



**BUEHLER**

*Strong Partner, Reliable Solutions*



A complete line of Epoxy  
Mounting Systems, Equipment  
& Accessories

# Epoxy Mounting Guide



[www.buehler.com](http://www.buehler.com)

# WHY IS MOUNTING IMPORTANT?

## Sample Quality

Mounting metallographic samples helps to protect and preserve edges during metallographic preparation. Maintaining specimen edges is crucial when evaluating the material surface.

## Automation

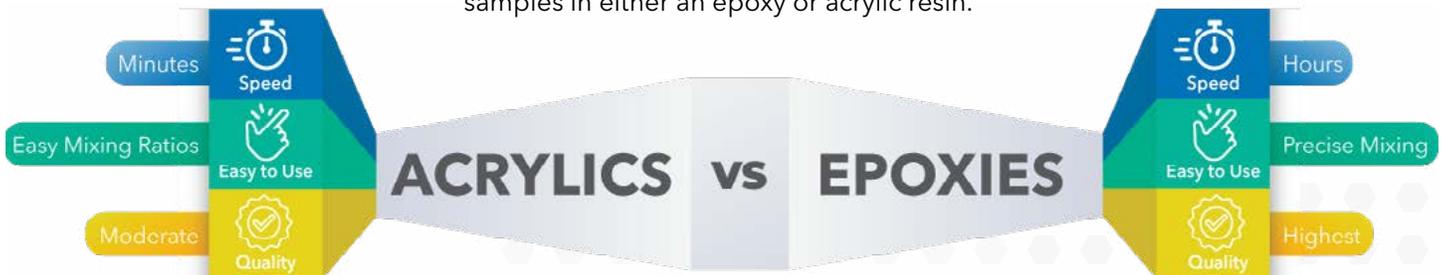
Mounting enables automation of preparation processes, quality of material preparation, and eliminates subjectivity of operator. A secondary benefit of mounting is ease of handling during the preparation process in the event manual preparation is performed.

## What is Proper Mounting?

The mounting process should not cause any damage to the microstructure of the specimen. It is important to understand what conditions will adversely affect the material being mounted and to choose a mounting technique accordingly.

## Castable Mounting Systems

Recommended for mounting specimens that are sensitive to heat and/or pressure. The term "castable mounting" refers to mounting samples in either an epoxy or acrylic resin.

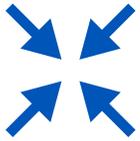


Not sure if epoxies are right for you? Learn more about Buehler's acrylic mounting systems on our website.



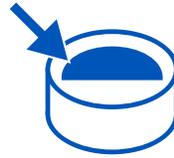
# Castable Mounting with Epoxies

Epoxy mounting involves the mixing of a resin and hardener to be poured into a mounting cup. A variety of products are available to meet different needs for hardness, edge retention and cure time. Epoxy media is preferred when you need excellent infiltration and minimal shrinkage gaps.



## Shrinking

Shrinkage gaps between the mounting media and the specimen may entrap abrasives that can become dislodged during subsequent preparation steps, contaminating the polishing cloth and causing damage to the sample surface. These gaps can also entrap suspensions, water, or etch solutions that may bleed out after preparation and obstruct clear view of the sample surface. Excessive shrinkage can even cause separation of layers or coatings and a loss of edge-retention. A mounting media with low shrinkage and better adhesion to the specimen provides a higher quality mount and improved edge retention.



## Edge Retention

Edge retention is the capability of mount media to preserve edge information on the encapsulated sample. Ideally, the media and sample abrade at a comparable rate. When the abrasion rate between the media and sample differs, the two are in different planes at their interface. This complicates inspection of the sample near the edge due to difficulty of focus in this region. For epoxies, electroless Nickel or Flat Edge Filler particles can be added to the system to increase edge retention.



## Chemical Resistance

Metallurgical samples that are intended to be etched after preparation require chemical-resistant mounting compounds that resist the attack of acidic and caustic solutions.



## Infiltration

Infiltration refers to the mount media's capability to infiltrate sample features during molding. Porous materials, or those with cracks and fine features are best mounted using media with an excellent flow capable of filling these areas. Infiltration is greatly improved by using epoxy medias with vacuum mounting systems. Follow the link to learn more.



## Cure Time

Epoxies have cure times that can vary greatly. Faster cure times are often associated with higher peak temperatures. Cure times can sometimes be improved for epoxies when used in conjunction with an oven.



## Conductivity

Conductive media is useful when material characterization includes electron microscopy. To obtain electrical conductivity, conductive filler can be added to epoxy. This assists in the elimination of charging, the collection of current on the sample surface that interferes with imaging.



## Color & Identification

Color of mount media is useful for quick identification of a particular type of sample, and to create contrast under the microscope. Epoxies are typically clear, but color pigments can be added as needed.



## Peak Exotherm

Some samples need to be protected from excessive heat. Low exotherm products should be used for heat sensitive samples. Consider the peak exotherm of each epoxy before media selection.



## Clarity

Clarity of media may be essential for viewing a particular region of interest during preparation, such as when cross-sectioning to a specific plane.

# Epoxy Systems

## Selecting the Right Compound

Buehler epoxies are formulated to excel in a wide variety of applications. Whether the priority is speed, pore penetration, or low curing temperature, there is a Buehler epoxy suited for every sample type.

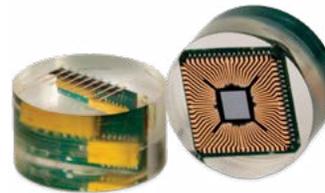
EpoKwick® FC



EpoThin® 2



EpoxCure®



EpoHeat® CLR



## Epoxy System Selection Guide

		Cure Time	Peak Exotherm	Shore D	
	Material	Properties			
General Purpose	EpoxCure® 2	General-purpose mount media with an excellent balance of good hardness and low shrinkage.	6 hrs @ room temp	104°F [40°C]	80
Specialty	EpoKwick® FC	Combines very low viscosity and extremely low shrinkage with good hardness and a fast cure. EpoKwick FC is the fastest Buehler epoxy without use of an oven.	2 hrs @ room temp	250°F [121°C]	82
	EpoThin® 2	Combines low viscosity and low cure temperature with strong adherence and good pore penetration	9 hrs @ room temp	149°F [65°C]	78
	EpoHeat® CLR	When peak exotherm is not of concern, EpoHeat saves time when used in conjunction with an oven, providing strong sample infiltration for porous materials and materials with fine features	1 hr @ 149°F (65°C)	324°F [162°C]	82

## Epoxy Mounting Tips

- Some epoxies can be cured more quickly by gently heating, which accelerates exothermic reactions. Use caution using excessive heat.
- When mixing, tilt the cup containing the resin and hardener slightly and gently work the resin and hardener together using a lift and stir motion.
- To get the best results, use a vacuum system to evacuate air from samples and pour under vacuum. This best fills gaps and pores in the specimen with epoxy. Cycling the vacuum greatly improves penetration of the sample.
- Epoxies are sensitive to the ratio of resin and hardener. Be sure to follow the recommended mixing ratio for each product. Measuring by mass is recommended, especially when mixing small quantities.
- Epoxy systems are sensitive to shelf life, which depends on proper storage. Keep out of excessive high or low temps and extreme humidity. It is good practice to date your containers when received





### Selection Guide Notes

Values are compared to other Buehler medias and based on a one to three scale. Best values are ranked as a value of three.

Edge Retention	Viscosity/Infiltration	Shrinking	Recommended Use
			<b>Recommended Use</b>
★	★	★★	For general applications, particularly when low viscosity isn't required. Also ideal when using heat sensitive samples
★★	★★★	★★★	Aerospace coatings and other porous samples insensitive to heat.
★	★★	★★	For vacuum impregnation of intricate parts including heat sensitive materials such as electronic boards
★★	★★★	★	When processing large quantities of samples, large volume mounting, vacuum impregnation or applications which require a long pot life

## Partner with **Buehler** for your Success

Buehler's Material Scientists are experts in listening. Our team takes a consultative approach to address specific goals for the materials lab including minimizing training time, minimizing rework, or minimizing the total cost/number of steps in a process. Our applications experts frequently process samples in our labs giving them first-hand knowledge of not only the science but also the day-to-day challenges that materials labs can face. Our solutions strive to remove complexity from the preparation and analysis process making improvements easier to implement and easier to maintain.

- Worldwide support labs
- Buehler SumMet Guide
- TechNotes and SumNotes
- Seminars, webinars, and classes



Contact our Lab!



Register for Webinars

# Mounting Ordering Information

Material	Small Resin & Hardener		Large Resin & Hardener	
	Resin	Hardener†	Resin	Hardener†
EpoKwick® FC mix ratio 4:1 by volume			20-3453-128 128oz [3.8L]	20-3453-032 32oz [0.95L]
EpoThin™ 2 mix ratio 2:1 by volume	20-3440-032 32oz [0.95L]	20-3442-016 16oz [0.48L]	20-3440-128 128oz [3.8L]	20-3442-064 64oz [1.9L]
EpoxiCure® 2 mix ratio 4:1 by volume	20-3430-064 64oz [1.9L]	20-3432-016 16oz [0.48L]	20-3430-128 128oz [3.8L]	20-3432-032 32oz [0.95L]
EpoHeat® CLR mix ratio 4:1 by volume	20-3423-064 64oz [1.9L]	20-3424-016 16oz [0.48L]		

† Restricted article, requires special packaging

## Pigments & Fillers

### Pigments



For color coding or creating contrast between the specimen and the mount. Contrast is most apparent when viewing the specimen in darkfield mode

20-8505 Black, 1.5oz [45mL]  
20-8506 Red, 1.5oz [45mL]  
20-8507 Blue, 1.5oz [45mL]

### Flat Edge Filler



Enhances edge retention in castable mounting systems, recommended when mounting very hard materials for edge examination

20-8196 1 lb [0.45kg]

### Conductive Filler



Nickel-based filler makes castable mounting systems conductive, for use in SEM and electropolishing applications.

20-8500 2 lb [0.9kg]

## Mounting Clips & Clamps



**SampKlip Support Clip**  
20-4000-100 Stainless Steel (qty 100)



**UniClip Support Clip**  
20-5100-100 Clear Plastic (qty 100)  
113043 Black Plastic (qty 100)

## Plastic Ring Forms



Provides a stronger fit of the castable mount to the sample holder for polishing in central force mode. (Qty 100)  
\*Not recommended for acrylics

20-8151-100 1in  
20-8152-100 1.25in  
20-8153-100 1.5in  
20-8154-100 2in

## Release Agents

Apply release agent or mold release powder to the upper and lower molds rams at the end of each shift or day of use to reduce potential of mount media sticking to mount mold.



**Release Agent** - A light petroleum distillate liquid that is applied with a swab.

20-8186-004† 4oz [120mL]  
20-8186-032† 32oz [950mL]

† Restricted article, requires special packaging



**Mold Release Powder** - Non-hazardous wax powder that is applied using a brush.

20-3048 2oz [45g]

**Mold Release Spray**  
20-3050-008 8oz [0.24L]



Click to view our wide range of mounting cups.



# Epoxy Mounting Equipment

## SimpliVac®

### SimpliVac is designed to optimize your epoxy mounting process

The SimpliVac provides superior pore impregnation with an easy-to-use format and multi cycle feature. Tested with Buehler's epoxies for optimal results, the SimpliVac enhances edge retention and epoxy penetration.

### Easy to Use Programmability

The ability to set your vacuum level, time under vacuum, and the number of cycles under vacuum allows for more control over the mounting process than ever before, resulting in consistent, reliable results.

### High Efficiency

The SimpliVac utilizes a large chamber diameter for a high volume of samples to be processed, while the sample tray also provides ample room for large or stacked samples to fit easily in the chamber.

### Simple Dispensing

Use dispensing tubes and the built-in rotating turn table to dispense epoxy while under vacuum.



### Accessories



Dispensing tubes  
(Qty 100)  
20-1551



Vacuum Bowl Liner  
(Qty 5)  
20-1553



Vacuum Tray Liner  
(Qty 100)  
20-1555

Part Number	Voltage/Frequency
20-1500	100-240 VAC/ 50-60 HZ, Single Phase

## Industry Highlight: Aerospace

### Optimizing your sample infiltration with the SimpliVac

Buehler knows applications for aerospace manufacturing require the highest quality of sample preparation to ensure repeatability and reproducibility of results. We've developed strong relationships with industry leaders and created long lasting, trusted partnerships.

As complexities in aerospace materials increase, there is a constant push for higher performance. Efficient sample preparation that is reproducible helps our partners consistently achieve reliable results in a fast-paced industry.



### SimpliVac Short Cycles

Using multiple short cycles during vacuum impregnation ensures optimized impregnation of epoxy in delicate and porous samples. The SimpliVac is also the only unit on the market that does not require any interference when moving to each step of the vacuum cycle, freeing up technician time and shortening the overall process time.

Sample mounted without vacuum



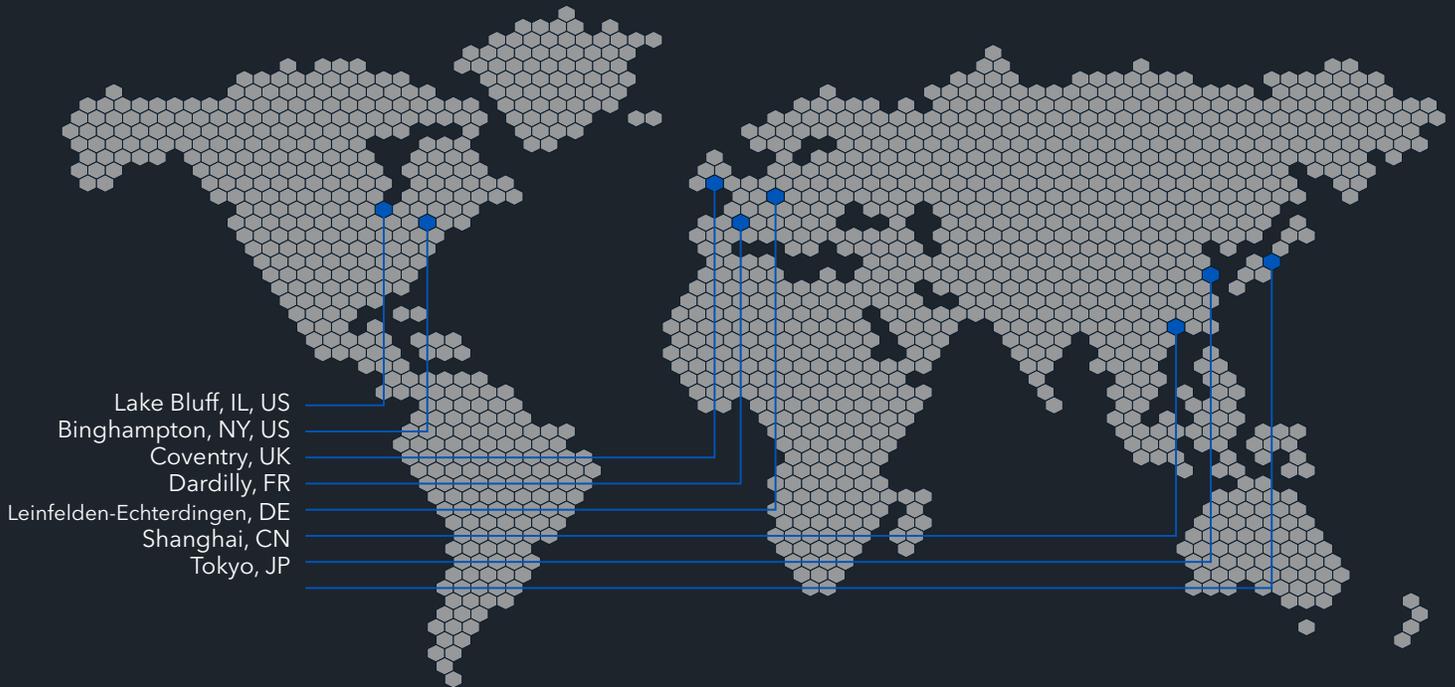
Sample mounted for 3 min, 1 cycle



Sample mounted for 3 min, 3 cycles



# Buehler Worldwide Locations



Solutions for Materials Preparation, Testing and Analysis

## **BUEHLER**

41 Waukegan Road, Lake Bluff, Illinois 60044  
P: 847 295 6500 | 800 BUEHLER (800 283 4537)  
W: [www.buehler.com](http://www.buehler.com) | E: [info@buehler.com](mailto:info@buehler.com)

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