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TECHNICAL*MANUAL*

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PITCH RAISING

Your piano, just like every piano, is designed to sound its best when tuned to A-440 (the A above middle C vibrates at 440 cycles per second), the international pitch standard. It has been designed to perform at a specific tension, and when strings stretch beyond, or drop below this tension, pitch adjustments are required to bring it back to A-440. It's important to remember that maintaining your piano at standard pitch allows you to play along with other instruments which are all designed to this same standard. Through neglect, pianos may deviate from this standard, making them unsuitable to play with other instruments and causing them to lose market value. In addition, lower pitched instruments can compromise the pianist's ear training.

It's important to note that pianos do not go flat or sharp uniformly. Some strings will invariably change more than others.

If I Haven't Had My Piano Tuned Regularly, How Can I Get it Back in Good Playing Condition?

After years of regular use, your piano may have fallen silent when the family member who studied moved away from home. Though your home is no longer filled with music, it's important to remember your piano is still a living, breathing thing. Its wood continues to expand and contract with seasonal changes in temperature and humidity, and the string tension also fluctuates accordingly. If your piano has gone without tuning for an extended period, its pitch may have dropped far below the pitch at which it was designed to perform. It may require a procedure technicians call a "pitch raise".

Why Has My Piano Become Out of Tune?

Changes take place because your piano's overall pitch is dependent upon changes in the relative humidity. In some temperate regions of the country, the relative humidity increases in the summer resulting in a higher moisture content in the soundboard and a higher string tension (pitch). In the winter, when heating systems dry the air, the soundboard loses moisture and contracts, causing the pitch to drop. The drop in the winter tends to exceed the rise in the summer, so the net result is a drop in pitch each year that the piano isn't serviced. In some parts of the country where the cold season is exceptionally long, the annual drop can be considerable. In other parts, mild winters combined with dry summer cause the cycle to be reversed. You can, however, greatly increase the stability of your piano's pitch by maintaining a relatively consistent humidity level in the room.

Why is a Pitch Raise Necessary?

When the tension of each string on a piano is raised back up to pitch, the additional load on the piano's structure causes the pitch of previously adjusted strings to change. The only way to achieve a fine, accurate tuning on a piano is to have the tension of all the strings so close to their proper place that altering the tension of one string would not affect the others. Therefore, a piano must already be fairly close to standard pitch in order to be finely tuned.

Wouldn't it be Easier to Just Tune the Piano to the Lower Pitch?

Tuning to anything other than the international standard of A-440 is seldom appropriate. If a very old piano has been allowed to remain appreciably below pitch for a long time, some strings may break if the piano is restored to A-440. Your technician will advise you as to whether repeated tunings will correct the problem, or if the piano should be completely restrung or rebuilt.

If a piano has dropped in pitch, the drop will not be even. The middle (tenor) section of the piano usually drops most along with the high treble section. The bass section tends to drop least. Consequently, a piano that is tuned to a pitch that is below the international pitch standard would have to have significant adjustments made to the tension of every string, resulting in an unstable tuning. It's much more reliable to bring the piano up to standard pitch and then to proceed with the fine tuning.

How Far From the Standard Pitch Must a Piano be Before a Pitch Raise is Necessary?

Pianos that have been subjected to severe changes in humidity routinely need pitch raises before a fine tuning can be achieved. For example, if A-440 has drifted only two cycles per second to A-438, a separate pitch raise is advisable. Most recreational musicians would want to have their pianos tuned before the pitch drops that far. Even if you aren't bothered by a slightly out-of-tune piano, it's best to tune the piano on a regular basis to avoid tuning instability and the extra cost of a pitch raising procedure.

Like your car, your piano is a major investment which deserves to be protected by regular servicing, which can head off preventable problems in the future. But most importantly, your piano will sound its best and give you and your family the most pleasure when it is tuned regularly and kept in proper playing condition.

REGULATION

As a conscientious piano owner, you probably have your piano tuned regularly by a qualified technician. You may, however, notice a deterioration of its performance despite regular tuning. It's important to note that tuning is only the adjustment of the system of strings and pins that determines the pitch of each string. Your piano also requires a periodic servicing called regulation, which attends to the mechanical parts which cause strings to sound when keys are played and affect the sound through the use of the pedals.

What is Regulation and How Does it Affect My Piano's Performance?

Regulation is the adjustment of the mechanical aspects of the piano to compensate for the effects of wear, the compacting and settling of cloth, felt and buckskin, as well as dimensional changes in wood and wool parts due to changes in humidity.

The three systems involved in regulation are the action, trapwork and damper system. The action is the mechanical part of the piano that transfers the motion of the fingers on the keys to the hammers that strike the strings. It is comprised of over 9,000 parts which require adjustment to critical tolerances to be able to respond to a pianist's every command. The trapwork is the assemblage of levers, dowels and springs that connects the pedals to the action affecting sustain and dynamics. The damper system is the mechanical part of the piano that stops the vibration of the string when you release the key and is controlled by the key and pedal systems.

If I Have My Piano Tuned Regularly, Why Do I Need to Have it Regulated?

While tuning corrects the pitch of your piano, it is only one component of a complete maintenance program. Regulation attends to the touch and uniform responsiveness of your action, all vital to making each performance pleasurable. In addition, regulation ensures that your instrument is capable of producing a wide dynamic range – a critical factor, particularly in pianissimo passages.

Music is one of the most complex vehicles for expression. Its beauty is reliant upon personal interpretation which employs use of changes in dynamics and tempi. These changes require extremely fine adjustments to respond to the pianist's nuances and subtle shadings. A smooth, even response throughout the entire range of the keyboard and an extremely quick action capable of playing rapid passages and repeated notes evenly is essential. Outstanding response is essential for a pianist to create an outstanding performance.

How Often is Regulation Needed?

Only you and your technician together should decide how frequently your piano needs regulation. Several factors can contribute to this. The intensity and number of hours your instrument is played, and climatic conditions are all determinants. A piano kept in relatively consistent conditions which are neither too wet nor dry, optimally at a temperature of 68 degrees Fahrenheit and 42 percent relative humidity, will require less adjustment.

The quality of the instrument itself also can affect frequency of regulation. Some manufacturers decrease costs by not going over the regulation and voicing processes in the factory as much as needed. Reputable retailers sometimes do the necessary regulating themselves prior to selling the piano, but others don't.

Also, performance instruments may require some regulation before each use, due to the higher demands placed on them.

What are the Signs That My Piano Needs Regulation?

If your instrument displays a lack of sensitivity or a decreased dynamic range, it's a candidate for regulation. If you notice that the keys are not level (some higher or lower than the rest), the touch is uneven or that the keys are sticking, the need for regulation is indicated. However, a sluggish action or deep grooves in the hammers indicate the need for reconditioning or repair. Ask your technician to show you what needs adjustment on your piano.

No amount of practice can compensate for a poorly maintained action. Poor legato touch, chord playing where all notes of the chord don't speak clearly, a gradual loss of subtlety in phrasing and an inability to execute quick passages or note repetitions evenly may be the fault of the piano – not the player.

Do All Pianos Need to be Regulated?

All upright and grand pianos need periodic regulation to perform their best. Frequency of regulation is dependent upon amount of use, exposure to climatic changes, and the instrument's quality, age, and condition. New pianos may require regulation in their first year because settling and compacting of parts sometimes necessitates adjustment.

Why is Reconditioning or Rebuilding of the Mechanical Systems Sometimes Necessary Prior to Regulation?

Prior to regulation, your technician will assess the condition of your instrument. If it has badly worn parts or if there has been corrosion or moth damage, the piano may not be able to be properly regulated without some repair or replacement of parts.

Reconditioning is the process of putting your piano back in good condition by cleaning, repairing, and adjusting your instrument for maximum performance with replacement parts only where specifically indicated. If your piano has deteriorated beyond simple reconditioning, it may need to be rebuilt.

Rebuilding involves complete disassembly, inspection, and repair as necessary with replacement of all worn or deteriorated parts. The piano is then reassembled, tested and adjusted to the same or similar tolerance and performance as when it was new.

Your piano is a major investment which deserves to be protected through regular servicing by a qualified technician. Properly maintained, your piano will sound its best and give you and your family a lifetime of enjoyment.

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HUMIDITY CONTROL

Your piano is made primarily of wood, a versatile and beautiful material ideal for piano construction. However, being made of wood, your piano is greatly affected by humidity. Seasonal and even daily changes in humidity cause wood parts to swell and shrink, affecting tuning stability and touch. Extreme swings in humidity can eventually cause wood to crack and glue joints to fail.

Other materials in your piano also are affected by changes in moisture content in the air. The many felt and leather parts in your piano's action can change dimension, affecting regulation and friction, or stiffness of the touch. Very high humidity can even create condensation on metal parts such as strings, tuning pins and hardware, eventually causing them to rust.

How Does Humidity Level Affect My Piano's Tuning?

Swelling and shrinking of the piano's soundboard is the most immediate and noticeable effect of humidity change. The soundboard, a sheet of wood approximately 3/8 of an inch thick, is made with a slightly crowned shape. The strings pass over the soundboard and are connected to it by a wooden piece called a bridge. The upward crown of the soundboard presses the bridge tightly against the strings.

As the moisture level in the soundboard increases during periods of high relative humidity, the crown expands and pushes the bridge harder against the strings. The strings are stretched tighter and the piano's pitch rises. Because this increase in crown is greater in the center of the soundboard than at the edges, the pitch rises more in the middle octaves than in the bass or treble registers.

During periods of low relative humidity the soundboard shrinks, reducing the crown and decreasing pressure against the strings. The pitch drops, again with the greatest effect noticeable in the center of the keyboard. When relative humidity returns to its previous level, the average pitch of all the strings will return to normal, although the exact pitch of individual strings will be slightly changed from their original settings. Thus, a piano only will stay in tune as long as the relative humidity level in the air surrounding the soundboard remains constant. Extreme humidity changes require making greater changes in string tension to bring the piano into tune. This upsets the equilibrium between the string tension and the piano frame, and the piano never becomes stable.

What is Relative Humidity?

Wood swells and shrinks in response to changes in the relative humidity of the air around it. Relative humidity (RH) is the amount of moisture contained in the air, compared to the maximum amount of moisture that it is capable of holding. The moisture content of air is affected by weather as well as conditions and activities within the home, while the moisture-holding capacity of air varies with temperature. One way of thinking about RH is that it is a measure of air's tendency to absorb or release moisture to its surroundings. Thus when the RH of air in a room increases, moisture will tend to transfer from the air to wood, and other absorbent materials in the room. When the RH of air decreases, moisture will transfer from other materials back into the air. The RH of the atmosphere is always changing by the hour and, more dramatically, with the seasons. Consequently, the wood and felt parts in your piano are constantly changing dimension as they absorb and release moisture.

Since RH depends upon the temperature and moisture content of the air, it is not possible to maintain a constant RH by controlling room temperature alone. In fact, maintaining an even temperature while moisture content varies will cause RH to change.

What Can be Done to Minimize Humidity Problems?

Keeping the humidity level around your piano as constant as possible will help it stay in tune longer as well as slow such damage as soundboard cracks, loose turning pins, and glue joint failures. The first and simplest precaution you can take is to position your piano away from areas where it would be exposed to extremes of temperature and humidity such as heating and cooling vents, stoves, doors, and windows. Direct sunlight is especially damaging. If your home is not well insulated, an interior wall is preferable to an outside wall.

Controlling the humidity within the home is another step you can take to preserve your instrument. In most areas of the country the relative humidity is very low during the cold winter season, and very high during the spring and summer. In other areas these humidity cycles are reversed. Wherever you live, you have probably noticed the symptoms of low RH (shocks from static electricity when sliding out of a car or after walking across carpet), and the signs of high RH (limp, soggy-feeling newspapers and sticking doors). To monitor RH changes in your home, you may wish to purchase a moderately priced wall hygrometer available from most instrument supply companies or electronic stores.

Use of a room humidifier during dry seasons will help somewhat. However, too much moisture added to a room during winter months can cause condensation to form on cold surfaces such as windows, eventually causing mildew, rot, and, in extreme cases, damage to the building structure. During the humid season dehumidification is needed. If your humid season is winter, keeping the home evenly heated will help. However, humid summer situations require much more elaborate dehumidification systems. Unfortunately, it is seldom possible to adequately control the relative humidity of a piano by controlling the room environment alone.

A very practical and effective answer to humidity problems is to have a humidity control system installed in the piano itself. These systems consist of three parts: a humidifier for adding moisture to the air, a dehumidifier for eliminating excess moisture, and a humidistat or control unit which senses the RH of the air within the piano and activates the system to add or remove moisture as needed. These systems are designed to maintain the RH of the air within the piano at the ideal level of 42%. The components are installed out of sight, inside the case of a vertical piano or under the soundboard of a grand. They are easy to maintain, and can be installed by your piano technician.

While not eliminating the need for regular piano maintenance, humidity control will allow more stable tunings by reducing the radical pitch changes your piano may experience through the seasons. When your piano stays closer to its correct pitch level of A-440 (A=440 cycles per second), your technician does not have to perform a large pitch raising or lowering procedure prior to fine tuning. Thus, a balance of forces is maintained between the strings and the frame of the piano, allowing more accurate and stable tunings to be done.

In addition, a stable environment will help to preserve your piano through the years. Wood parts, glue joints, metal parts, and your piano's finish will all last longer if not subjected to excessive humidity swings. Maintaining the correct environment will preserve your piano investment for a lifetime of enjoyment.

How Will Humidity Control Benefit My Piano?

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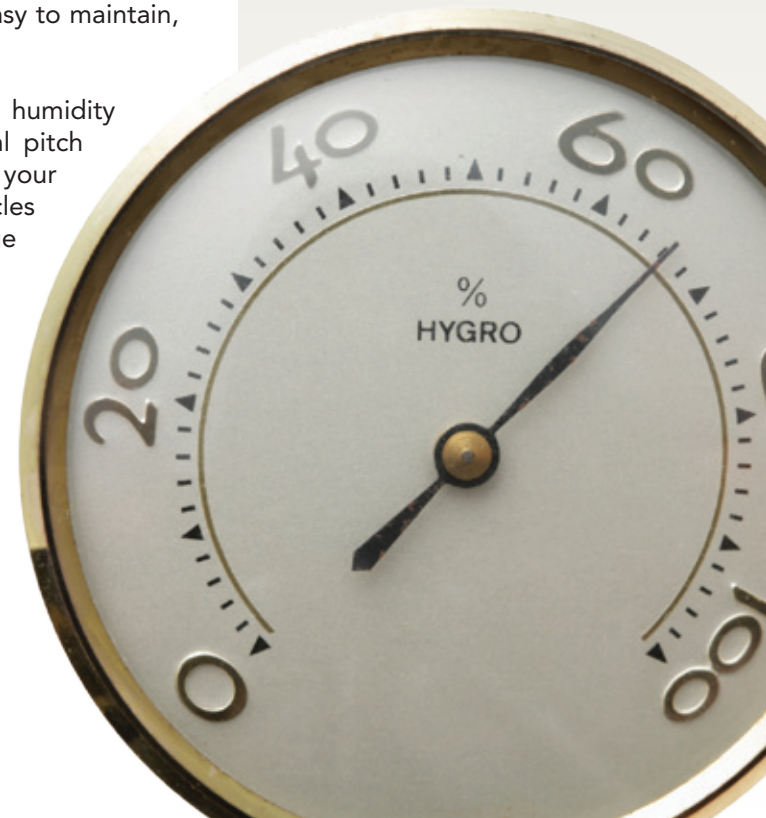

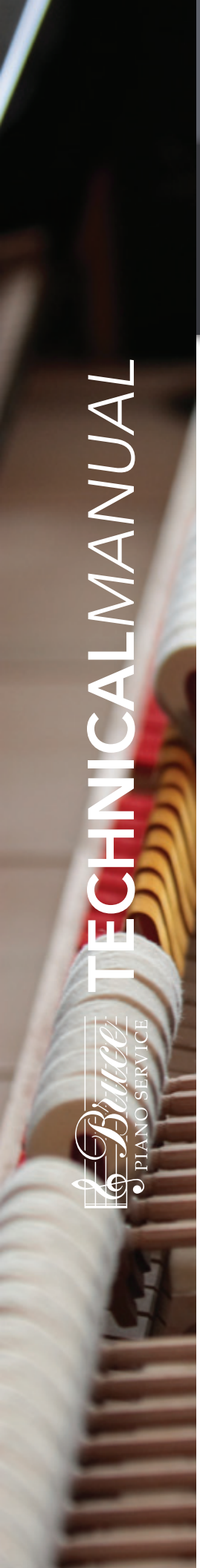

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VOICING

Every piano has its own unique sound. One might be described as "glassy", another as "warm". One might have a "full singing" tone, and yet another sounds "thin". Although the original design establishes the basic character of your piano's tone, your technician can modify it to better suit your taste or restore its original tone if it has deteriorated with age. The process of modifying a piano's tone is called voicing.

What is the Difference Between Tuning and Voicing?

Tuning is the adjustment of the tension of all of your piano's 220 (or more) strings to the correct pitch or frequency. This ensures that notes played in a musical interval (octaves, chords, etc.) will sound in harmony.

Voicing is the adjustment of a piano's tone or quality of sound. Tone can be changed without affecting the pitch. For example, turning the bass or treble knobs on your stereo changes the tone but does not alter the notes the musician recorded. A skilled piano technician can voice a piano to change its tonal personality from mellow to bright or robust to delicate. The degree of change possible depends upon the piano's design and condition.

What is Good Tone?

Tone varies, even among pianos of the same make and model. No matter what its size or cost, any good piano should provide a wide range of tone, from soft and sweet to loud and bright. The tone should be even from the lowest to the highest notes. Most of all, it should sound musical.

What does the perfect piano tone sound like? There is no single answer, because everyone's taste varies. Also, certain tonal characteristics are more suited to specific styles of music. A bright, lively tone might be best for jazz, whereas you might prefer a rich and dark sound for Beethoven's music. There are many different sizes and models of piano available in the marketplace; you chose your piano because it sounded good to you.

But a piano's tone changes with use. As the hammers wear and compact, the tone often becomes too bright and harsh, robbing the pianist of the ability to produce a sweet sound. As parts wear, the regulation (adjustment of the mechanical parts that transmit motion from the fingers to the hammers) becomes uneven, and the pianist loses control over volume and tone. This is most noticeable in quiet playing. A delicate ppp passage becomes very difficult or impossible to play, and some keys may not sound at all if played very lightly.

Aging of the piano's strings and structure also can diminish its tone.

Other factors that affect the sound you hear from your piano are:

- Room acoustics. Hard shiny surfaces such as windows and bare floors reflect high frequencies, making a piano sound bright and loud. High ceilings or large adjoining rooms add resonance. Rugs and upholstered furniture soften tone and add warmth.
- The lid. Both grands and verticals sound louder and brighter if the lid is opened.
- You. Your ears are sensitive, and will perceive sound differently if you have spent all day in a quiet office or at a loud construction site.

Getting the Most Enjoyment From Your Piano

One of your piano's most important assets is its tone. Properly voiced, your piano can offer you a rich palette of music expression, and inspire good practice habits in every member of your family. However, piano owners are not always aware that tone can be customized to their own taste and room acoustics, and to correct for deterioration and age. If the only service your piano has received is tuning, the sound can likely be improved by voicing.

How Does a Technician Voice a Piano?

Before you or your technician can fully evaluate the tone of your piano, it must be well-tuned. Tuning is the first step in improving the sound of any piano and may actually provide the tone you desire. If the tone is still not satisfactory your technician will inspect the action, hammers, and strings. If these components are severely worn, major repairs may be required before an improved tone is possible.

Moderately worn hammers can be reshaped with sandpaper to remove string grooves and restore their original rounded shape. Next, the hammers are aligned to strike each string squarely.

Action regulation should be checked or adjusted. This ensures an even, powerful response from each key.

If tuning, hammer shaping and regulation are correct, the tone probably will be balanced but still may be too bright or mellow for your taste. If so, your technician might recommend voicing the hammers.

For a tone that is too loud, too bright, or seems to die out too quickly, softening the hammer felt often is recommended. This is usually done by inserting needles into specific areas of the hammer to increase flexibility.

For a tone that is too weak or too mellow, hardening of the hammer felt may be necessary. This is usually done by filing away soft outer layers of hammer felt or by applying a chemical hardening solution.

Once the overall tone is correct, individual notes are voiced to make the tone as even as possible from one end of the keyboard to the other. In some pianos, certain notes still may sound different from their neighbors, no matter how skillfully the technician voiced the piano. This most commonly occurs about an octave below middle C, where the strings change from steel wires wrapped with copper to plain steel. Such irregularities are a result of design compromises, and usually cannot be corrected by voicing.

Does My Piano Need Voicing?

Your piano may benefit from voicing if:

- Your piano sounds different than when you purchased it.
- You don't like the sound even after it has been tuned.
- Tone varies radically from note to note.
- You cannot achieve a range of tone (mellow to bright) at different volumes.
- The piano has lost its ability to play softly.

Before deciding if a new piano needs voicing, make sure it is well-tuned and well-regulated. Then, play a wide variety of music on it. Most voicing procedures are long-lasting, so give yourself some time to explore the sound of a new instrument before deciding to change it. How often voicing is needed depends upon the piano's usage and its intended audience. Pianos in concert halls and recording studios often receive minor refinement of the voicing before each performance. A home piano may need some initial voicing to customize it to the owner's taste, then once every one to five years to maintain its tone.

Your piano and your musical needs are unique – your own schedule for periodic voicing is a matter for you and your technician to decide. To find out how voicing might improve the tone of your piano, ask for a demonstration on one or two notes.

FINISH CARE

The piano is unique among musical instruments because it also serves as fine furniture for the home. In fact, the term "piano finish" has traditionally been used to describe the highest standards in wood finishing. Properly maintaining that fine finish will enhance your home's décor and preserve the value of your piano.

Basic Finish Care

Modern pianos are finished with a variety of materials, from traditional lacquer to modern polyurethanes and polyester resins. Whatever the material, a piano finish is designed to protect the wood from dirt and liquid spills, reduce the damaging effects of humidity changes, and – in the case of clear finishes – enhance the beauty of the wood. Modern finishes are designed to do their job without the additional aid of polishes or waxes. In most cases, a piano finish is best maintained by simply keeping it clean and avoiding exposure to direct sunlight, extremes of temperature and humidity, and abrasion.

1. Avoiding finish damage.

Your piano's cabinet, like all woodwork, is subject to expansion and contraction with humidity changes. Excessive wood movement can eventually cause the finish to develop tiny cracks and even separate from the wood. Moderating the temperature and humidity swings around the piano will help to preserve its finish as well as its overall structure and tuning stability. Locate the piano in a room with a fairly even temperature, away from drafts, dampness, and heat sources. Always avoid direct sunlight – it will age the finish prematurely and cause color fading. To prevent scratches, never set objects on your piano without a soft cloth or felt pad. Never place plants or drinks on a piano, because spillage and condensation can cause major damage.

2. Dusting your piano.

Dust is very abrasive, and can scratch the finish if wiped off with a dry cloth. To avoid scratching, dust the piano lightly with a feather duster. Alternatively, wipe lightly with a soft damp cloth to pick up the dust, followed immediately with a dry cloth. The cloths should be soft cotton such as flannel, because coarse or synthetic fabrics can scratch some finishes. Wring out the damp cloth thoroughly so it leaves no visible moisture on the surface. To avoid creating swirl marks, always wipe with long straight strokes rather than circular motions. Wipe with the grain for natural wood finishes, or in the direction of the existing sheen pattern for solid-color satin finishes. Because some exposed parts inside your piano are fragile, it's best to let your technician clean these areas.

3. Cleaning the finish.

To remove smudges and fingerprints, first dust using the damp/dry cloths as above. If heavier cleaning is necessary, dampen your cloth with a small amount of mild soap solution. A common product is Murphy's Oil Soap, available at most grocery and hardware stores.

4. To polish or not?

Before using polish on your piano, be sure it is actually necessary and beneficial. In general, most manufacturers recommend against using polishes because of the potential for damage to the finish and contamination of other parts of the instrument. Common household products such as "lemon oil" or inexpensive "furniture polish" should be avoided. Despite labels' claims that they "protect" the finish or "feed" the wood, they offer no protection from scratching and can actually soften the finish if overused. Worse, they often contain silicones and oils that contaminate the wood, complicating future refinishing or repairs. Silicone is especially dangerous because of its tendency to spread within the piano, sometimes causing extensive internal damage. Avoid aerosol products altogether since the over-spray can contaminate piano strings, tuning pins and action parts. An appropriate polish can help to restore lustre to a dulled finish or reduce the tendency of some finishes to show fingerprints. However, it should be applied sparingly and infrequently, and all excess should be wiped clean with a soft dry cloth so no visible film remains. To prevent scratching, always dust before polishing. Specific recommendations follow.

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5. Removing a heavy polish build-up.

If your piano's finish appears gummy, oily, or streaked, it may be contaminated with too much or the wrong type of polish. Adding more polish will not correct this problem. Instead the finish should be thoroughly cleaned, then evaluated for any further treatment. To remove accumulations of old polish, use a cloth dampened with a mild soap solution as in item 3 above. Wring the cloth thoroughly to minimize wetting of the finish, and dry the surface immediately. Test a small area first to make sure the washing does not cause white marks or softening of an older finish. If stronger cleaning is necessary, look for a product called "wood cleaner and wax remover" at a hardware or wood workers supply store, or ask your technician for a suggestion.

Care of Specific Finish Types

The two most common piano finishes are lacquer and polyester. Either material may come in clear, black, white, or other colors. Check your piano's owner information booklet to determine the type and recommended care of your piano's finish, or ask your technician or dealer for help if you're not sure.
Lacquer. Most, but not all, American-made pianos have lacquer finishes. They may be satin (dull sheen), semi-gloss, or high-gloss.

- Cleaning. For general dusting and cleaning of lacquer finishes, see items 2 and 3 preceding. Be especially careful to avoid scratching high gloss finishes by using only very soft, clean cloths and wiping with light pressure. For satin finishes, always rub in line with the existing sheen.
- Polishing. Satin finishes are intended to be dull and will normally have a poor appearance if a gloss-producing polish is applied. If desired, a polish may be applied to gloss or semi-gloss finishes. Two common products are Guardsman Furniture Polish and OZ Cream Polish. Your technician may carry these or other products especially recommended for piano care. Note the precautions under item 4 regarding selecting and applying polishes.
- When cleaning or polishing a lacquer finish, avoid hard pressure on sharp corners and edges since the finish can easily wear through to bare wood.

Polyester. Most Asian and European pianos have polyester finishes in satin or high-gloss (called high polish). This material is harder and more scratch-resistant than lacquer, and best maintained by simple dusting and cleaning.

- Cleaning. Use the same procedure as for lacquer.
- Polishing. Satin polyester looks best when simply kept clean. Avoid gloss-producing polishes, which leave satin finishes looking shiny but scratched.
- High-polish polyester finishes need only be kept clean to maintain their gloss. However, high-wear areas such as the music desk may eventually develop a hazy appearance caused by many fine scratches. These areas can be buffed back to a high gloss using a product designed to remove tiny scratches from fiberglass boats or plastic windows in convertible cars. Two such products are Meguiar's Mirror Glaze #17 Plastic Cleaner, and Meguiar's Mirror Glaze #9 Swirl Remover – available from marine supply, auto-parts, or automotive paint supply stores. Your technician may carry special products for this purpose, or can recommend a local source.v

Finish Repairs

Dents, scratches, and chips sometimes occur, spoiling the appearance of an otherwise perfect finish. Such damage can usually be corrected by a specialist in "finish touch-up". Your piano technician may perform this service, or can offer a referral.

Cleaning Your Keys

Piano keys eventually become soiled with accumulated oil and dirt from fingers. To clean your white keys, use a soft cloth dampened with water and a small amount of mild soap. Avoid solvents. Make sure the cloth is thoroughly wrung out, and wipe the keys back-to-front, rather than side-to-side, so excess moisture and dirt will not seep down the sides of the keys. Clean only a few keys at a time, drying immediately with a clean cloth.
Ivory keys are porous, and excessive moisture can penetrate and loosen their glue joints. Also, a dirty or brightly colored cleaning cloth can transfer stains into the ivory.
Clean sharps in the same manner, but use a separate cloth for painted wooden sharps to avoid black stains on the white keys.

Finish Care Tips

- Locate your piano to avoid direct sunlight as well as excessive temperature and humidity changes.
- To avoid scratching, always remove dust first with a damp cloth or feather duster before wiping with a dry cloth.
- Never place drinks, plants, etc. on the finish.
- Avoid placing vinyl or rubber in contact with the piano.
- Make sure that piano lamps, etc. have a felt-padded base.
- Avoid touching piano strings with fingers or damp cloths.
- Delicate parts inside your piano should be cleaned only by your technician.
- Use polish sparingly, if at all.
- Avoid aerosol products.
- Read labels carefully, and avoid any product containing silicone.
- Before playing, always wash your hands to prevent staining the sides and tops of the keys.

REBUILDING/RECONDITIONING

A piano not only serves the art of music, it is a work of art itself. A wonderfully complex machine, it has thousands of moving parts, a framework and soundboard supporting tremendous string tension, and beautifully finished cabinetry.

Although remarkably durable, pianos are subject to deterioration with time and use. Felt wears, strings break, wooden structures weaken and crack, and the exterior finish loses its beauty. Regular service and periodic action regulation can compensate for minor wear, but heavy or extended use – especially when combined with wide seasonal humidity swings – can eventually cause severe deterioration.

Today, many high-quality older pianos exist in various stages of wear. Because it happens so gradually, this wear often goes unnoticed, leaving many pianos operating far below their potential. In extreme cases, some older pianos are simply left unplayed because of their poor condition.

Some technicians possess the skills to restore such instruments to excellent condition. This work is variously described as rebuilding, restoration, renovation, remanufacturing, refurbishing, or reconditioning. To establish some uniformity, the Piano Technicians Guild uses the following terms:

- **Reconditioning** is the process of putting a piano back in good condition by cleaning, repairing, and adjusting for best performance with parts replacement only where necessary. This is most appropriate for a piano with only moderate wear or those of medium value with average performance requirements.

  Reconditioning does not involve replacing major components such as the soundboard, bridges, pinblock, and most action parts. This means the performance and life-span of an older piano will not be restored to new. Instead, reconditioning is designed to improve a piano's performance, keeping in mind both costs and benefits.

- **Rebuilding** involves complete disassembly, inspection, and repair as necessary, including replacement of all worn, damaged, or deteriorated parts. The piano is then reassembled, tested, and adjusted to the same or similar tolerances as new. Complete rebuilding includes the entire piano structure – including soundboard, bridges, pinblock, and strings – as well as the action, keyboard, and case refinishing. Partial rebuilding includes only one or two of these areas, for example rebuilding of the action and structure, but not case refinishing.

  Rebuilding restores the piano to original condition or better. Such comprehensive work is usually most practical for high-quality instruments where maximum performance and longevity are required.

What Happens to a Piano as it Ages?

In the short term, leather and felt compact, affecting the adjustment (regulation) of the parts. The action becomes uneven and less responsive, and the piano's tone loses dynamic range. Squeaks and rattles may develop. Routine maintenance such as hammer filling, regulation, voicing, and tuning will correct these problems and maintain the piano in near-new condition.

After extended or very heavy use, action parts become severely worn. Leather and felt wear thin. Keys become wobbly, hammer felt gets too thin to produce good tone, and the action becomes noisy. Regulation adjustments reach their limit. In addition, piano strings may begin breaking and the copper windings of bass strings lose resonance.

After decades of exposure to seasonal changes, the wood of the soundboard, bridges, and pinblock is weakened. This causes loose tuning pins, poor tuning stability, and further loss of tone. By this time the piano's finish will often be scratched or faded.

How Do I Decide if Major Repairs are Appropriate?

Not all pianos are worth the expense of reconditioning or rebuilding. In consultation with your piano technician, you should consider the following factors:

- The overall condition of the piano. Can it really be restored to original condition or is it deteriorated beyond repair? Pianos subjected to severe fire, flood, or moving damage may not be repairable.
- The quality, size, and type of the piano. Low priced, small pianos of poor design have limited potential. If the rebuilt piano would not be capable of meeting your performance needs, it would be better to replace it with one of better design.
- The cost of repairs versus replacement. Major repairs may exceed the value of small low-quality pianos. However, most large high-quality instruments can be rebuilt for one-half to two-thirds the cost of a comparable new piano, making rebuilding a cost-effective option for fine pianos.
- Sentimental value. Personal attachment or historical value may justify investing in major repairs rather than replacement.

When Does a Piano Need Reconditioning or Rebuilding?

Most pianos can be played for many years without major repairs. However, the tone, touch, and appearance will continually decline with age. When regular maintenance such as cleaning, regulating, voicing, and tuning can no longer provide satisfactory performance, a piano may require reconditioning or rebuilding.

Exactly when a piano needs rebuilding or reconditioning depends on its original quality, the climate, usage, and performance requirements. One piano may need rebuilding after just twenty years, while another may need only reconditioning after fifty years. The best way to decide is to seek out a qualified piano rebuilder with the judgment, experience, and expertise to advise you on such an important decision. If your Registered Piano Technician does not offer rebuilding services, ask for referrals.

How Do I Arrange for These Major Repairs?

If you suspect that your piano needs major repairs, have a complete evaluation done by a qualified piano technician who specializes in rebuilding. Discuss costs versus benefits of various repair options, and whether the completed piano would meet your performance requirements. Most rebuilders will provide you with a written proposal. Expect to pay a modest fee for this service.

You may want to visit the rebuilder's shop to inspect other work in progress, or ask for a reference list of past clients. Checking out similar jobs will give you a sense of how your instrument could be improved, as well as a feeling for the technician's workmanship.

When you decide to proceed with major work, be sure to ask for a written contract. This enables you to know exactly what will get done to your piano and the associated costs, estimated completion date, payment method, and guarantee policy.

What Work is Included in Reconditioning?

Reconditioning may include:

- Thorough cleaning.
- Repair or replacement of damaged parts as needed, typically including such jobs as felt replacement, hammer filing or replacement, and partial restringing.
- Adjustment, regulation, tuning, and voicing to return all parts to proper function, reduce mechanical noise, and improve tone.
- Finish touch-up or polishing.

What Work is Included in Rebuilding?

Complete rebuilding typically includes:

- Complete disassembly of the instrument.
- Repair or replacement of soundboard, bridges, and pinblock, as well as repair of any structural damage to the case.
- Replacement of all strings and tuning pins.
- Thorough restoration of action and damper system, including replacement of hammers, many action parts, springs, and most felt.
- Rebuilding of the pedal and trapwork system, including replacement of all worn felt, leather, and metal parts.
- Refinishing of case and plate, polishing or replating of all hardware, and replacement of all decals, felt trims, and rubber buttons.
- Complete action regulation, tuning, and voicing.
- Multiple tunings to stabilize new strings.