BUEHLER

# Mounting
## Application Guide

A complete line of Mounting Systems, Equipment and Accessories

*Strong Partner, Reliable Solutions*

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# WHY IS **MOUNTING** IMPORTANT?

## Edge Retention

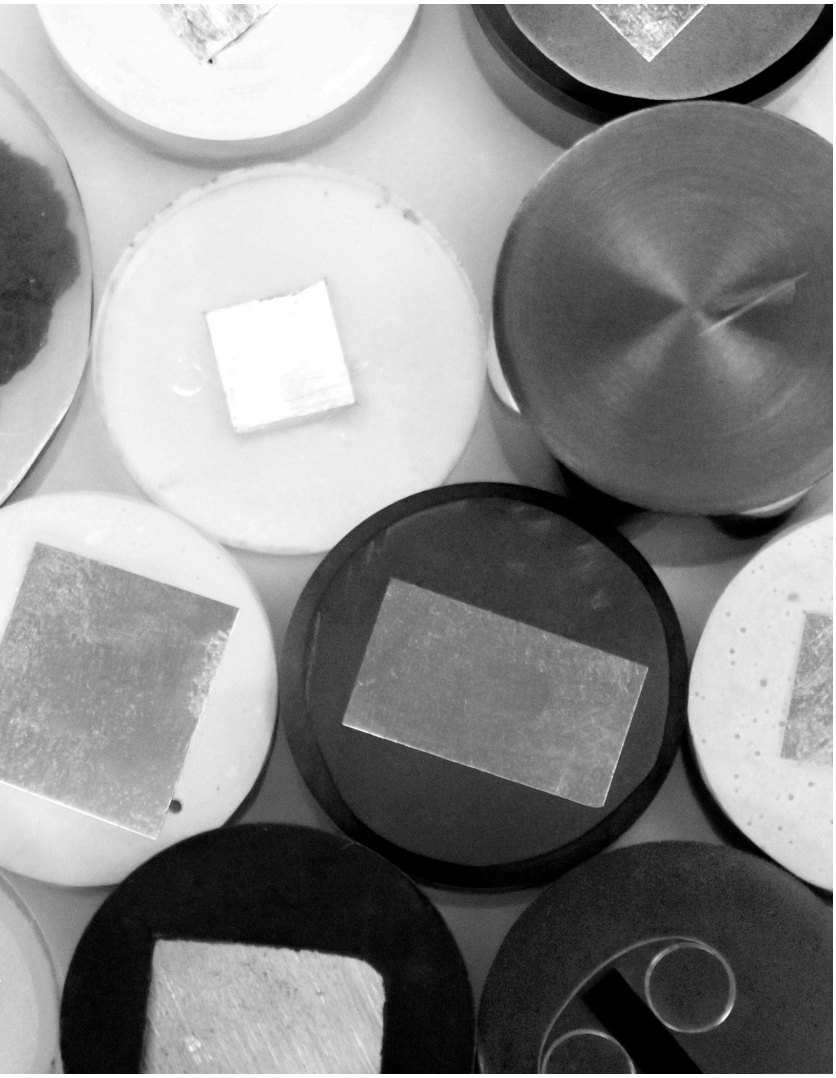
Mounting metallographic samples helps to protect and preserve edges during metallographic preparation. Maintaining specimen edges is crucial when evaluating the surface for structural integrity.

## Ease of Handling

A secondary benefit of mounting is ease of handling during the preparation process. Mounted samples are easier to handle for manual polishing and can be processed using an automated grinder-polisher.

## What is Proper Mounting?

The mounting process should not cause any damage to the microstructure of the specimen. Pressure and heat are the most likely sources of damage during the mounting process. It is important to understand the material being mounted and choose an appropriate method.



# MOUNTING Methods

## Compression Mounting

Compression mounting uses a mounting press to apply heat and pressure to encapsulate the sample in a mounting compound. This technique provides excellent edge retention which protects and preserves the edges during the preparation process. Compression Mounting is the preferred method for processing a high volume of **samples that are not susceptible to heat or pressure.**

## Castable Mounting

Epoxy and acrylic castable mounting systems involve mixing of components and pouring into mounting cups. Standard systems do not require pressure or external heat to mount specimens although some specialty systems do. A variety of products are available to meet different needs for hardness, edge retention and cure time. Castable Mounting is recommended **for specimens that can be damaged by high temperatures or pressures** and labs processing a lower volume of samples.

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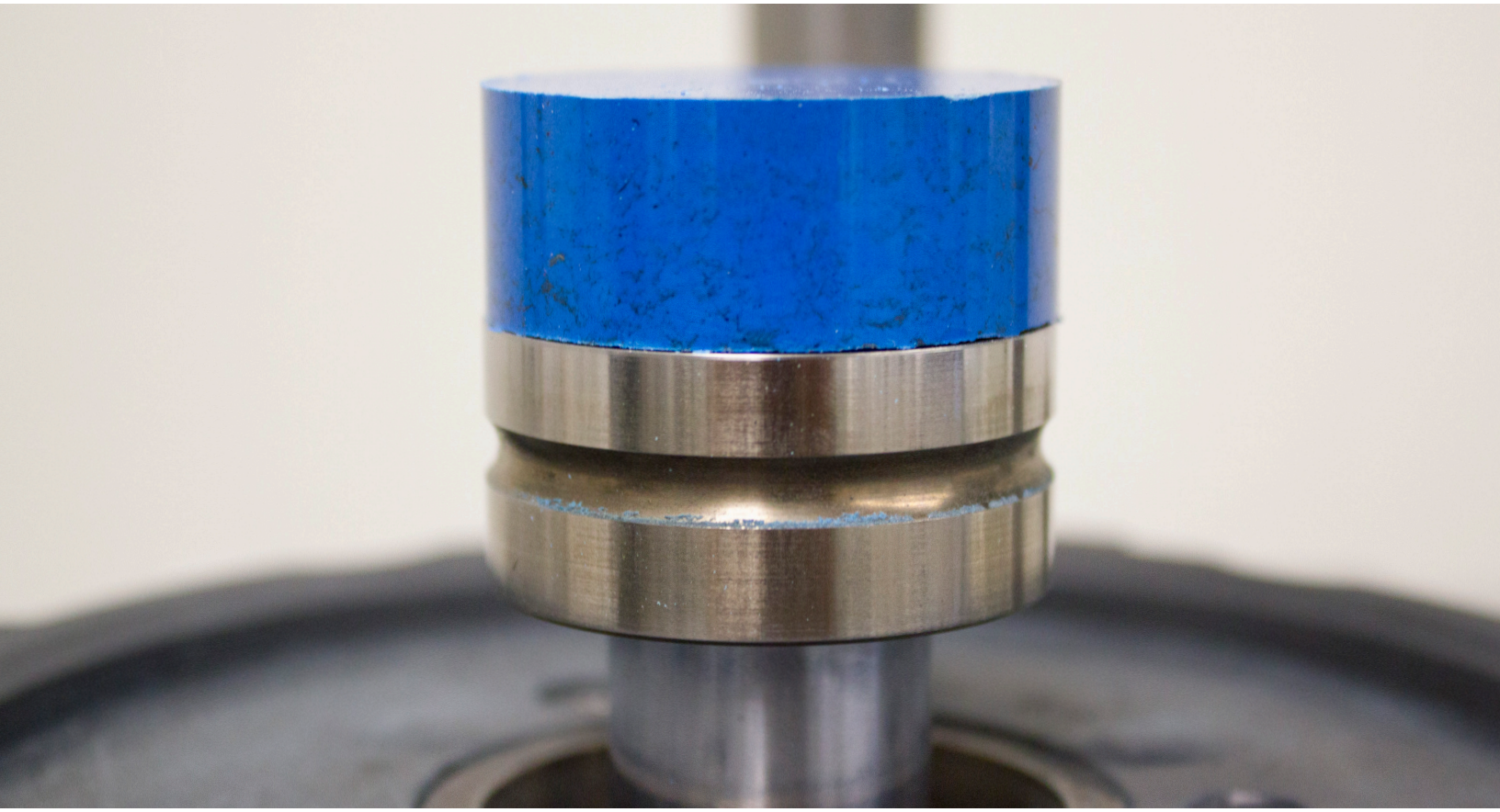
# COMPRESSION **MOUNTING**

Compression Mounting is the preferred method for optimal edge preservation and highest process throughput. Buehler carries compression mounting equipment and compression mounting compounds designed to fit the varying needs of different labs.



## Compression Mounting Equipment


### SimpliMet™ 4000

**High reliability in 24/7 use envirionments**
The SimpliMet 4000, was tested in extreme conditions, and simulated the duty cycle of the busiest labs in the world, providing high reliability in continuous use environments.

**Optimize Productivity in Your Space**
The SimpliMet 4000 packs fast mounting cycles into limited bench space, optimizing productivity. Fast duplex mounting allows two mounts to be made during the same cycle with negligible increase in cycle time.

**Ease of use saves time and protects sample quality**
Simple user interface eliminates errors and protects the quality of your sample prep. Everything you need is right on the front panel. Use your press out of the box without the wait.

# Compression Mounting Compounds

### Selecting the Right Compression Compound

When selecting a compression mounting compound, it is important to consider the hardness of the material, conductivity requirements, further analysis needs and clarity level.

| Material | Recommended Use | Color | Hardness (Shore D) | Edge Retention |
|---|---|---|---|---|
| PhenoCure™ | General purpose metallography | Black, Red, Green | ~88 | Good |
| Diallyl Phthalate – Mineral Filled | Moderately hard material | Blue | ~91 | Better |
| Diallyl Phthalate – Glass Filled | Moderately hard material for etching | Blue | ~91 | Better |
| EpoMet™ G (Granular) | Very hard material | Black | ~94 | Best |
| EpoMet™ F (Fine) | Very hard material with complex geometries | Black | ~94 | Best |
| TransOptic™ | When transparency of the mount is useful | Clear | ~80 | Good |
| KonductoMet™ | SEM analysis when carbon is not the object of analysis | Black | ~88 | Good |
| ProbeMet™ | SEM analysis when copper is not of interest | Copper | ~94 | Better |

**PhenoCure™**

**Diallyl Phthalate**

**EpoMet™**

**TransOptic**

**KonductoMet**

**ProbeMet**

# Compression Mounting Tips

You can minimize shrinkage and improve edge retention by cooling the mount to room temperature under pressure before removing it from the mounting press.

Uncured mounts can be caused by too much moisture in the mounting compound. Make sure to properly close the container between uses.

Radial splitting of mounts is often caused by sharp edges on the sample or by samples that are too large for the mold. Round off sharp corners and move the specimen farther from the edge of the mount.

Bulging or soft mounts are caused by insufficient cure times. Increase the cure time.

Unfused or frosted mounting compound is often a sign of insufficient molding temperatures or pressures. Ensure the temperature and pressure settings on the mounting press match the recommendations for the compression compound being using.

# CASTABLE **MOUNTING**

Epoxy and Acrylic castable systems are recommended for mounting specimens that are sensitive to high pressures and temperatures. Epoxy systems provide good physical adherence, low shrinkage and excellent infiltration into pores and cracks. Acrylic systems are typically selected for their short cure times.

## Epoxy Systems

### EpoKwick™ FC

**Spend less time preparing and more time analyzing.**

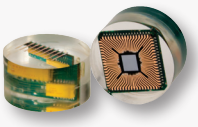
- Combines very low viscosity and extremely low shrinkage with good hardness and a fast cure.
- Obtain the best sample prep quality even with highly porous samples.
- Recommended for Aerospace coatings and other applications with porous samples.

### EpoThin™ 2

**Protect samples with this gentle low cure temperature epoxy**

- Combines low viscosity and low cure temperature
- Provides strong adherence and good pore penetration.
- Can be used with larger mounting cups

### EpoxiCure™ 2



**General purpose epoxy system optimized for routine application**

- A balanced formula providing good hardness and low shrinkage
- Can be used with larger mounting cups

### EpoHeat™ CLR

**Save time with long pot life**

- Can remain mixed at room temperature for 3 hours and cures in 60 minutes in the oven.
- Water-like viscosity when heated

| Material | Cure Time | Viscosity* | Shrinkage* | Shore D Hardness | Peak Exotherm |
|---|---|---|---|---|---|
| EpoKwick™ FC | 2hrs @ room temperature | Best | Best | ~82 | 250°F [121°C] |
| EpoThin™ 2 | 9hrs @ room temperature | Better | Better | ~78 | 149°F [65°C] |
| EpoxiCure™ 2 | 6hrs @ room temperatures | Good | Better | ~80 | 104°F [40°C] |
| EpoHeat™ CLR | 1hr @ 149° F(65°C) | Best | Good | ~82 | 324°F [162°C] |

**values compared with other epoxies*

## Cast N' Vac Vacuum System

This vacuum system offers excellent pore impregnation. As a result, edge retention is enhanced and friable samples are supported during grinding and polishing.

### Optimized pore impregnation

- The unique dispensing mechanism with a built in rotating turn table allows pouring epoxy while under vacuum.

### High efficiency

- Large vacuum chamber allows for 11, 1.5in molds to be processed simultaneously.
- The rugged vacuum pump supplies ample vacuum pull down to quickly evacuate trapped air from any porous specimen while the patented, high strength plastic chamber maintains vacuum throughout the impregnation period.



# Acrylic Systems

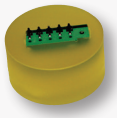
### SamplKwick™

SamplKwick offers quick cure times and excellent wetting characteristics making it ideal for electronics and PWB applications.

### VariKleer™

VariKleer produces a crystal clear mount when cured under pressure making it ideal for applications where clarity is required.

### VariDur™ 10



VariDur 10 is a general purpose acrylic system offering a semi-transparent mount with a reduced odor while curing.

### VariDur 200

VariDur 200 is a quick curing acrylic with good edge retention that is ideal for mounting hard materials.

### VariDur 3003

VariDur 3003 is a three-part acrylic with minimal shrinkage and high hardness making it ideal for edge retention applications.

| Material | Cure Time | Viscosity* | Shrinkage* | Shore D Hardness | Peak Exotherm |
|---|---|---|---|---|---|
| SamplKwick™ | 5-8min @ room temperature | Better | Good | ~85 | ~179°F [81°C] |
| VariKleer™ | 5-15min @ room temperature | Better | Good | ~84 | ~212°F [100°C] |
| VariDur™ 10 | 8min @ room temperature | Good | Good | ~80 | ~212°F [100°C] |
| VariDur 200 | 5-8min @ room temperature | Good | Better | ~85 | ~212°F [100°C] |
| VariDur 3003 | 15-30min @ room temperature | Good | Best | ~90 | ~252°F [122°C] |

**values compared with other acrylics*

# Castable Mounting Tips

## Epoxy Tips

- Some epoxies can be cured more quickly by gently heating, typically at 30-40° C. Use caution as higher cure temperatures can cause excessive heating during curing.
- 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 evaucate air trapped in epoxy systems and samples. This reduces or elimates the gap at the sample/epoxy interace, fills pores in the specimen with epoxy and enhances the end result.
- Epoxies are sensitive to the ratio of resin and hardener. Be sure to follow the recommended ratio for each product.

## Acrylic Tips

- Acrylics cure quickly so it is recommended to pour the mixture into the mold immediately after mixing to prevent "gelling".
- Acrylic systems are not for use with Vacuum Systems or Disposable Mounting Cups.
- To improve edge retention for acrylic systems, coat the sample in the liquid hardener before pouring in mixed compound.

# MOUNTING ACCESSORIES

A wide variety of mounting accessories are available depending on the specimen being mounted, the mounting method chosen, and the goals of final analysis.

## Release Agent

Release agent is used with both compression and castable mounting systems for easier removal of mounts.

### Release Agent

Liquid release agent for rapid application and drying on castable mounting molds or compression mounting presses.


### Mold Release Spray

Water-based spray release agent for use on castable mounting molds

### Mold Release Powder

Powder release agent for use on mounting presses


## Pigments & Filler

Pigments and fillers are added to castable mounting systems to change the color or performance of the systems.

### Pigments for Castable Systems

For color coding or creating contrast between the specimen and the mount

### Flat Edge Filler

Enhances edge retention in castable mounting systems.


### Conductive Filler

Nickel-based filler makes castable mounting systems conductive

## Support Clips

Support clips are used to support specimens during mounting. The material, size and weight of the clips should be considered when selecting a clip.

### SamplKlip Support Clip


For use with all mounting systems.*

**Material:** Stainless Steel
**Weight:** 0.575g
**Qty:** 100
**Size:** 0.25 H x 0.550 W x 0.350in L
[6 x 14 x 9mm]

### Specimen Support Clip


Best for castable mount systems.†

**Material:** Plastic
**Weight:** 0.145g
**Qty:**1000
**Size:** 0.25 H x 0.290 W x 0.375in L
[6 x 7 x 9.5mm]

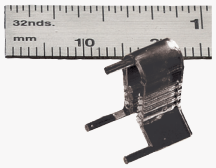
### SamplKlip I Support Clip


Best for castable mounting systems.*

**Material:** Plastic
**Weight:** 0.230g
**Qty:** 100

**Size:** 0.25 H x 0.475 W x 0.3in L
[~6 x 12 x 8mm]
**Size:** 0.25 H x 0.425 W x 0.25in L
[~6 x 11 x 6mm]

### UniClip Support Clip




For use with all mounting systems. Orient with "legs" upward for compression mounting.†

**Material:** Plastic
**Weight:** 0.290g
**Qty:** 100
**Size:** 0.4 H x 0.360 W x 0.500in L
[10 x 9 x 13mm]
**Color:** Clear or Black

** Compatible with specimens up to 0.200in [5mm] thick*

*† Compatible with specimens between 0.0035 – 0.090in [0.9 – 2.3mm]*

## Mounting Cups

Mounting cups are used with castable systems and selection dpends on the size and shape of the mount.

### SamplKup™

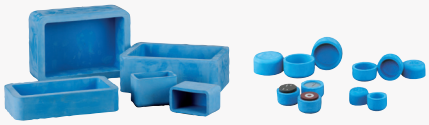
Best dimensional stability and suitable for use with all Buehler castable systems.
**not for use in ovens**

### Disposable Mounting Cups

Best for mounting low exotherm castable systems like EpoxiCure™ 2 and EpoThin™ 2

### EPDM Round & Rectangular Molds

Suitable for use with all Buehler castable systems. Best choice for large, rectangular mounts and for curing mounts in ovens



### Mixing Cups & Stirring Sticks

For mixing and stirring castable mounting systems

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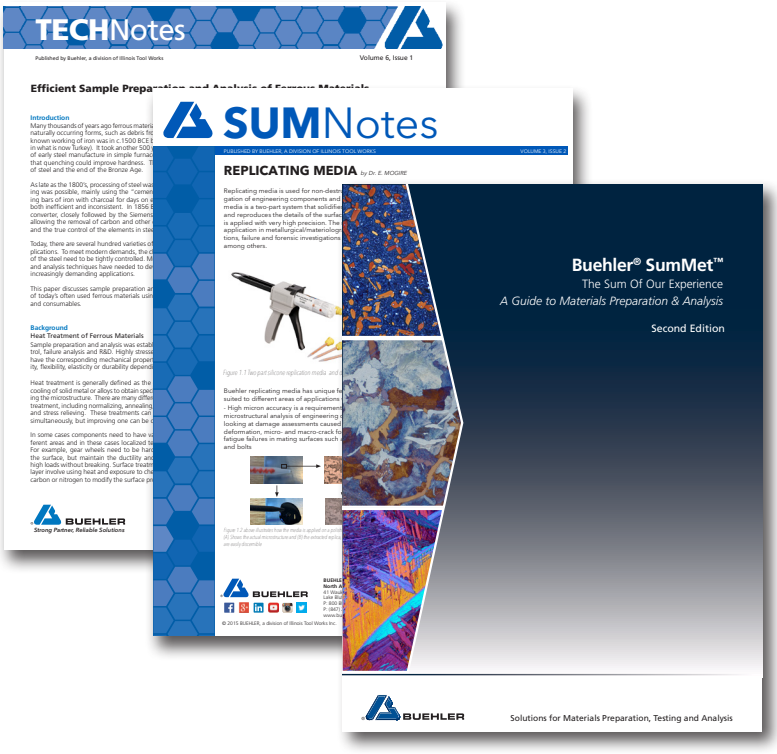
- Seminars, Webinars and Classes



# MOUNTING ORDERING INFO

## Compression Mounting Compounds

### General Purpose Compounds

| | Color | Part Number | Size |
|---|---|---|---|
| PhenoCure Powder | Black | 20-3100-080 | 5 lbs [2.3kg] |
| | | 20-3100-400 | 25 lbs [11.3kg] |
| | | 20-3100-500 | 40 lbs [18.1kg] |
| | Red | 20-3200-080 | 5 lbs [2.3kg] |
| | | 20-3200-400 | 25 lbs [11.3kg] |
| | | 20-3200-500 | 40 lbs [18.1kg] |
| | Green | 20-3300-080 | 5 lbs [2.3kg] |
| | | 20-3300-400 | 25 lbs [11.3kg] |
| | | 20-3300-500 | 40 lbs [18.1kg] |
| PhenoCure Premolds | Black | 20-3111-501 | 1in [25mm] |
| | | 20-3112-501 | 1.25in [32mm] |
| | | 20-3113-501 | 1.5in [38mm] |
| | | 20-10090 | 1.75in [45mm] |
| | Red | 20-3212-501 | 1.25in [32mm] |
| | | 20-3213-501 | 1.5in [38mm] |
| | Green | 20-3312-501 | 1.25in [32mm] |
| | | 20-3313-501 | 1.5in [38mm] |
| EpoMet G | Black | 20-3380-064 | 4 lbs [1.8kg] |
| | | 20-3380-160 | 10 lbs [4.5kg] |
| | | 20-3380-400 | 25 lbs [11.3kg] |
| | | 20-3380-500 | 40 lbs [18.1kg] |
| Diallyl Phthalate | Blue | 20-3330-080• | 5 lbs [2.3kg] |
| | | 20-3340-080* | 5 lbs [2.3kg] |

*Glass Filled •Mineral Filled

### Specialty Compounds

| | Color | Part Number | Size |
|---|---|---|---|
| EpoMet F | Black | 20-3381-070 | 4 lbs [1.8kg] |
| | | 20-3381-160 | 10 lbs [4.5kg] |
| | | 20-3381-400 | 25 lbs [11.3kg] |
| KonductoMet | Black | 20-3375-016 | 1 lbs [.45kg] |
| | | 20-3375-400 | 25 lbs [11.3kg] |
| TransOptic | Clear | 20-3400-080 | 5 lbs [2.3kg] |
| ProbeMet | Copper | 20-3385-064 | 4 lbs [1.8kg] |

## Mounting Accessories

### Mounting Clips & Clamps

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

**Specimen Support Clip**
20-4001-000 Plastic (qty 1000)

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

**SamplKlip I Support Clip**
20-4100-100 Standard Plastic (qty 100)
20-4100-100S Small Plastic (qty 100)

### Additives

**Pigments for castable systems**
20-8505 Black, 1.5oz [3mL]
20-8506 Red, 1.5oz [3mL]
20-8507 Blue, 1.5oz [3mL]

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

**Flat Edge Filler**
20-8196 1lb [0.45kg]

**Mold Release Powder**
20-3048 2oz [45g]

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

**Conductive Filler**
20-8500 2 lb [0.9kg]

*† Restricted article, requires special packaging*

# Castable Mounting Systems

## Epoxy Systems

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

*† Restricted article, requires special packaging*

## Acrylic Systems

| | Powder | | Liquid† | | Kit† | |
|---|---|---|---|---|---|---|
| **Material** | **Part Number** | **Size** | **Part Number** | **Size** | **Part Number** | **Size** |
| **SamplKwick™** | 20-3562<br>20-3566<br>20-3562-025<br>20-3562-100 | 1 lb [0.45kg]<br>5 lbs [2.3kg]<br>25 lbs [11.3kg]<br>100 lb [45kg] | 20-3564<br>20-3568<br>20-3564-320<br>20-3564-640 | 12oz [0.36L]<br>64oz [1.9L]<br>2.5gal [9.5L]<br>5gal [19L] | 20-3560 | Powder 1 lb [0.45kg]<br>Liquid 12oz [0.36L] |
| **VariKleer™** | 20-3591<br>20-3591-002<br>20-3591-010 | 2.2 lbs [1kg]<br>4.4 lbs [2kg]<br>22 lbs [10kg] | 20-3592<br>20-3592-001<br>20-3592-005 | 16.9oz [500mL]<br>33.8oz [1L]<br>1.3gal [5L] | 20-3590 | Powder 2.2 lbs [1kg]<br>Liquid 16.9oz [500mL] |
| **VariDur 10** | 11-1027<br>11-1031 | 2.2 lbs [1kg]<br>22 lbs [10kg] | 11-1029<br>11-1033 | 16.9oz [500mL]<br>1.3gal [5L] | 11-1037 | Powder 2.2 lbs [1kg]<br>Liquid 500mL |
| **VariDur 200** | 11-1030<br>11-1034 | 2.2 lbs [1kg]<br>22 lbs [10kg] | 11-1029<br>11-1033 | 16.9oz [500mL]<br>1.3gal [5L] | 11-1039 | Powder 2.2 lbs [1kg]<br>Liquid 33.8oz [1L] |
| **VariDur 3003**<br>*3-part system* | 20-3531<br>20-3534 | 3.3 lbs [1.5kg]<br>16.5 lbs [7.5kg] | 20-3532<br><br>20-3535<br>20-3536 | 16.9oz [500mL] Liquid 1<br>33.8oz [1L] Liquid 2<br>33.8oz [2.5L] Liquid 1<br>1.3gal [5L] Liquid 2 | 20-3530 | Powder 1.7 lbs [750g]<br>Liquid 1 8.4oz [250mL]<br>Liquid 2 16.9oz [500mL] |

*† Restricted article, requires special packaging*

## Mounting Cups

**SamplKup™**
(qty 12)
20-9178 1in
20-8180 1.25in
20-9181 1.5in
20-9184 2in
20-9177 25mm
20-9179 30mm
20-9182 40mm
20-9183 50mm

**Disposable Mounting Cups**
(qty 50)
20-8280 1in
20-8281 1.25in
20-8282 1.5in

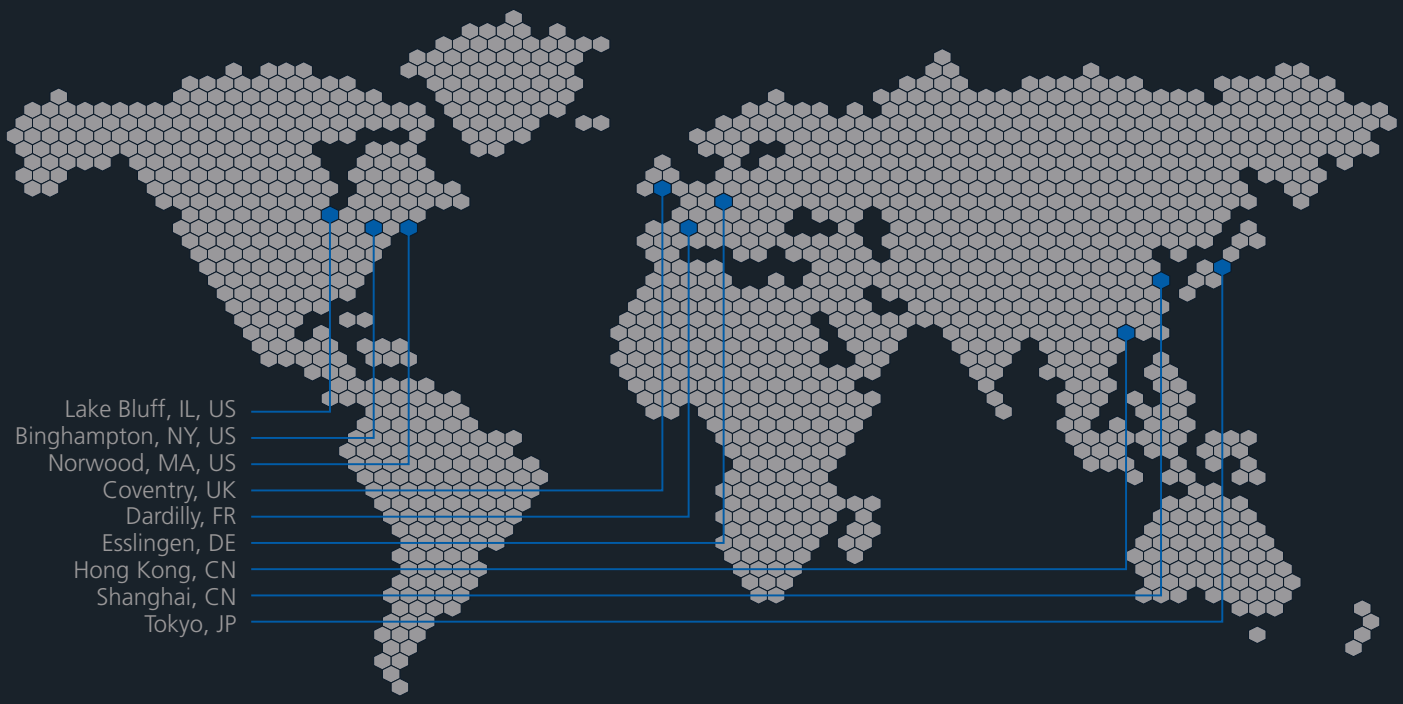
**EPDM Mounting Cups**
(qty 5)
20-8181 1in
20-8182 1.25in
20-8183 1.5in
20-8184 2in
20-7183 40mm
20-7184 50mm

**Ring Forms**
(qty 100)
20-8151-100 1in
20-8152-100 1.25in
20-8153-100 1.5in
20-8154-100 2in

**EPDM Rectangular Molds**
(qty 1)
20-7185 2.2 x 1.2 x 0.9in [55 x 30 x 22mm]
20-6185 2.5 x 1.4 x 1.8in [63 x 25 x 46mm]
20-7186 2.8 x 1.6 x 0.9in [70 x 40 x 22mm]
20-6186 6 x 4 x 2in [150 x 100 x 50mm]
20-6187 6 x 3 x 1in [150 x 76 x 25mm]

**Mixing Cups & Stirring Sticks**
20-8177-100 Non Graduated Paper 5oz [148mL] (qty 100)
20-8176-100 Graduated Plastic 8.5oz [250mL] (qty 100)
20-8175 Wooden Stirring Sticks (qty 1000)

# Buehler Worldwide Locations

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