Title: STANDARD PROCEDURES TO PREPARE GLASS KNIVES USING LKB 7800B KNIFEMAKER

Equipment: LKB 7800B KnifeMaker

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Warning!

Before you attempt to operate this equipment for the first time, please make sure you are aware of the precautions that you must take to ensure your own safety.

Warning!

Operation of the instrument involves shape glass materials. Extra cautions should be taken care when preparing the glass knives.
**Standard Procedures to Use the KnifeMaker**

1. Clean glass strip with lukewarm soapy water, rinse thoroughly with distilled water, and dry carefully with a paper towel. For subsequent handling, hold the strip with a Kimwipe.

2. Prepare the apparatus for making squares:
   2.1. Swing the locking lever (2) to rear position.
   2.2. Check that scoring shaft is fully pushed in.
   2.3. Set shaft (15, with symbol on score selector 13) upward.
   2.4. Loosen screws (9) and (23) and push the two glass holder (22) and (28) to their outermost positions.
   2.5. Turn breaking knob (18) counter-clockwise until it stops.

3. Cutting glass strips in half:
   3.1. Set guide plate (21) at 90° line. Be sure not to touch the sides of glass strips with fingers.
   3.2. Place glass strip in apparatus with scoring edges of the strip turned downwards. Make sure that no glass splinters or other litter lies under the glass strip and support plate (16).
   3.3. Press glass strip against guide plate (21) and lift the left part of strip over the studs (29) and (29a) and push simultaneously the strip to the left until the right end of the strip comes above doe (14a)
   3.4. Lower clamping head (8) onto strip with locking lever (2) while still holding the glass strip until it touches the strip.
   3.5. Remove the hand. Press lever (2) firmly downwards to locking position. However, do not use undue force.
   3.6. Set score selector (13) to the setting indicated on the right. Pull scoring shaft (15) toward you until it stops.
   3.7. Break square by turning the breaking knob (18) clockwise. When the glass breaks immediately return knob to its fully counter-clockwise position.
   3.8. Support the scoring shaft with the right hand while moving lever (2) to its starting position to prevent clamping head (8) from causing damage to glass parts.
   3.9. Push in the scoring shaft fully. Remove the two glass strips
**Note:** User could also skip this step if the glass strip is short. However, it is highly recommended to cut the glass strips supplied (length 400 mm) in half when using them in the KnifeMaker. A too long strip will not be clamped properly and squares or rhombi produced in such case may have misshaped corners which are unsuitable for knife production.

**Warning:** The rippled edge of the strip should always be placed face down.

4. Making glass squares (see diagrams)

   4.1. Set guide plate (21) at 90° line. Be sure not to touch the sides of glass strips with fingers.

   4.2. Place glass strip in apparatus with scoring edges of the strip turned downwards. Make sure that no glass splinters or other litter lies under the glass strip and support plate (16).

   **Note:** The glass strip abuts the first pedestal (29). Glass should be squarely placed into the holder to make an exactly 90° break, thus forming a perfect square. The square is then placed between the front (22) and rear (28) glass holders and tightened into position using knob 31.

   4.3. Press glass strip against guide plate (21) and push strip to the left until it stops against arresting stud (29). **Do not remove hand.**

   4.4. Push front glass holder (22) until it touches glass strip, then tighten locking screw (23).

   4.5. Lower clamping head (8) onto strip with locking lever (2) while still holding the glass strip until it touches the strip. **Note:** Strip should not move when nudged gently with your finger.

   4.6. Remove the hand. Press lever (2) firmly
downwards to locking position. However, do not use undue force.

4.7. Place fork (1) under end of glass strip.

4.8. Set score selector (13) to the setting indicated on the right. Pull scoring shaft (15) toward you until it stops.

4.9. Break square by turning the breaking knob (18) clockwise. When the glass breaks immediately return knob to its fully counter-clockwise position.

4.10. Support the scoring shaft with the right hand while moving lever (2) to its starting position to prevent clamping head (8) from causing damage to glass parts.


4.12. Remove the glass square with fork (1). Remember which corner is the lower left one.

5. Making knives

5.1. Put glass square on top of breaking pins (26) so that its corner “A” faces operator. The definition of corner “A” is shown in the figure under step 4.2.

5.2. Inserting lower left edge between white guiding rings (22a) of front glass holder (22).

5.3. Turn breaking knob counter-clockwise to stop.

5.4. Put fork in under glass square.

5.5. Lower rear glass holder onto upper left edge of square by pushing in and

5.6. Turn disengage the knob (31) clockwise and push it in. Glass holder (28) will then press against glass square.

5.7. Set score shaft selector (13) control to 25 (25) and score the glass square.
5.8. Lower clamping head (8) onto square with lever to locking position. Do not use undue force when locking.

5.9. Move the damping pad (23b) with lever (23a) up to lower left edge of the square so that it is pushing on it lightly.

5.10. Break the knife square into two knives by quickly turning breaking knob (18) clockwise. Return knob to fully counter-clockwise position when the square breaks into two.

**Note:** Two knives will be made as a result of breaking—one of which should be an inverted mirror image of the first. At one end of the triangle, there is a 90° glass step, whereas on the other side, there is a sharp edge created by two free breaks that occur at approximately at 52° angle (α). Placement of the stress lines and occurrence of defects should influence your knife selection.

5.11. Move damping pad to its original position.

5.12. Support scoring shaft with the right hand while moving lever (2) to its starting position.


5.14. Turn disengage knob (31) backwards and pull it outward to stop.

5.15. Remove knives with the fork. *Don’t touch anywhere near the knife edge.*

**Note:** Alignment of the positioning of the glass square is critical to forming a good knife. Positioning of the square is critical to making useful knives. If the knifemaker repeatedly makes inadequate knives, contact EMC staff. *Only EMC staff will make these adjustments as these settings are critical to everyone.*

6. Putting boats on knives

   a. Cut a small length of aluminum tape and attach squarely to one edge of boat and wrap around to the opposite end as indicated in the
following drawing.

b. Remove excess tape with a razor blade or by carefully tearing across the back of the knife.
c. Seal the bottom edges of the knife using hot Pyseal and a paint brush. Pay particular attention that the bottom of the knife is well sealed.

7. Checking knives

a. View the glass knife with a dissecting knife. A good knife for thick sectioning has a large edge with no spur, or a small one.
b. For either thick or thin sectioning, examine the knife edge directly to locate any edge imperfections, whiskers, contamination or fingerprints on the back of the knife.
c. For thin sectioning, bounce light off of the front edge of the knife. Any lines running parallel to the stress mark which sweeps from the left may result in knife marks. The best knives do not show this artifact.
d. The sharpest edge is to the left generally. The most durable surface is to the right (but left of the whiskers.) See drawing.

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Reference:

The parts of the LKB 7800B KnifeMaker

1. Fork used to remove the glass knives from the apparatus
2. Locking lever
3. Shaft
4. Adjusting sleeve for (8)
5. Bracket
6. Set screw for (4)
7. Cover screw for (6)
8. Clamping head
9. Locking screw for (28)
10. Support studs
11. Locking screw for (12)
12. Rear dial
13. Score selector
14. Cover plate
14a. Dot (marking 200 mm)
15. S= shaft with cutter wheel
16. Support plate for glass strip
17. Locking knob for (21)
18. Breaking knob
19. Operation Instructions
20. Angle setting plate
21. Guide plate
22. Front glass holder
22a. Guiding rings
23. Locking screw for (22)
23a. DPA-lever (lever for Damping Pressure Adjustment)
23b. Damping pad
24. Locking screw for (25)
25. Front dial
26. Breaking pins
27. Centre line
28. Rear glass holder
29. Arresting stud for 25 mm glass strips width 29a.
30. Foundation block
31. Foundation block (silumingamma)
31a. Dot (marking 200 mm)
32. Cutter wheel holder (see fig. 8).
33. Screw for adjusting scoring pressure
34. Cutter wheel (sintered tungsten carbide)
35. Shaft for cutter
36. Locking pin 8. Clamping head strip length)
37. Bracket for (32)
38. Guide for (15)
39. Allen wrench for adjusting scoring pressure
40. Screws for (20)
The standard glass knives preparation procedure in picture form