ATAMI Standard Operating Procedure

Metallography Tools

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Revision	Date	Description/Change	Curator
0	9/27/2019	New document	Randy Greb

Contents

Scope:

Operations procedures for the metallographic equipment installed at ATAMI

System Specifications:

See supplier documentation and ATAMI website for capability.

Safety

General

Give a general description here of the safety issues of the system.

PPE Required

Safety goggles/glasses are required for all metallography operations.

Standard nitrile gloves should always be used when handling samples, polishing paper and slurry materials.

Use leather heat resistant gloves as needed to remove parts from the TP-7001 mounting press.

Hazardous Energies

Electrical

NA.

Mechanical

There is significant risk of finger injury with metallographic equipment.

Remove all hanging jewelry and badges before using

Use extreme caution in the following circumstances to prevent pinch or cut damage:

- Manual polishing on a moving wheel.
- Moving the automated polisher head.
- Removing the mounting press.
- Operating the precision saw.

Stored/Potential

NA

Thermal

Samples and the bayonet closure on the mounting press may be hot.

Materials/Consumables Hazards

Do not breath mounting powders and slurries. Do not let slurries contact your skin (use nitrile gloves).
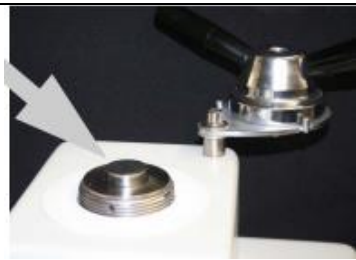
Interlocks

The precision saw will not operate without the cover in place.

Training Requirements

1. Pass all ATAMI required safety courses
2. Finish lab tour with qualified ATAMI trainer.
3. Complete all hands on training for this system and signed off by trainer.
4. Verify access to this document for reference.

Procedures

Pace Hot Mounting Press - How to Process a Sample:

Step	Action	Notes
1	**This general procedure is also described in the following video:**	https://www.youtube.com/watch?v=dNRS3Oaqwyg
2	Turn on the power with the power switch on the back right of the machine. Also turn on the water valve, ½ way, from the wall.	
3	Push the ram up to the point that it is sticking out the top of the molding cylinder.	
4	Place the sample oon the ram.	There are clips available for holding items that will not stay flat on the surface of interest.
5	Lower the ram until you have enough space for resin granules and the top bayonet assembly.	
6	Pour ½ to 1 scoop of resin into the chamber through the funnel.	1 scoop will produce a mount approximately ½ inch thick.

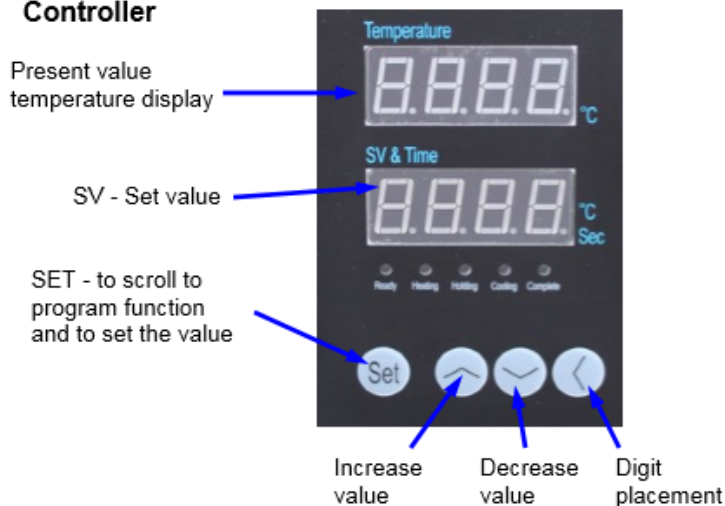| Step	Action	Notes
7	Carefully screw the top bayonet assembly to the top of the unit. Then back off 1/8 of a turn.	Use caution when threading the top bayonet assembly to avoid cross-threading.
8	Press the Start button.	You can check recipe parameters per "How to Setup a New Recipe" section, below.
9	After the sample is complete, the buzzer will ring and you can remove the sample. **Be sure to lower the ram to release pressure before unscrewing the top.**	
10	Turn off the water supply after you are done.	

Pace Mounting Press - How to Setup a New Recipe:

These instructions are pasted from the PACE manual.
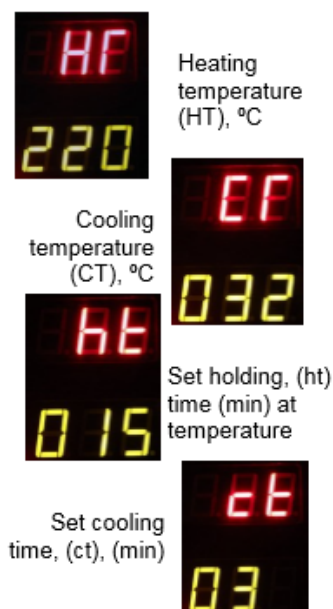
Standard recipe for green phenolics is

- 200 deg C high temp
- 70 PSI pressure
- 8 minutes hold time
- 37 deg cooling T

4.2.1 Controller

Present value temperature display

SV - Set value

SET - to scroll to program function and to set the value

Temperature

SV & Time

Ready Heating Holding Cooling Complete
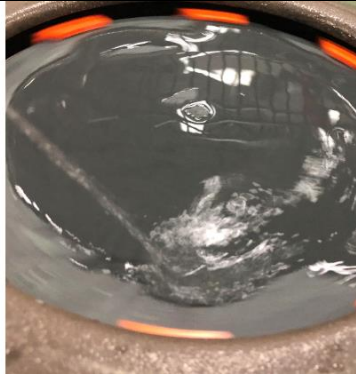
Set

Increase value

Decrease value

Digit placement

4.2.2 Controller (Temperature, Time, Cooing, Temperature Holding Range)

1. To enter program mode either press the SET key.

2. Use SET button to "HT" (temperature setting) and enter value up to 300ºC (Recommended temperature for most compression mounting resins is 200-220ºC).

3. To change the cooling temperature, press the SET button to display "CT" (recommended set temperature is 5ºC above the temperature of the incoming water).

4. To adjust the holding time, press "ht" and set in minutes (Recommended time 10-15 minutes).

5. To set the cooling time, press ct and enter cooling time (minutes).

6. To change the end of cycle buzzer time, press "ALT" and enter the time in seconds

7. Exit by pressing SET button.

HP
220
Heating temperature (HT), ºC

CF
032
Cooling temperature (CT), ºC

ht
015
Set holding, (ht) time (min) at temperature

ct
03
Set cooling time, (ct), (min)

Leco VariPol VP50 Polisher - How to polish a sample.

Step	Action	Notes
1	Spray water on to the top surface of the brass platen.	

Step	Action	Notes
2	Place the paper on the water and press it down to get a seal.	
3	Place the ring around the paper and then put the zip-tie ring around that to hold it down tight.	
4	Be sure to place the outer ring back on the polisher after changing the paper.	
5	Spray water on the surface of the polishing paper.	
6	Press the power button.	

Step	Action	Notes
7	**<u>Verify that the polish RPM's are at the lowest point in the curve before starting. This is an important safety step.</u>**	
8	Press the start button and adjust the speed.	
9	Use the spray bottle to apply water and carefully use your hand to apply manual pressure as needed for your polishing. Carefully ramp RPM's as needed.	
10	After polishing is complete: • Ramp up the RPM's and spray water back and forth from the center to rinse the polish paper, and then let it dry. • Return the rpm's to the low value. • Press Stop. • Remove the outer ring. • Place the paper on the top rack behind the polisher. • Place the orange clamp ring in it's designated location on the polisher.	

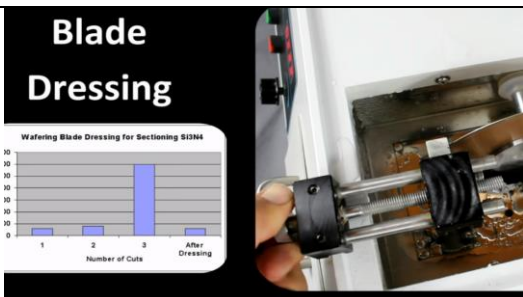| Step	Action	Notes
	• Place the outer ring and cover back on the polisher.	
11	**Always clean up!** • Place paper on the wire rack to dry it. Or dispose of it, if it is too contaminated to be re-used. • Thoroughly rinse the catch basin. • Wipe down the surface of the brass platen and the polisher.	

Pace Automated Polishing Head - How to Process a Sample in manual mode:

Step	Action	Notes
1	Turn on the system with the power switch on the back of the base.	For automated mode, refer to the Pace manual.
2	Carefully raise the head and move it out of the way of the platen.	
3	Peel and stick polishing paper on to the platen for the right wheel. For the left wheel use the appropriate slurry solution and felt base.	
4	Be sure that the cover is on the polish head that you are not using.	This is an important safety step to ensure you do not have accidental
5	Spray water on to the surface of the paper.	
6	Move the head back to the platen and lower it to the surface.	Place the head in a location that has the rings at the far back right edge of the bottom platen as shown in the picture below.

Step	Action	Notes
7	Place the samples in the holders.	
8	Press lower pistons on the head.	
9	Verify recipe parameters.	See the default parameters listed below under Standard Recipes
10	Press Start on both the head and the base to run the polish.	Use caution to ensure that the head does not catch and run over to the side of the polish wheel.
11	Monitor polishing to ensure there is enough water to maintain polishing. Inject water as needed with the spray bottle.	
12	After completing polishing raise the pistons and remove the samples.	
13	Raise the head carefuly clean the wheel and head. Rinse extra slurry down the drain.	
14	If you are going to polish with slurry and the felt pad on the left wheel, place the cover on the right wheel before starting.	
15	For polishing with slurry and felt, use concentrations, forces and speeds optimized for your particular sample type.	
16	After polishing with slurry and felt, use the rubber scraper and lots of water to move all the slurry off the felt, and then rinse and clean thoroughly.	
17	Return the polisher condition to the standby condition, as you found it.	Clean up your mess, every time!

Pace Pico 155 Precision Saw - How to cut a sample:

Step	Action	Notes
1	**This general procedure is also described in the following video:**	https://www.youtube.com/watch?v=TNu3zlRVVmY
2	Turn on the cutter with the power switch on the back of the tool.	
3	Turn on the machine by pressing the on button on the front and adjust rpm to 100.	
4	Test the stopper switch to make sure it stops cutting and the beeper sounds when it is activated.	
5	Clamp the sample and ensure that it is securely mounted.	

Step	Action	Notes
6	Make sure the cutting fluid is above minimum in the fluid reservoir.	
7	Use the dressing stone to condition the blade at 2-300 rpm if cutting time is slow compared to previous cuts. Dressing at higher rpm's will only cut the dressing stone and not effectively condition the blade.	
8	Gently lower the arm so that the sample is resting on the blade and turn on the blade at 100 rpm.	
9	After cutting is stable and the initial cut is started, you can gradually increase the blade speed to up to 1000 rpm's.	
10	After cutting is complete, remove sample and clean the cutting tool thoroughly and then power down. **Be sure to leave the cutter clean for the next person to use!**	If set up correctly, the switch will stop the blade and the beeper will sound when the cut is complete.

Standard or Example Recipes

Pace automated polisher default settings:

- Pressure = 50psi
- Base speed = SPL = low = 100 rpm
- Head speed = 100 rpm

- Wheel direction = counterclockwise ().
- In general, matched rotation direction and speed between the base and the head give the flattest polish surface.

Pace automated polisher automated recipes and non-standard polishing conditions:

Refer to the Pace NANO 1000T/Femto 1100 manual, pages 27-43, for guidelines.

Basic Troubleshooting

General:

Refer to the Pace manuals for general troubleshooting guidelines.

Attachments

Consumables and supplies:

For the Leco polisher, ATAMI has a large number of available papers that can be used.

For the Pace equipment, ATAMI has a limited amount of basic materials (slurry, mounting resin, blades,..) available, but you will need to identify and purchase consumables as needed for your specific applications.