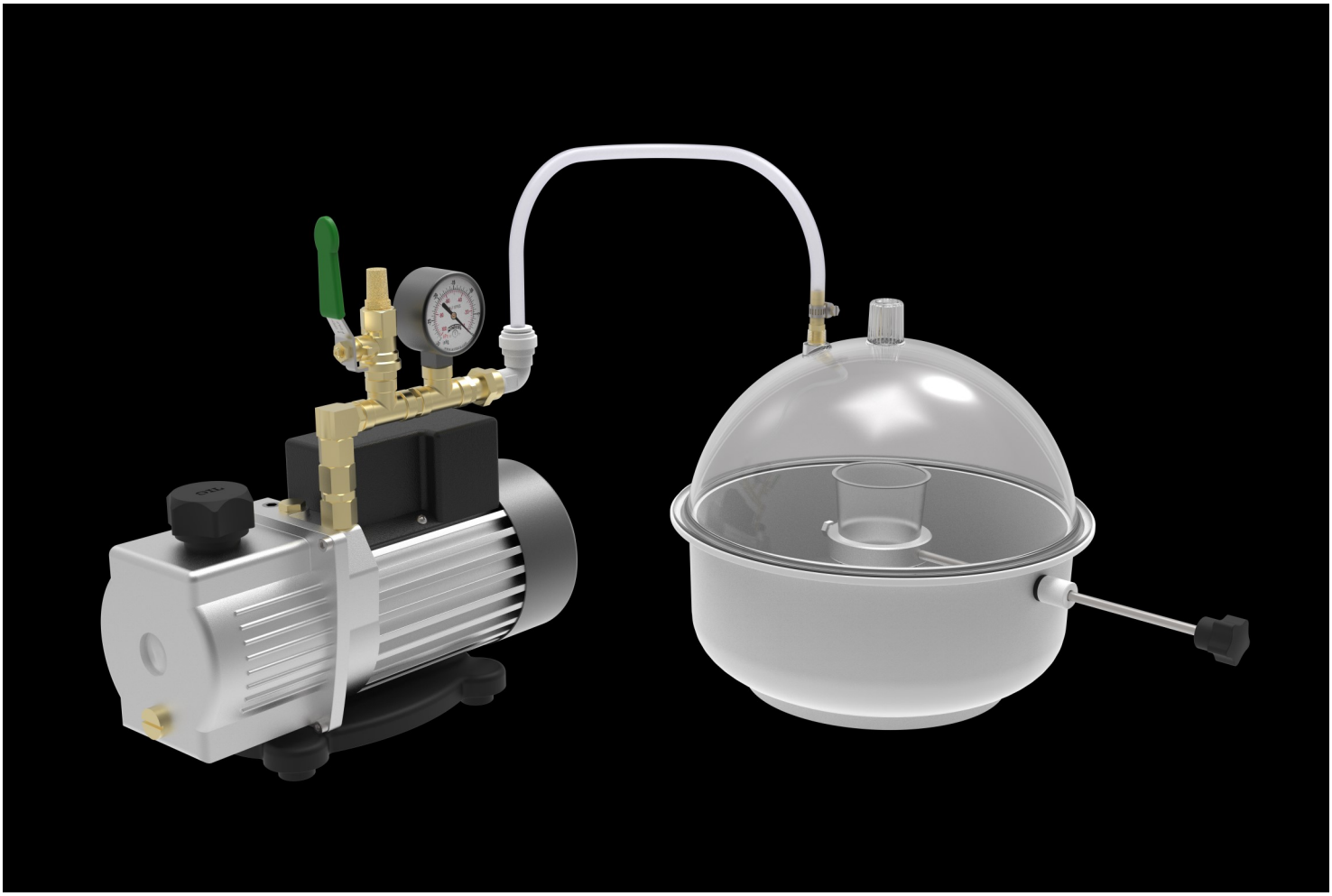
PACE TECHNOLOGIES

Vacuum Mounting Chamber

INSTRUCTION MANUAL



Model:	***LSSA-001***
Electrical Requirements:	110V/220V pump
Frequency:	50/60 Hz
Motor Horsepower:	N/A
Manual Revision Date:	September 28, 2023

Please read this instruction manual carefully and follow all installation, operating and safety guidelines.

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▲ INSTRUCTION MANUAL

3601 E. 34th St. Tucson, AZ 85713 USA Tel. 520-882-6598 Fax 520-882-6599 email: pace@metallographic.com Web: https://www.metallographic.com

Contents

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Customer shall inspect the Products promptly upon receipt of delivery. Unless customer objects in writing within thirty (30) business days thereafter, customer shall be deemed to have accepted the Products. All claims for damages, errors, or shortage in Products delivered shall be made by Customer in writing within such five (5) business day period. Failure to make any claim timely shall constitute acceptance of the Products.

5. PAYMENT:
Customer agrees to provide timely payment for the Products in accordance with the terms of payment set forth on the reverse side hereof or in any proposal submitted herewith. If any payment is not paid on or before its due date, Customer shall pay interest on such late payment from the due date until paid at the lesser of 12% per annum or the maximum rate allowed by law.

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If Buyer is in default (including, but not limited to, the failure by Buyer to pay all amounts due and payable to Seller) under the work or purchase order or any other agreement between Buyer and Seller, Buyer ’s rights under the warranty shall be suspended during any period of such default and the original warranty period will not be extended beyond its original expiration date despite such suspension of warranty rights.

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1.0 Safety Guidelines

1.1 Warning Sign

! This sign points to special safety features on the machine.

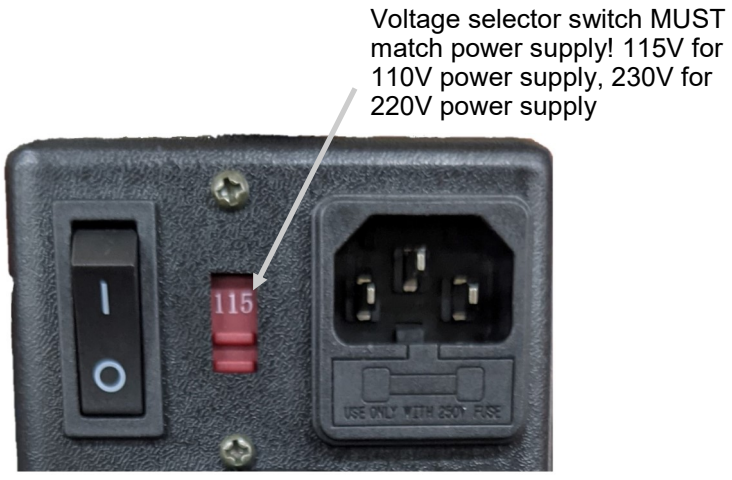
1.2 Safety Precautions

! Careful attention to this instruction manual and the recommended safety guidelines is essential for the safe operation of the ***Vacuum Mounting Chamber***.

! Proper operator training is required for operation of the ***Vacuum Mounting Chamber***. Any unauthorized mechanical and electrical change, as well as improper operation, voids all warranty claims. All service issues need to be reported to the manufacturer /

! Make sure the voltage on the vacuum pump is to the appropriate voltage for the vacuum mounting chamber. The motor of the vacuum pump will overheat if the voltage selector and power supply voltage do not match.

! Operate unit as specified in this manual.



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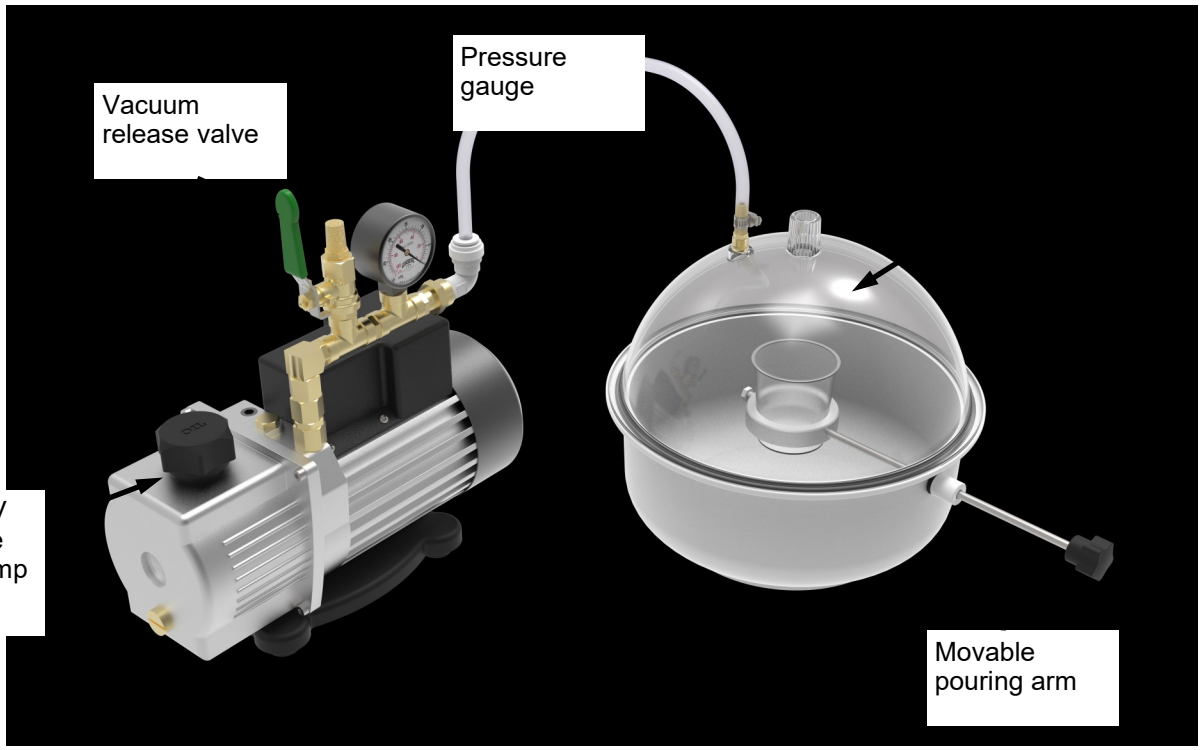
2.0 Product Description

2.1 General Description



The ***Vacuum Mounting Chamber*** is designed to fill voids in specimens by first pulling a vacuum, then pouring the resin (epoxy, acrylic or polyester), followed by slowly increasing the pressure in order to force or push the castable resin into the void, pores, cracks or other crevices in the specimen.

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2.2 Technical Specifications

Electrical specifications:	110 V / 220 V dual voltage pump
Weight:	Approx. 5 lbs (2.2 kg) without pump Approx. 19 lbs (8.6 kg) with pump
Dimensions (WxDXH):	Approx. 12” x 12” x 12” (300 mm x 300 mm x 300 mm)
Working temperature:	32° - 100°F (0 - 40°C)
Shipping temperature:	32° - 100°F (0 - 40°C)
Storage temperature:	32° - 100°F (0 - 40°C)
Maximum diameter sample	2.5” (65 mm)
Construction	Plastic

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3.0 Unpacking, Shipping and Installation

3.1 Unpacking

Unit is delivered in a box. Unpack and check for completeness of parts.

Measures WxHxD: 12 x 12 x 12-inch

Weight: Approximately 5 lbs without pump
Approximately 19 lbs with pump

3.2 Shipping

No special consideration

No special consideration

(Installation on following page)

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3.3 Installation

! Install unit carefully! Improper installation voids warranty.

The ***Vacuum Mounting Chamber*** should be placed on a flat stable surface. Connect vacuum pump or vacuum source.

After connection to vacuum, the system is ready for operation.

Vacuum connection

Vacuum pump

4.0 Start-up and Operation

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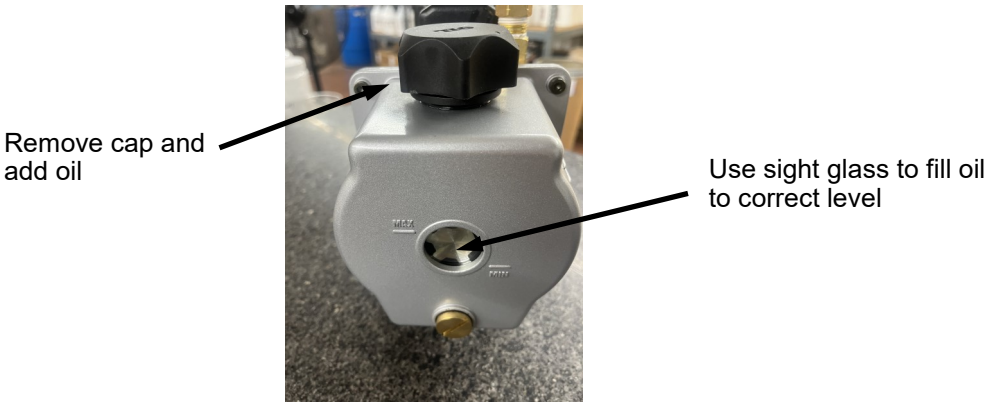
4.1 General

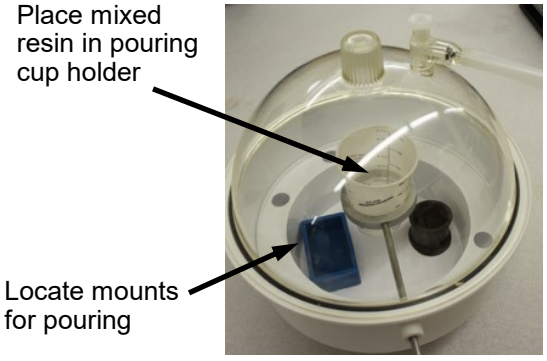
The ***Vacuum Mounting Chamber*** is meant for use with castable mounting resins such as epoxy, acrylic, or polyester.

4.2 Operation Procedure

4.2.1 Add oil to vacuum pump



4.2.2 Mix resin and position molds in chamber



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4.2.3 Close valve and pull vacuum

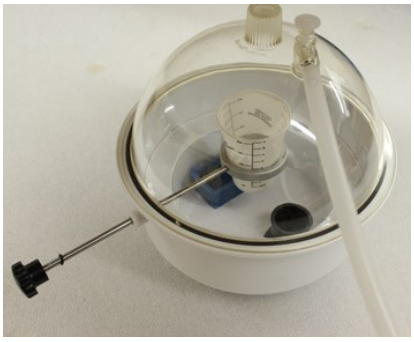
Close valve and turn on vacuum. DO NOT POUR RESIN YET.

Once the valve is closed, pull vacuum for approximately 1 minute.

Note: do not let resin degass too much - turn off pump when resins begin to froth.

4.2.4 Pour resin under vacuum

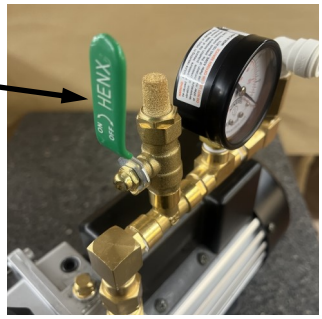
Turn off vacuum and pour resin into molds



4.2.5 Slowly open valve and let resin cure at room pressure

Open valve slowly.
Note: If the pressure is increased too quickly, the resin will splash all over the chamber creating a mess.

Allow resin to cure at room pressure.



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4.4 Metallographic Castable Mounting Basics

Vacuum/Pressure Mounting

Vacuum impregnation is a very useful technique for filling in pores or voids prior to specimen preparation. It is highly useful for thermal spray coatings and other porous samples.

The most effective technique is to pour the resin under vacuum and/or apply pressure during the curing cycle. The advantages include better infiltration of pores and cracks, more transparent mounts, and fewer air bubbles. Figure 1 shows an example of a vacuum impregnation device for this purpose.

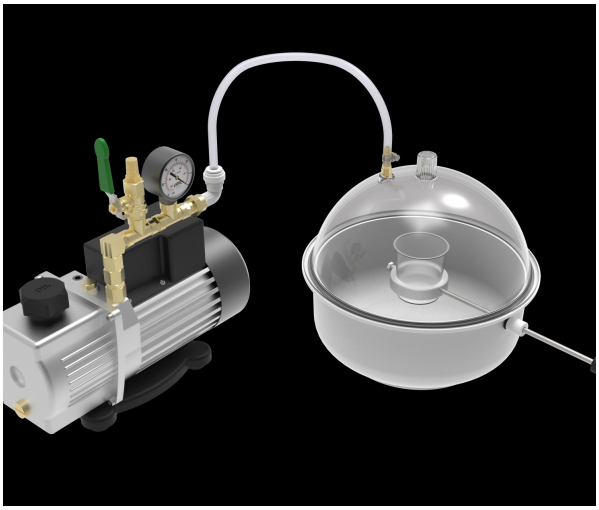

Figure 1 Vacuum impregnation device.

For porous or cracked specimens, the resin can aid in supporting these features. Filling these voids can be difficult depending upon their size, with smaller voids being much more resistant to impregnation than larger voids. This arises mainly because of the compressibility and volume of air within the void. By applying a vacuum to the specimen and then pouring the resin while under vacuum, the total pressure of the air bubbles can be reduced significantly. Subsequent curing at increased pressures will force or push the resin into the voids. Note that the vacuum time on both the resin and specimen should be kept to a minimum in order to minimize degassing of the resin.

PV = nRT (gas law)
P - Pressure
V - Volume
T - Temperature

$$V(\text{bubble size}) = \frac{nRT}{P}$$

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Thus, in order to decrease the air bubble size, impregnate at low pressures and cure at higher pressures.

Recommended Procedure:
1. Place mold and sample into impregnation chamber.
2. Mix castable mounting resin.
3. Place cover on chamber and pull vacuum.
4. Pour resin into mount.
5. Slowly increase the pressure.
6. Allow the mount to cure at room pressure or apply an external pressure.

TIP: Do not pull vacuum for more than 60 seconds. Extended vacuum causes the dissolved gases in the liquid resin to degass and bubble (similar to opening up a carbonated beverage bottle).

TIP: To reduce the curing time, preheat resin, hardener, and specimen to 30°C (85°F). **Note:** this will also increase maximum exotherm.

TIP: Slight preheating of the epoxy will also reduce the viscosity of the resin and allow it to flow better.

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5.0 Maintenance

5.1 Introduction

The ***Vacuum Mounting Chamber*** requires very minimal maintenance. To increase the life of the chamber, make sure to clean any excess resin after usage. To increase the life of the vacuum pump, change the vacuum pump oil after 50 hours of usage.

5.2 Cleaning cover

The cover should be cleaned occasionally with a moistened cloth. Do not use any chemicals or cleaning abrasives.

6.0 Troubleshooting

Problem	Cause	Solution
Resin splattering	Increasing pressure too fast	Open valve slowly

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7.0 Recommended Consumables

Reusable rubber molds

2-piece reusable molds

Specimen mounting clips, plastic or metal

Epoxy resins

Acrylic resins

Polyester resins