

Standard Operating Procedure – Simplimet 3 Specimen Mounting Press

About this SOP

This document provides a step-by-step procedure for mounting a specimen using the Buehler Simplimet 3 automatic specimen mounting press. General familiarity with the objectives and methods of mounting metallographic specimens is assumed. Even so, you should have a experienced person show you how to use this press. This could save you much time and frustration and will ensure the best possible results with the least effort and expense.

About the Simplimet 3 Automatic Mounting Press

The Simplimet 3 is an automatic electro-hydraulic specimen mounting press. To mount a specimen the operator simply loads the press, starts the automatic molding sequence and returns 7 to 20 minutes later to remove a cool mounted sample. The essential specifications of the Simplimet 3 include a maximum 200°C molding temperature which can be specified in 10°C steps, 0 to 4400 psi mounting pressure in 10 psi steps, 1 second to 30 minute molding time and a 100 psi pre-load. In addition, all controls and readouts are digital. Molding media can be a phenolic, diallyl or acrylic, any of Buehler's molding powders or premolds. The mold diameter is 1¼-inches.

Operating Precautions

- C Keeping the press clean is very important. A buildup of mounting compound residue can seriously effect the performance of the press, generally either causing the ram to stick in the cylinder, with your specimen, or making it difficult to open and close the cylinder.
- C Consider the mounting pressure and temperature used in the mounting process before attempting to mount a specimen. It might be more appropriate to use a cold-mounting system instead of this press.
- C Use only approved molding compounds and release agents.
- C Always be careful to not scratch or dent the cylinder or the ram. Never use sandpaper or hard sharp tools to clean these parts.
- C Never put flammable or otherwise hazardous materials in the press.
- C Never attempt to clean the press using solvents. These will damage the case and, if they leak into the press, could ignite.

Procedure for Mounting a Specimen

Preliminary

- C Inspect the mounting press. It should be clean, especially cylinder and the upper and lower rams, and all tools and parts should be on hand.
- C Make sure the process cooling water is running and that the valves are open.
- C Turn on the press.

Prepare the Molding Compound

- C Select the appropriate molding compound. See tables 1 and 2.
- C If using a powder, measure out enough (typically 20 ml) to fully encase your specimen. See figure 1.

Load the Specimen and Mounting Compound

- C Raise the ram to the top of the cylinder.
- C Every 20 specimens or so you should coat the inside surfaces, rams and threads with mold release.
- C Place your specimen in the center of the ram.
- C Lower the ram until it is low enough to add the molding compound.
- C Add the molding compound. If the molding compound is in powder form please use a funnel to avoid spilling it down the outside of the cylinder or on the threads.
- C Close the cylinder by inserting the upper ram, tightening the fixture and then backing it off ¼-turn.

Program the Mounting Press

- C Set the mold size to 1¼ inches.
- C Set the temperature, pressure, time and other parameters per table 3.

Start the Mounting Process

- C Double check everything.
- C Press RUN to start the process.
- C While waiting you can monitor the pressure and temperature via the bar-graph displays. Once the correct temperature has been reached the time will start counting down. At the end of the process the heater will be turned off and the cooling water will, if AUTO was selected, help to cool the cylinder. When finished a bell will sound and the “COMPLETE” LED will light.

Remove the Specimen

- C Unscrew the fixture and remove the upper ram.
- C Raise the lower ram.
- C Remove the specimen.
- C Clean up all molding compound/residue.

Finish Up

- C Clean up the work area.
- C Replace all tools and molding compounds.
- C Turn off the press.
- C Leave the cooling water valves open.

Table 1. Features of Different Classes of Molding Compounds.

Thermosetting			Thermoplastic
Phenolics	Diallyls	Epoxies	Acrylics
Fast cycle Economical Easy to use High shrinkage Low hardness Poor edge retention	High hardness Chemically resistant Moderate shrinkage	High hardness Low shrinkage Chemically resistant	Transparent Low initial pressure Slow cure Fair hardness Defect prone Low chemical resistance

Table 2. Buehler Molding Compounds.

Buehler Mounting Compounds			
Material	Colors	Filler	Cost per Specimen ¹
Thermosetting Powders			
Phenolic Powder	Black, red, green	Wood flour	\$ 0.03
Diallyl Phthalate	Blue	Mineral	\$ 0.14
Diallyl Phthalate	Blue	Short glass fiber	\$ 0.18
EPOMET [®]	Black	Epoxy	\$ 0.12
Thermosetting Premolds (1¼ inch)			
Phenolic	Black, red, green	Wood flour	\$ 0.27
Conductive Mounting Powders			
KONDUCTOMET [®] II	Green	Aluminum	\$ 0.13
KONDUCTOMET [®] I	Black	Carbon	\$ 0.25
Thermoplastic Mounting Material			
TRANSOPTIC [™]	Transparent	None	\$ 0.07fs

¹Based on 20 ml of powder per specimen and winter 1995 prices.

Table 3. Recommended Molding Schedule for Buehler Molding Compounds.

Material	Temperature °C	Pressure psi	Time minutes	Pre-load	Auto Cooling
Phenolic	150	4200	2	Off	Yes
Diallyl Phthalate	150	3000	2	Off	Yes
EPOMET®	150	3000	1.5	Off	Yes
KONDUCTOMET®II	150	4200	2	Off	Yes
KONDUCTOMET®I	150	4200	1.5	Off	Yes
TRANSOPTIC™	160	4400	8	On	Yes

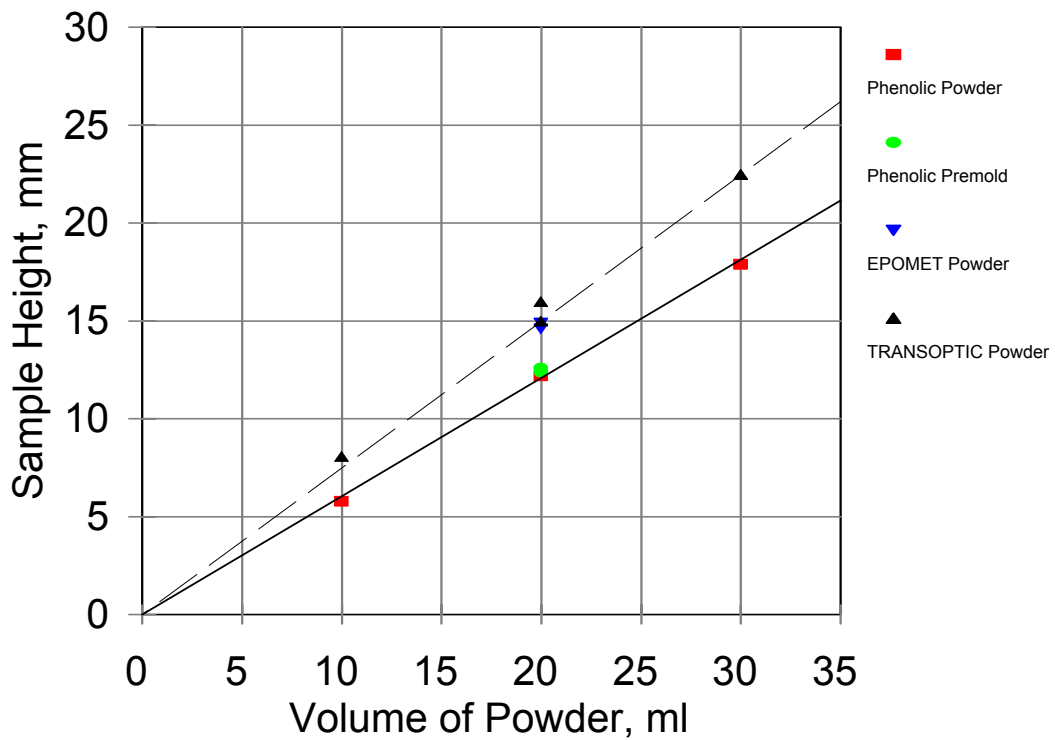


Figure 1. Height of pressed molding compound as a function of volume of powder.