

Buehler Minimet 1000 Polisher/Grinder

Instructions for Use

(Round Samples)



Sample Preparation:

1. Clean stages (Figure 1) and back of sample with 2-propanol. Mount round sample on metal stage with double-sided masking tape. Make sure not to touch the part of the masking tape that will be holding the sample. Make sure to push down very hard on top of a tissue. (Sample facing down into tissue)

Polishing:

1. The back of the SiC “sand” paper peels off to reveal a sticky side. Adhere the SiC paper onto the glass platen (Figure 2) using the same technique used on the metal stages. Make sure the SiC paper (Figure 4) is completely stuck on the glass platen. Avoid touching the surface of the SiC paper with your hands. Use the scratched platen for regular paper and the newer platen for the diamond paste.
2. Use a different bowl (Figure 3) for each sample. It is important to use the same one throughout the procedure for each sample.
3. Match up the notch in the glass platen with the bowl, and set the platen into the bowl. Make sure it is flat in the bowl.
4. Put the bowl onto the platform so that it locks into place. (Dots on bowl facing either perpendicular or parallel to polishing arm)
5. Squirt about 5 drops of soap and water solution from the squeeze bottle onto the SiC paper.
6. Lift lever and fit sample stage into the peg. The sample should be facing down.
7. Turn on the machine.
8. Use Table 1 to determine what the settings the machine should be set on. The appropriate settings may be entered by pressing the select mode button to toggle through the menu. When the light is lit up next to the setting you want to change, press the up or down arrows to adjust it. The soft stop setting should always be on. (The force should be in Newtons. If it isn't, turn off the machine and reset it)



Figure 1: Metal Stages

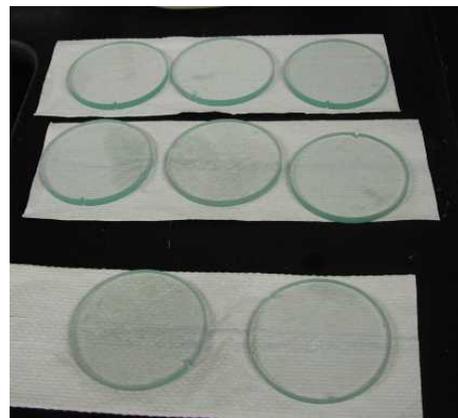


Figure 2: Glass Platen



Figure 3: Polishing Bowls

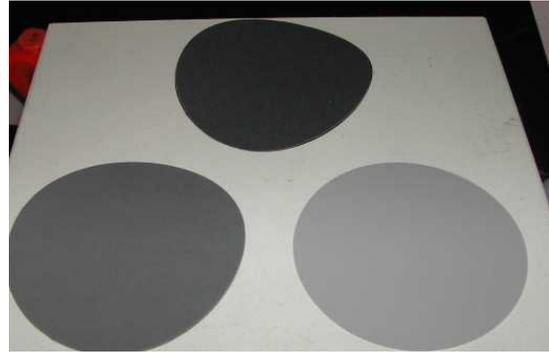


Figure 4: SiC "sand" paper

9. The bowl should look like Figure 5 before starting the polisher. Start the machine by pressing the Run button. The machine will start out slowly. Once it gets up to the set speed and load, the timer will start counting down.

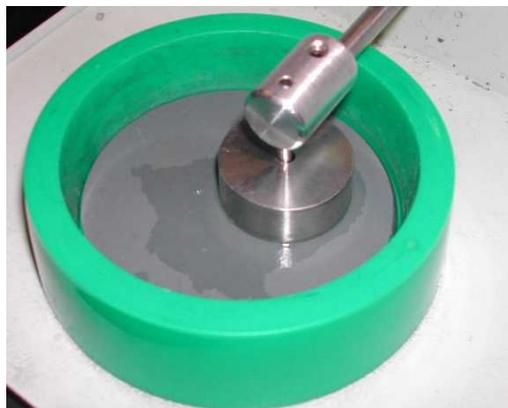


Figure 5: Ready to begin Polishing

10. Once the machine stops, wait for the timer to stop blinking. **Warning: Do not left lever until after the timer stops blinking. The polishing arm will break if you force the lever up.**
11. Lift lever and remove sample.
12. Rinse the sample with de-ionized water after each step, and examine the surface finish. Set the sample and stage down on a clean surface with the sample facing up.
13. Before moving to the next Grit level, make sure that the surface polish is uniform. If the finish is not uniform, repeat that polishing step. The scratches can be inspected with a microscope. Circular scratches are not bad.
14. Repeat the procedure until you're finished polishing with 1200 grit.
15. SiC paper can be removed by soaking the platen in the sink and peeling off the paper.

Polishing with Diamond Paste:

1. Mount the polishing cloth onto a newer glass platen. Use nylon cloths for 9 micron diamond paste and microcloths for 6, 3, and 1 micron(s).
2. Using the syringe of diamond paste (Figure 6), apply 2 or 3 small beads of paste in the center of the cloth. Apply 3-4 squirts of polishing oil from the nebulizer. (Figure 7)
Note: You do not need to completely cover entire cloth with the paste.
3. Spread the paste over the cloth by using half of another cloth.

- Load the bowl onto the Minimet 1000 and set the machine to the appropriate settings. (Use the same speed and load settings as 800 and 1200 grit.) Spray 2-3 squirts of polishing oil onto the cloth for lubrication. Do NOT lubricate with soap and water.

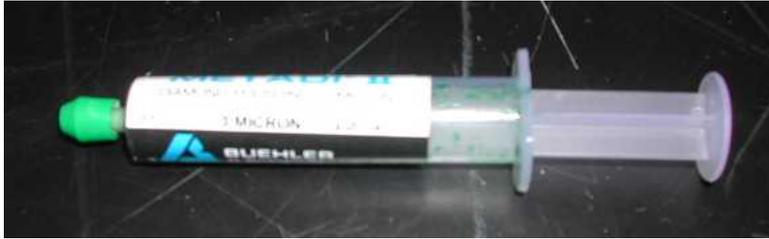


Figure 6: Diamond paste (3 micron)



Figure 7: Nebulizer

Removing the Sample:

- Take the sample and stage and hold it on it's side on a tissue.
- Carefully slide an exacto knife in between the sample and the stage.
- Slowly loosen the sample, but don't let it fall face down on the tissue.
- When it's loose enough, grab the sample by the edges and pull it off of the stage. Remove any excess tape from the stage or from the back of the sample.

Table 1: Typical Grits and Minimet 1000 settings

Grit	ANSI/CAMI (μm)	Load/Force (N)	Speed	Time (min.) Change to new grit before each 5 or 3 min run
180	78.0	50	50	5,5,5
240	51.8	30	50	5,5,5
320	34.3	15	40	5,5,5
400	22.1	15	30	5,5
600	14.5	10	10	5
		20	30	5
		20	30	5
800	12.2	20	30	3,3,3
1200	6.5	20	30	3,3
9 μm		20	30	3
6 μm		20	30	3
3 μm		20	30	3
1 μm		20	30	3

- For all grits, change if SiC paper starts lifting off the glass platen.
- If the sample's surface polish doesn't seem uniform, repeat that step until the surface finish is uniform.
- After polishing with 600 grit SiC paper, minimize handling the sample to avoid scratching the surface.
- These steps are a generic procedure. You may alter the procedure to better suit your samples.

Troubleshooting:

- If the sample becomes dislodged from the stage while the machine is polishing, there could be some serious scratches depending on how hard it fell off. You may have to go back 1 or 2 grits and start the procedure over again just to get rid of these scratches.
- After a sample falls off, clean the back of the sample and the stage with de-ionized water for about a minute. After drying them off, clean the stage and the back of the sample with 2-propanol. Allow them time to dry. Finally, make sure your hands don't touch the part of the tape that adheres the sample to the stage.
- If the sample starts chattering (skipping on top of the surface) during the first 10 seconds or so, stop the machine immediately. Try rotating the bowl 90 degrees and start over. This chattering may have created some small scratches around the edge of the sample. An extra run on the same grit may be necessary.

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Grit	ANSI/CAMI (μm)	Load/Force (N)	Speed	Time (min.)
180	78.0	50	50	5
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				5
				5
320	34.3	15	40	5
				5
				5
400	22.1	15	30	5
				5
600	14.5	10	10	5
		20	30	5
		20	30	5
800	12.2	20	30	3
				3
				3
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9 μm		20	30	3
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