



Saint Mary's
University

Electron Microscopy Centre

**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

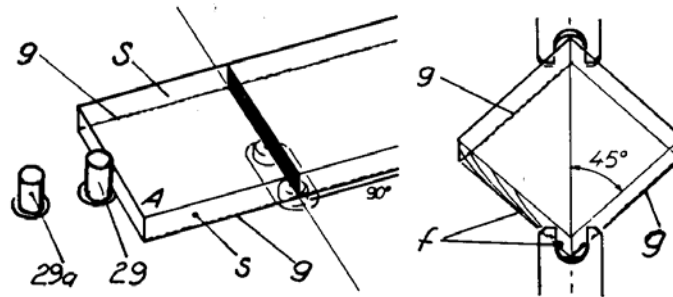
1. Clean glass strip with lukewarm soapy water, rinse thoroughly with distilled water, and dry carefully with a paper towel. For subsequent handling, hold the strip with a Kimwipe.
2. Prepare the apparatus for making squares:
 - 2.1. Swing the locking lever (2) to rear position.
 - 2.2. Check that scoring shaft is fully pushed in.
 - 2.3. Set shaft (15, with symbol \equiv 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).



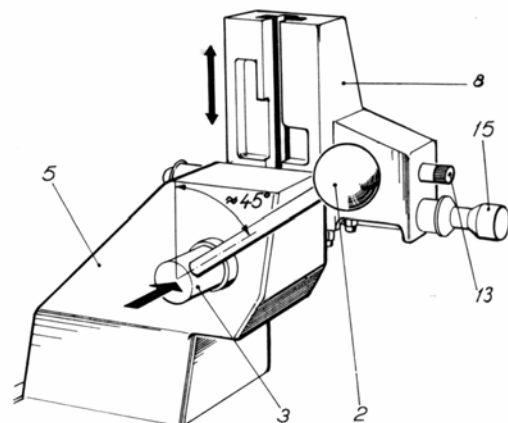
Note: The glass strip abuts the first pedestal (29). **Glass should be squarely placed into the holder to make an exactly 90° break, thus forming a perfect square.** The square is then placed between the front (22) and rear (28) glass holders and tightened into position using knob 31.

- 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



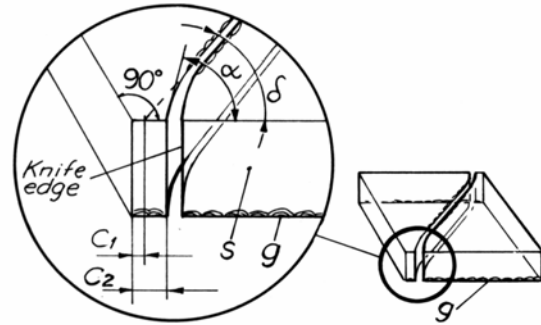
5.8. Lower clamping head (8) onto square with lever to locking position. **Do not use undue force when locking.**

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.

5.13. Push in scoring shaft fully.

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.

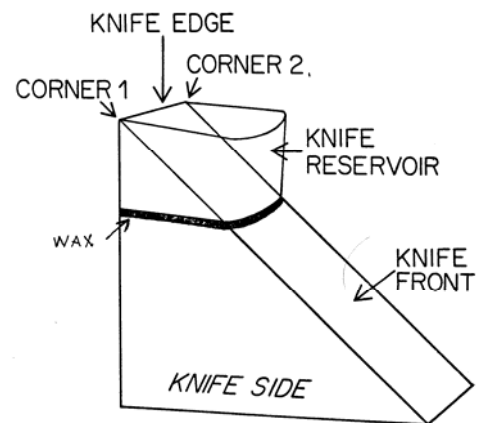
Positioning of the square is critical to making useful

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

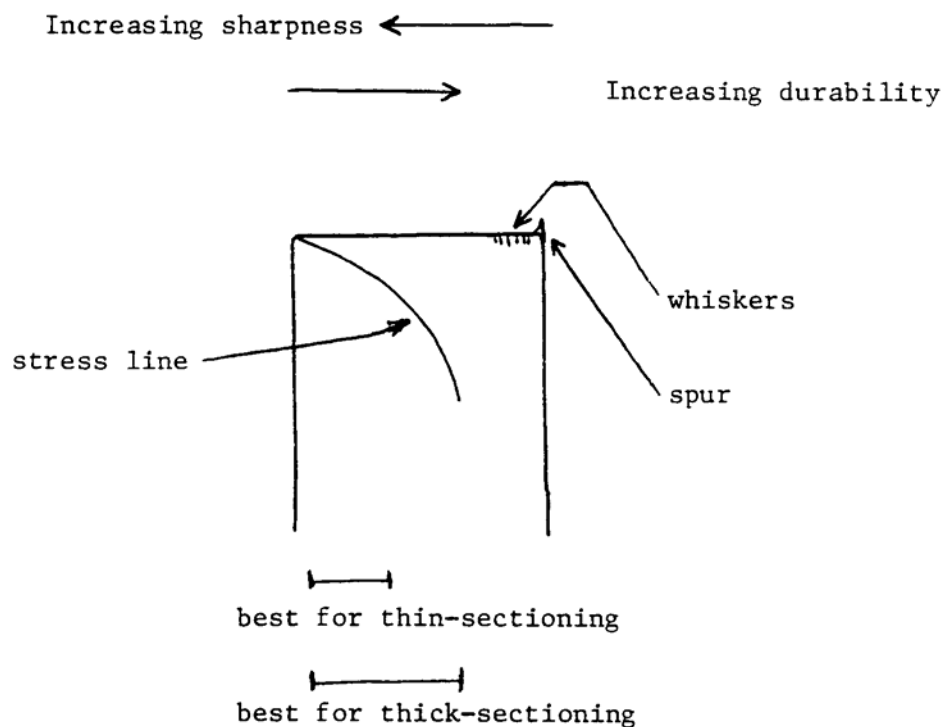


following drawing.

- 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

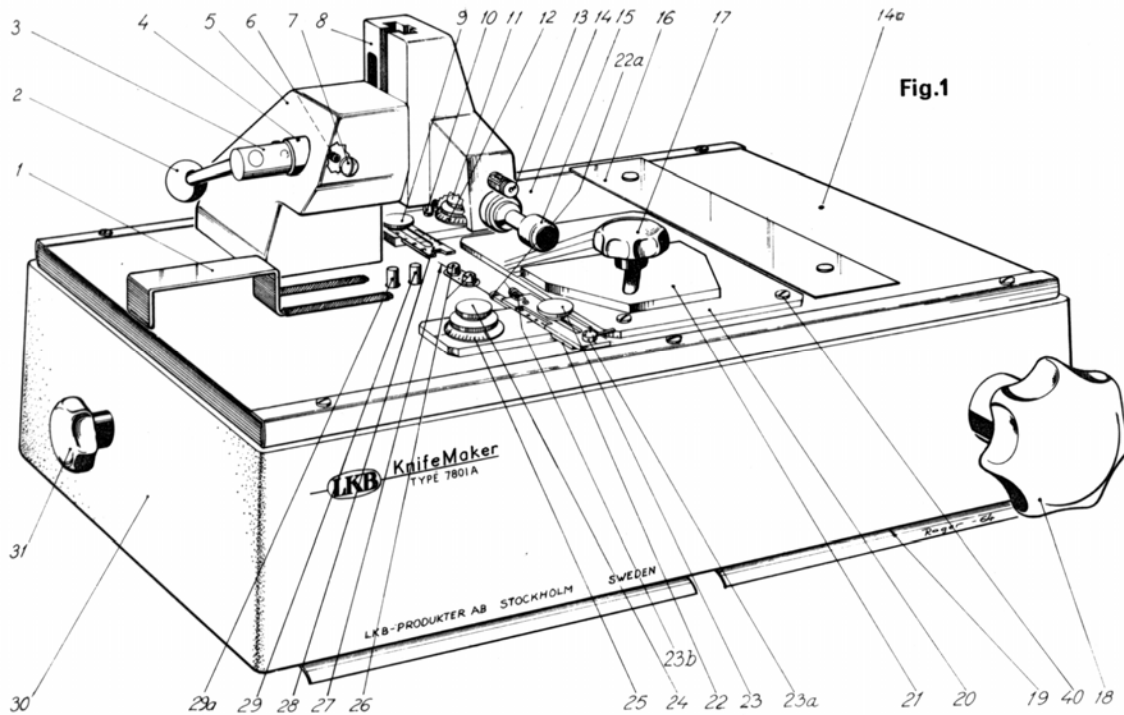
- a. View the glass knife with a dissecting knife. A good knife for thick sectioning has a large edge with no spur, or a small one.
- b. For either thick or thin sectioning, examine the knife edge directly to locate any edge imperfections, whiskers, contamination or fingerprints on the back of the knife.
- 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.



Reference:

1. Instruction Manual for Knifemaker 7800B. LKB Bromma, Sweden.

The parts of the LKB 7800B KnifeMaker



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

The standard glass knives preparation procedure in picture form

KnifeMaker
7800 B



LKB



How to make perfect knives the fastest way

<p>1 <i>Wash, rinse and dry!</i></p> 	<p>2</p> 
<p>3</p>  <p>CHECK</p> <p><i>Adjusting instructions overleaf</i></p>	<p>4</p>  <p>CHECK</p> <p><i>Adjusting instructions overleaf</i></p>
<p>5</p>  <p><i>In touch plus a little more</i></p>	<p>6</p>  <p><i>Check edge</i></p>

