

# **Operating Instructions**

# **Hot Properties Sand Rammer**

Model 42116





Туре:	Hot Properties Sand Rammer
Model:	42116
Part No.:	0042116-ASM
Serial Number:	

Name and address of manufacturer:

Simpson Technologies 2135 City Gate Lane Suite 500 Naperville, IL 60563

For other Simpson Technologies offices around the work and for our contact information please visit us on the internet <u>simpsongroup.com</u> on the Contacts page.

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# 1 Introduction

Congratulations, you have just purchased an extremely reliable sand testing instrument that is backed by the professional technical support and years of proven sand technology experience of Simpson Technologies .

This laboratory equipment is constructed of quality materials and is the result of unsurpassed craftsmanship. The Hot Properties Sand Rammer should be operated only when it is in perfect condition, in accordance with its designed purpose and being aware of possible hazards. Observe the safety instructions in Section 2 and operating instructions in Section 5.

# 1.1 Application and Designated Use

The Hot Properties Sand Rammer, Model 42116, is intended exclusively for the preparation of high temperature compression test, 1.125" diameter x 2" high sand specimens of prepared molding sand used in metal casting. Usage of other materials may be possible upon consultation with the Technical Service department of Simpson Technologies. Any other application outside the intended usage will be regarded as use not in accordance with its purpose, and, therefore, the manufacturer / supplier will not be held liable for any damage that might arise thereunder. The risk in this case will be exclusively that of the User.

#### 1 Introduction



## 1.2 Organizational Measures

The operating instructions should be readily available at the place of operation. In addition to the operating instructions, the general legal regulations, or other mandatory rules for prevention of accidents and environmental protection should be made known and be observed!

The personnel instructed to use this apparatus, before beginning work, should have studied, and fully understood these Operating Instructions, in particular the "Safety" chapter.

No modifications, extensions, or changes of design of the device that would impact safety requirements should be put into effect without prior consent of the supplier! Spare parts must conform to the technical specifications defined by the manufacturer. This is always guaranteed when using original spares.



# 2 Safety



Before operating and/or performing maintenance or repair on Simpson Technologies designed and/or manufactured equipment, it is required that all personnel have read and understood the entire Operating Instructions manual. If any questions exist, you must contact your supervisor or Simpson Technologies before taking further action.

If properly operated and maintained, your Simpson Technologies supplied equipment can provide many years of dependable and safe operation. Please follow all recommended safety, operating, and maintenance instructions. Furthermore, the introduction of any non-Simpson Technologies manufactured and/or approved parts to the equipment may create a hazardous situation. Never alter the equipment without prior consultation with Simpson Technologies.



**DO NOT** use this machine for purposes other than that for which it was intended. Improper use could result in serious injury.

## 2.1 Safety Signs and Labels

Simpson Technologies has incorporated the ANSI Z535.6 / ISO 3864-1-2 safety symbol only label format on all of its laboratory equipment.

The harmonized ANSI Z535.6 format became an established safety label format since it not only fully meets the current ANSI Z535 standards, but also incorporates ISO 3864-2 symbols into the hazard severity panels and, thus, can be used for both the U.S. and international markets.



#### 2.1.1 Safety Alert Symbols



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. OBEY all safety messages that follow this symbol to avoid possible injury or death.



DANGER! Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



The safety alert symbol used without a signal word to call attention to safety messages indicates a potentially hazardous situation which, if not avoided, could or may result in death or minor to serious injury.



NOTICE indicates information used to address practices not related to personal injuries but mayresult in property damage.



This symbol indicates information containing important instructions concerning the use of the machine or directions for further procedures. Ignoring this information can lead to malfunction of the machine.



#### 2.1.2 Safety Symbol Labels



# HAND CRUSH / FORCE FROM ABOVE (STC #214058)

This label is located on the lower and center of the front panel

The compacting head moves down, driven by a pneumatic cylinder, while performing a test which may **crush** or **cut** body parts. Follow **Lockout and Tagout** procedures before servicing.



#### EXPLOSION / RELEASE OF PRESSURE (STC #217945)

This label is located on the back panel of the unit by the pneumatic tubing connections.

With pneumatic pressure present, disconnecting or cutting the pneumatic tubing will release the pressure contained within the tubing. Blown-out air with or without solid particles in the air stream may get into the eyes and may irritate or damage the eye. Follow **Lockout and Tagout** procedures before servicing.





# READ AND UNDERSTAND ALL SERVICE MANUAL INSTRUCTIONS (STC #214042)

This label is located on the lower left of the base

Before operating and/or performing any maintenance or repair on Simpson Technologies designed and/or manufactured equipment, it is required that all personnel read and understand the entire Operating Instructions manual. All protective guards and covers shall be installed, and all doors closed before operating the equipment. If any questions exist, you must contact your Supervisor or Simpson Technologies before taking further action. Follow **Lockout and Tagout** procedures before servicing.



## 2.2 Lockout and Tagout System Procedure

**NOTICE** Whenever performing any type of maintenance or repair, whether in the form of cleaning, inspection, adjustment, mechanical or electrical maintenance, the equipment must be rendered into **Zero Mechanical State (ZMS)**.

Prior to any maintenance (routine or otherwise) or repair of equipment, a safety procedure should be established and maintained. This procedure should include training of personnel; identification and labeling of all equipment which is interlocked mechanically, electrically, through hydraulics, pneumatics, levers, gravity or otherwise; and a listing of the established lockout procedures posted on each piece of equipment.

"Lockout and Tagout" refers to specific practices and procedures to safeguard personnel from the unexpected energizing of machinery and equipment, or the release of hazardous energy during service or maintenance activities. This requires, in part, that a designated individual turns off and disconnects the machinery or equipment from its energy source(s) before performing service or maintenance, and that the authorized employee(s) lock or tag the energy-isolating device(s) to prevent the release of hazardous energy and take steps to verify that the energy has been isolated effectively.





#### 2.2.1 Lockout and Tagout Devices

When attached to an energy-isolating device, both lockout and tagout devices are tools used to help protect personnel from hazardous energy. The lockout device provides protection by holding the energyisolating device in the safe position, thus preventing the machine or equipment from becoming energized. The tagout device does so by identifying the energy-isolating device as a source of potential danger; it indicates that the energy-isolating device and the equipment being controlled may not be operated until the tagout device is removed.

#### 2.2.2 Glossary:

**Authorized Person(s)** - Personnel who have been designated by his/her department to perform maintenance or service on a piece(s) of equipment, machinery, or system, and are qualified to perform the work through proper training on Safety System Procedures for the equipment, machinery, or system.

**Lockout** - The placement of a lockout device on an energy isolating device, in accordance with an established procedure, to ensure that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

**Lockout Device** - Any device that uses positive methods, such as a lock (either key or combination type), to hold an energy isolating device in a safe position, thereby preventing the energizing of machinery or equipment. When professionally installed, a blank flange or bolted slip blind are considered equivalent to lockout devices.



**Tagout** - The placement of a tagout device on an energy isolating device, in accordance with an established procedure, to indicate that the energy isolating device and the equipment being controlled may not be operated until the tagout device is removed.

**Tagout Device** - Any prominent warning device, such as a tag and a means of attachment that can be securely fastened to an energy isolating device in accordance with an established procedure. The tag indicates that the machine or equipment to which it is attached is not to be operated until the tagout device is removed in accordance with the energy control procedure.

**Zero Mechanical State** - The mechanical potential energy of all portions of the equipment or machine is set so that the opening of pipes, tubes or hoses, and the actuation of any valve, lever, or button, will not produce a movement which could cause injury.



# 3 Short Description & Specifications

#### 3.1 Description

The Hot Properties Sand Rammer, Model 42116, is used to prepare AFS sand specimens of prepared clay bonded molding sand that are 1.125" in diameter by 2.00" high used for high temperature compression testing in a foundry. The standard AFS sand specimen used for high temperature compression testing has 31.64% less volume compared to a standard 2" x 2" sand specimen. Ramming energy is applied from both ends of the sand specimen.

# 3.2 Specifications, Dimensions and Weights (Approximate)

Specifications	Hot Properties Sand Rammer
Length	330 mm (13 in.)
Width	280 mm (11 in.)
Height	660 mm (20 in.)
Weight	20 kg (44 lbs.)
Compressed Air	Filtered and lubricated, 6 to 7 kg/cm <sup>2</sup> , regulated to between 6 and 7 bar (90 to 100 psi)



# 4 Unpacking and Installation

## 4.1 Unpacking



Your new Laboratory Equipment has been thoroughly inspected before being shipped to your plant. However, damage can occur enroute, so it is wise to inspect all equipment on arrival. Notify both the carrier and Simpson Technologies of any damage at once. Damage should be noted on the shipper's receipt before signing for receipt of the shipment.

The Hot Properties Sand Rammer, Model 42116, is shipped in one piece and is intended to be used as received; no further assembly/disassembly is required. No lifting equipment is required for handling. The machine weighs approximately 20 kg (44 lbs.). Due to its bulky dimensions and tight-fitting shipping crate, it is recommended that two people remove the equipment from the crate. Whenever positioning or relocating this instrument, two people should be utilized. The approximate instrument dimensions are 330mm x 280mm x 660 mm (13 in. x 11 in. x 26 in.). Its shipping weight (in a crate) is 28 kg (62 lbs.).





ONLY authorized personnel may unload and install this equipment. Two people may be required to unpack this instrument due to the bulky dimensions and tight-fitting packing crate

- 1. Remove any loose accessories/parts from the shipping crate and place in a location away from any packaging material to assure that these items are not misplaced.
- 2. Carefully remove the sand rammer from the packing crate and place it on stable bench.
- Once removed from the crate, proceed by taking off any protective wrap and unpackage the protective material from the included accessories.
- 4. The packaging remains the property of the Customer and may be used for returning the apparatus if some repair is required.



#### 4.2 Components

Your new Hot Properties Sand Rammer is shipped with the following accessories and installation components (Figure 4). Please take a moment to identify that the following items were included:

- Instruction manual for Hot Properties Sand Rammer
- Pneumatic hose and connectors
- Pneumatic regulator/filter/lubricator
- AFS specimen tube
- Extraction pedestal
- Locking clip (for positioning the specimen tube onto the extraction pedestal.



Do not store the electronic devices in the open and unprotected from atmospheric conditions. If this instruction is not followed, claims under guarantee will no longer be considered.



#### 4.3 Installation

The installation of the apparatus is the responsibility of the Client to include procuring and preparing the material required for this purpose.

The Hot Properties Sand Rammer should be placed on a stable bench. The rammer should be anchored onto the bench using two bolts of appropriate length. These bolts are not supplied with the sand rammer and are the responsibility of the customer to provide and install.

Locate the bolts in the two countersunk holes located on the base of the rammer frame.

It is recommended that the rammer should be situated close to the High Temperature Compression Tester.

The sand rammer would likely be occupied by one operator at a time. It is used in a foundry sand laboratory, with its operation display and control lever placed at about eye level for the operator. It should be placed in an ergonomically correct position to allow the operator to comfortably handle the sand sample as well as the pneumatic valve lever on the side of unit.



#### 4.4 Pneumatic Power Connection

Pneumatic Requirements: Compressed air that is filtered and regulated between 6 and 7 bar (90 to 100 psi).



Before connecting the equipment, an approved pneumatic safety Lock-Out air valve must be installed in the supply air line. This item is not supplied with the Hot Properties Sand Rammer and is the responsibility of the customer to provide and install.



A pressure regulator/filter/lubricator and length of pneumatic hose required to connect the Hot Properties Sand Rammer to the regulator/filter/lubricator have been included with the Sand Rammer.



The compressed air should be free of dirt, debris, and condensate. Debris and condensate will cause damage to the Hot Properties Sand Rammer.



Do not operate the Hot Properties Sand Rammer without first filling the pneumatic lubricator with standard pneumatic tool oil/lubricant and setting the proper oil addition rate on the pneumatic lubricator.

Failure to properly set up the pneumatic lubricator will result in erratic operation and will prematurely destroy the cylinder seal kit and potentially damage the cylinder.



#### 4.5 Connecting Power and Set-Up

- 1. Assemble the provided pneumatic regulator/filter/lubricator according to the original equipment manufacturer's instructions supplied with the regulator/filter/lubricator. (See Figure 1).
- 2. Connect the pneumatic lock-out valve (supplied by customer) to the incoming compressed air line and then to the assembled pneumatic regulator/filter/lubricator air inlet (Figure 1, Item 1).
- 3. Connect the pneumatic regulator/filter/lubricator to the Hot Proper- ties Sand Rammer using the pneumatic air hose and fittings included with the unit. Connect the air hose from the air outlet of the regulator/filter/lubricator (Figure 1, Item 2) to the air inlet located on the back of the Hot Properties Sand Rammer (Figure 3, Item 1). Secure the air hose to the air inlet with the provided connector that is attached to the air inlet.
- 4. Fill the supplied pneumatic lubricator reservoir with pneumatic tool lubricant. Refer to the regulator/filter/lubricator manufacturer's manual for detailed instructions.
- Turn on the air supply. Using the supplied air regulator/filter/lubricator, adjust air pressure to 6.5 bar (94 PSI). Refer to the regulator/filter/lubricator manufacturer's manual for instructions on regulating air pressure.
- Adjust the oil addition rate to maintain a rate of one drop of oil every three (3) to four (4) cycles of the sand rammer. Refer to the manufacturer's manual for the air regulator/filter/lubricator for instructions on adjusting the oil lubrication rate.



Failure to set the proper lubrication rate will cause damage to the sand rammer cylinder.





Figure 1: Regulator / Filter / Lubricator

Item	Description
1	Air Inlet
2	Air Outlet to Rammer
3	Air Flow from Compressed Air Source to Rammer



#### 4.6 Airborne Noise Emission

Regarding airborne noise emission by the Hot Properties Sand Rammer, Model 42116, there is no motor or other noise emitted by this machinery other than the sound of air released through the exhaust. As such, the equivalent continuous A-weighted sound pressure level at the workstation does not exceed 70db(A).





# 5 Operating Instructions



For more information on how to use and care for your Simpson Analytics equipment and accessories visit our Simpson Technologies channel on YouTube and search our library of videos. Subscribe to our channel to keep updated on new releases.

#### 5.1 Sand Specimens for High Temperature Compression

The standard AFS sand specimen for high temperature compression testing has 31.64% less volume compared to an AFS standard 2" x 2" sand specimen.

To prepare a comparable condition to a standard 2" x 2" sand specimen, the smaller high temperature compression test specimen must be of similar compaction. For this reason, prepare a standard three ram 2" x 2" sand specimen and record its weight in grams. The high temperature compression test sample should weigh 31.64% less. The rammer has a set piston movement that will always produce a 1.125" wide sand specimen that is 2" high.

The standard AFS high temperature compression test sand specimen has 33.2% less volume than that of a standard metric 50mm x 50mm sand specimen.

To prepare a comparable condition to a standard metric specimen, the smaller high temperature compression test specimen must be of similar compaction. For this reason, prepare a standard three ram 50mm x 50mm sand specimen and record its weight in grams. The high temperature compression test sample should weight 33.2% less.



#### 5.2 Preparing a High Temperature Compression Test Sand Specimen

- 1. Ensure that the pneumatics are connected and set properly.
- 2. Ensure that there is air supply available, and the pneumatic lock-out valve is open to the sand rammer.
- 3. Apply a small amount of parting liquid to a tube swab. Insert the tube swab through the specimen tube several times in order to clean and properly lubricate its inner surface.
- 4. Insert the locking clip (Figure 4, Item 3) into the groove of the extraction pedestal (Figure 4, Item 2). The locking clip will keep the specimen tube at the correct height on the extraction pedestal. Place the specimen tube on the extraction pedestal. The specimen tube will slide down onto the locking clip. (See Figure 5)
- 5. Weigh the required amount of prepared molding sand to make a standard high temperature compression sand specimen as described in Section 5.1. Carefully fill the specimen tube making sure that all of the weighed sand is transferred.
- 6. Place the specimen tube assembly in the pneumatic Hot Properties Sand Rammer, Model 42116, verifying that the assembly is centered between the guide pin of the frame and the pneumatic rammer. (See Figure 6)



7. Gently hold the specimen tube by the lower portion with fingers away from the top of specimen tube. With the opposite hand, move the operating valve handle (Figure 2, Item 1) down to lower the main stem and compacting head (Figure 2, Item 2 and 3) into the specimen tube. Once the compacting head has entered the specimen tube, move the operating valve to the middle position, stopping the movement of the compaction head. At this time, the locking clip can be removed. Removing the locking clip will allow ramming energy to be applied to both ends of the sand specimen in the specimen tube. After removing the locking clip, move the operating valve handle down until the compacting head stops moving downward into the specimen tube. (See Figure 7)



Be aware of a potential pinch hazard between the top of the specimen tube and compacting head of the rammer when lowering the main stem into the specimen tube assembly. Always keep hands and fingers clear from this area when performing a test.

- To replicate the compacting energy of a standard sand rammer, do not remove the locking clip during the compaction process in Step 7, Section 5.2.
  - 8. Move the operating valve handle up to return the compacting head to home position.
  - 9. Remove the specimen tube assembly from the pneumatic rammer. Gently slide the specimen tube down over the compacted sand specimen and extraction pedestal.



- 10. The prepared sand specimen will remain on the extraction pedestal. Gently remove the prepared sand specimen from the extraction pedestal.
- 11. Clean and lubricate the specimen tube after each use.
- The specimen tube must be clean and lightly lubricated every time a sand sample is made. A dirty or non-lubricated tube will absorb, by lateral friction, an important fraction of the compacting work delivered by the rammer. Therefore, the resultant sample will have less strength than one correctly prepared.



# 6 Maintenance



For more information on how to use and care for your Simpson Analytics equipment and accessories visit our Simpson Technologies channel on YouTube and search our library of videos. Subscribe to our channel to keep updated on new releases.

Despite its robust construction, the Hot Properties Sand Rammer, Model 42116, is a precise mechanical measurement device and needs appropriate care.



Before performing any maintenance, turn-off the Lock-Out air supply valve. The Hot Properties Sand Rammer must be put into **Zero Mechanical State (ZMS)**. Follow **Lockout and Tagout** procedures before servicing.

#### 6.1 Daily Maintenance

- Verify that the air pressure regulator is correctly set.
- Check the compressed air filter and drain out any condensate.
- Ensure that the oil reservoir is full of high-quality pneumatic tool oil.
- Ensure that one drop of pneumatic tool oil is administered for every 3-4 cycles of the rammer. Verify the lubrication rate using the lubricator sight window. If required, adjust the lubrication drop rate as described in the supplied OEM regulator/filter/lubricator manual.
- Check that the compacting head (Figure 2, Item 3) is firmly secured to the main stem (Figure 2, Item 2).



- Wipe down the machine to remove any accumulated dirt or sand.
- Remove any full or partial sand specimens from the specimen tube and clean the internal surfaces of the specimen tube and lightly lubricate using a specimen tube swab.
- Regularly check the specimen tube. It must be lightly lubricated every time it is used.
- B

The specimen tube must be clean and lightly lubricated every time a sand sample is made. A dirty or non-lubricated tube will absorb, by lateral friction, an important fraction of the compacting work delivered by the rammer. Therefore, the resultant sample will have less strength than one correctly prepared.



# 7 Apparatus Layout



#### **Figure 2: Front View**

Item	Description
1	Operating Valve Handle
2	Main Stem
3	Compacting Head
4	Extraction Pedestal Support





#### Figure 3: Back View

Item	Description
1	Compressed Air Inlet
2	Air Vents





#### **Figure 4: Components**

ltem	Description
1	Specimen Tube
2	Extraction Pedestal
3	Locking Clip





Figure 5: Specimen Tube Assembly

## **Apparatus Layout 7**





Figure 6: Specimen Tube Assembly in Rammer Ready for Testing

# 7 Apparatus Layout





Figure 7: Preparing a Sand Specimen





# 8 Parts List / Ordering Parts / Returns

#### 8.1 Spare Parts List

Simpson maintains a large inventory of common spare parts for all current Simpson Analytics products. The following table provides part numbers for common spare parts for this device. Contact Simpson Technologies with the part number and description when ordering.

Part No.	Description
217400	Specimen Tube
217401	Locking Clip
217402	Extraction Pedestal

#### 8.2 Ordering Replacement / Spare Parts

The source of replacement parts for your Simpson Analytics equipment is just as important as the make of the equipment you purchase. ALWAYS order parts for your Simpson Analytics equipment directly from Simpson Technologies. To find the Simpson office closest to you please visit us on the internet at <u>simpsongroup.com</u> on the "Contact Us" page.

Parts may be ordered from the sales department via e-mail at parts@simpsongroup.com: When contacting our sales department to obtain a quotation on replacement parts or service please always include the equipment serial number, the description of the part and the part number. Your Simpson Technologies sales team representative will provide you with a quote on the items with current price and delivery times. When ordering, please always refer to the quote number on your order.

To arrange for calibration support or repair assistance please contact our customer service department at <u>service@simpsongroup.com</u>.



#### 8.3 Returned Goods Policy

Simpson Technologies strives to provide their customers with maximum follow-up support and, in order to offer the most practical flexibility; the following conditions apply to returned goods. Adherence to these procedures will assure the most prompt and efficient service.

#### **RETURNS WILL BE CONSIDERED IN THE FOLLOWING SITUATIONS:**

- Products ordered in error by customer (subject to a restocking charge).
- Incorrect or defective products shipped to customer.
- The return of existing products for factory repair or upgrade.
- Products ordered correctly but which are unwanted or unsuitable (subject to a restocking charge).
- A Safety Data Sheet (SDS) must accompany material that is sent to Simpson Technologies for testing purposes. Simpson Technologies will NOT authorize the return of hazardous materials.



#### **RETURN PROCEDURE:**

- Customer must obtain a Return Goods Authorization Number (RGA#) from Simpson Technologies prior to returning the merchandise.
- The customer must obtain a Return Material Authorization Number (RMA#) from Simpson Technologies prior to returning the goods.
- To obtain an RMA#, the customer should contact the Customer Service department by phone, , e-mail to service@simpsongroup.com. The material being returned must be identified and the reason for its return clearly specified. Once approved for return, Simpson Technologies will issue the customer an RMA form to be included with the shipment and with instructions on where and how to ship the goods.
- All returned goods are to be shipped with transportation charges PREPAID, unless otherwise agreed when the RMA# is assigned. If it has been predetermined that return goods are to be shipped COLLECT, Simpson Technologies will specify the desired routing.
- All returned shipments will be subject to inspection upon arrival at Simpson Technologies.
- Material returned without an RMA# may be refused and returned at customer's expense.



# 9 Decommissioning



Before doing any work, review the Safety Procedures in Section 2 and Lockout/Tagout all the power sources to the machine and peripheral equipment.

Failure to follow safety procedures could result in serious injury.

Use qualified personnel and follow safety procedures, applicable local policies, and regulations in decommissioning the Hot Properties Sand Rammer and peripheral equipment.

**Air Supply:** Shut-off all plant air lines supplying air to the pneumatic components and bleed the down stream air lines before dismantling.

#### WASTE DISPOSAL

The machinery and controls consists of:

- Iron
- Aluminum
- Copper
- Plastic

Dispose of the parts in accordance with the applicable regulations.



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