway plates with the addition of spraying a coat of clear lacquer as the final topcoat.

NOTE

As with any finishing recommendations the quality of the final product is directly related to the skill and experience of the individual(s) performing these tasks. Steinway cannot be held liable for results that may not meet expectations due to the many variable factors involved with finishing procedures.

It is also understood that those performing these tasks are in full compliance with the environmental and OSHA laws and rules that apply to the jurisdiction wherein they perform such processes. Lacquer, polyester, polyurethane, and the materials used in combination are volatile and can cause serious injury if not used properly or not used according to the codes that apply for applying or working with these materials.

This manual should only be used as a guide and by those professionals experienced and approved to work with these materials.