

Key Bushings
The Spurlock Method
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1. Selecting the cloth thickness
 - Use high quality felt
 - Start with medium
 - Do an initial dry-fit
2. Correct cloth depth
 - 3/16" is ideal
 - Less causes faster wear
 - More increases friction
3. Correct type and amount of glue
 - Use water soluble glue for future removal
 - Use fast-gelling to minimize glue wicking
 - Use hard-setting glue for a stable firm bushing
 - Use water-based glue for easy removal
4. Accurate mortise sizing
 - Clean up splintered or damaged holes
5. Key Pin Condition
 - Clean key pins
 - Lubricate key pins with dry Teflon
 - Elmer's Slide All
 - TFL from PianoTek
6. Measure Key Pins
 - Bushing cauls must respond to pin size
 - Measure with a micrometer or calipers
 - Balance and front rail pins are usually different: never assume the size
 - Normal pin size is 146mm
 - Common key pin sizes are posted on www.ErwinsPiano.com
7. Remove old bushings
 - Pre-wet to minimize steam damage to keys. Sometimes soak twice.
 - For old hide glue, use a travel steam iron & tweezers, or a wet cloth and an iron
 - Steam will swell the balance rail holes.
 - Use water & wallpaper remover with an applicator or a brush.
 - Clamp the keys together to keep them together & to prevent them from falling over.

- For stubborn white glues, or when the balance rail holes do not need sizing down, soak some felt wedges in wall paper remover and insert each plug into each mortise for 20 minutes.
- A soldering iron with a small flat tip will introduce heat, making it gummy. Be careful not to enlarge the hole.

8. Prepare the mortises

- If the felt was not well removed, use a Dremmel tool with a small fine drum sander
- Mortises in many keys will be uneven and rough
- Improve accuracy of the end result, and bushing stability, with mortise sizing cauls
- Clean off the key buttons and keys by sanding off any water damage and roughness.

9. Install the bushings: the two-caul method.

- Advantages:
 - Speed economy of motion and tool handling
 - Consistent cloth depth: only one piece of cloth to position at a time
 - Easy to learn
 - No wasted cloth.
- Procedure
 - Do a dry fit with a double caul.
 - Do a four-key sample, notes 40-44.
 - The caul should be easy to remove.
 - Do an actual test installation
 - Let these set up to allow for shrinkage to get an accurate feel for the samples.
 - They should be a tiny bit on the snug side after twenty minutes.
 - Make sure the key pins are straight and not turned.
 - If key pins turn too easily, do a super-glue fit

Hot Hide Glue

- Prepare hot hide glue
 - Rival Hot Pot Express
 - Keep the entire pot of glue even so it's not sticky on top
 - Hide glue from PianoTek comes with a mixing instruction sheet
 - If the glue is too thick or too watery, the bushings will fall out
 - Soak the glue, dissolve the granules, heat them up, and start working
 - There is a higher quality glue made from rabbit skins rather than horse hide
- Procedure
 - Fill a pot with glue
 - Spread a thin layer of glue onto one side of the felt, using a flat stick

Installing the bushing: applying glue to the cloth

- First side
 - Use a flat glue stick
 - Spread glue with the small end of the stick or small brush
 - Wipe again with the dry upper part of the stick or razor blade for a uniform layer with no excess

- Using the mortise width as a gauge, set the correct cloth depth.
- Check every five or ten to check the depth of the felts
- Pull back on the cloth, giving it a bit of tension as the caul is inserted.
- Slice off the felt with an exacto knife that is kept in the hand not holding the cloth.
- With cauls installed in mortises of front rail , lightly tap each caul with a small hammer
- Other side
 - Follow the same procedure with the double-sided cauls
 - This time, position the felt slightly into the mortise before inserting the caul.

Mortises Improvements

- When the bushing shoulder recess was made bgy compression it can disappear after bushing removbal
- A new recess can be routed into the keys, using a 3/8” straight router bit
 - Size the holes, let them dry, then rout

Key Buttons

- Repair the button after three more cauls. Clamp the broken button until the bushing cloth is dry.

Too tight

- If the bushings are too tight,
 - Key easing pliers
 - Alcohol and water on the whole set

Balance holes too loose

- Steam will tighten the holes
- Caul irons will size holes
- There is a special balance hole reamer/sizer
- Glue-size the holes

Fee

- Charge for 2.5 tunings
- Removing bushings 1.5 hours
- Installing new bushings 1.5-2 hours
- Removing & re-installing keys
- This is a maintenance item, so let the customer know this will need to be done again