SIMPSON
A Norican Technology

Operating Instructions

Digital Absolute Permmeter

Model 42105

Accessories:	Model
Shell Permeability Accessory	42105A
Mold Permeability Accessory	42105B
Base Permeability Accessory	42105C
Additional Permeability Accessory	42105D
Refractory Coating Accessory	42105E

Type:	Digital Absolute Permmeter
Model:	42105
Part No.:	0042105-ASM 0042105-M-ASM
Serial No.:	

Name and address of manufacturer:

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

Aurora, Illinois 60504

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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 Digital Absolute Permmeter 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

This device is intended exclusively for testing the permeability of test samples consisting of foundry sand. Usage of other materials may be possible upon consultation with the Technical Service 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 hereunder. The risk in this case will be exclusively that of the user.

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

NOTICE *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 Operation Maintenance 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 is intended. Improper use could result in death or serious injury.*

2.1 Safety Signs and Labels

Simpson Technologies has incorporated the ANSI Z535.6/ISO 3864-1-2 safety symbol 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 symbology and hazard severity panel 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.

ΔΑΝΓΕΡ! *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 injury.

NOTICE indicates information used to address practices not related to personal injuries but may result 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

ELECTRICAL SHOCK/ELECTROCUTION

(STC #217958)

This label is located on the back of the unit next to the electrical power receptacle.

With the front electrical or any other panels removed, the electrical power supply and electrical terminals are exposed. A hazardous voltage is present, can cause electric **shock** or **burn**, and will result in serious injury. Follow **Lockout and Tagout** procedures before servicing.

ELECTRICAL SHOCK/ELECTROCUTION

(STC #214043)

This label is located in front of the unit, on the left side under the control panel.

With the control panel removed, electrical terminals are exposed. A hazardous voltage is present that can cause electric **shock** or **burn** and will result in serious injury. Follow **Lockout and Tagout** procedures before servicing.

EXPLOSION / RELEASE OF PRESSURE
(STC #217945)

This label is located on the back 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 in front of the unit on the left side under the control panel.

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 maintenance (routine or otherwise) or repair of equipment, a safety procedure should be established and maintained. This procedure should include training of all personnel involved with the equipment; 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 energy-isolating device in a 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 or pieces of equipment, machinery or system. These individuals are qualified to perform the work through proper training on the Lockout/Tagout procedures for the equipment, machinery or system.

Lockout - 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.

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 properly 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, which 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 Application

The Digital Absolute Permmeter (Model 42105) is a device that automatically measures the permeability of a standard 50mm x 50mm metric or 2" x 2" AFS foundry sand specimen. With the addition of specifically designed accessories, the Permmeter can also measure the permeability of raw foundry sand, shell coated foundry sand, and refractory coatings that are used in the foundry industry.

3.2 Description

The Digital Absolute Permmeter (Model 42105) measures the permeability of porous sand masses, both in compacted and loose states.

The absolute determination of permeability is done by measuring the time required for a specific air volume at constant pressure to flow through the specimen or body being tested.

Permeability is determined by applying the following formula:

$$Perm = \frac{V \times H}{P \times S \times T}$$

Legend:

V = Percolated volume (ml)

H = Height of Test Sample (cm)

P = Air pressure (grams/cm^2)

S = Area of Sample (cm^2)

T = Time in minutes

This equation shows that the permeability is numerically equal to the volume of the air that passes through a test tube 1 cm in height and 1 cm^2 of cross section during a one-minute period in which time the air pressure is constant and equal to 1 gram/cm^2.

When determining the permeability of sand mold masses, the cylindrical metric test specimen has a height of 5 cm and cross section of 19.635 cm^2; pressure is applied at 10 g/cm^2, and time is expressed in seconds. Finally, if the air volume that passes through the test tube is 500 ml, the permeability formula is reduced to:

$$Perm_{(metric)} = \frac{763.98}{t}$$

The calibrated air volume is signaled by two slot marks on a stem. When the first mark passes a high-precision optical coupler, the measuring time begins. When the second mark passes the optical coupler, the measuring time ends. The accuracy of the time determined in this way is 0.05 seconds. Based on this time, the microprocessor makes the necessary calculations. The permeability result is then shown on a three-digit display.

For permeability values less than 30, the accuracy is 0.1 permeability units; for those greater than 30, the accuracy is 1.0 permeability units.

The range of the scale of the device is 1 to 999 permeability units.

In order to increase measuring accuracy, the permeability function has been corrected to:

- Compensate for air pressure fluctuation while the gasometrical chamber sinks into the sealing liquid.
- Eliminate the unit's own resistance to air passage.

It can be shown that for high permeability values this last correction is too important to be ignored, even in Permmeters with low resistances in their pneumatic circuit.

The final function is:

$$Perm_{(metric)} = \frac{776.07}{t - (t_0 - 0.04)}$$

OR

$$Perm_{(AFS)} = \frac{763.85}{t - (t_0 - 0.04)}$$

Where:

t = Time (seconds) that 500 ml of air takes to flow through the specimen.

t0 = Time (seconds) that 500 ml of air takes to flow through the apparatus without specimen.

0.04 = Falling time (seconds) of the drum in vacuum between the measurement limits. The permeability values displayed are already corrected for these two influences.

The Permmeter can also work in the “exploration mode”. In this mode the microprocessor determines and compensates for parasitic resistance to the pneumatic circuit created by other measuring devices, such as:

- Accessory for permeability in molds (Model 42105B).
- Accessory for base permeability (Model 42105C).

This feature enables the identification of permeability of a porous body attached to another porous body, provided that it is possible to previously determine the permeability of one of them. This is the case of permeability of a wash applied to a permeable substrate, for instance, a washed core.

The final results are shown in the display, with no need for calculations.

The device is fully automatic, and the system includes an Electro-valve that controls the compressed air flow which fills and therefore raises the gasometric chamber up to a certain height, after which the inlet flow is stopped, and the measuring stage start.

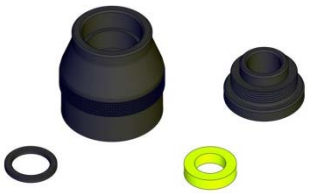
3.3 Specifications, Dimensions and Weights (Approximate)

Specifications	Digital Absolute Permmeter (42105)
Length	260 mm (10.25”)
Width	325 mm (12.8”)
Height	415 mm (16.3”)
Weight	15 kg (33 lbs.)
Power	100-240VAC 50/60 Hz, 1 amp, grounded
Air Compressed	Filtered air without oil regulated between 2.5 and 3.0 bar (35 psi to 45 psi). Pressure regulator and filter are supplied.

3.4 Accessories

3.4.1 Shell Permeability Accessory (Model 42105A)

These accessories measure the permeability of shell sand samples. The sand specimen is held in a metal fixture by a flexible ring. This assembly is attached to the Digital Absolute Permmeter for testing. The shell permeability sample pieces are made in the Test Pieces Blower (Model 42109).



Specifications	Shell Permeability Accessory
Diameter	ca. 60 mm (2.4”)
Height	ca. 71 mm (2.8”)
Weight	ca. 0.5 kg (1 lb.)

3.4.2 Mold Permeability Accessory (Model 42105B)

These accessories measure the permeability of an actual production mold or core. One end of the accessory fits on the Pedestal of the Digital Absolute Permmeter and the other is pressed firmly against the surface to be tested.

Specifications	Mold Permeability Accessory
Maximum Diameter	ca. 60 mm (2.4”)
Total Length	ca. 914 mm (36”)
Weight	ca. 0.3 kg (.65 lbs.)

3.4.3 Base Permeability Accessory (Model 42105C)

This accessory tests the base permeability of dry sands. It consists of a calibrated metal tube, screen and compacting weight. The tube is filled with loose sand and the Weighted Foot is placed on top of the sand. The filled tube is tapped until the loose sand is completely settled and reaches its maximum density. Then, the weight and top portion of the tube are removed, and the excess sand is struck off. The remaining assembly and sand specimen are installed on the Digital Absolute Permmeter (Model 42105) and measured to determine the base sands permeability.

Specifications	Base Permeability Accessory
Diameter	ca. 64 mm (2.5”)
Height	ca. 222 mm (8.75”)
Weight	ca. 1 kg (2.2 lbs.)

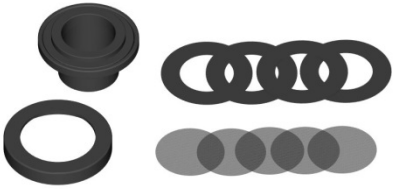
3.4.4 Additional Permeability Accessory (Model 42105D)

This accessory tests the permeability of refractory coatings applied to cores and molds. Using the Digital Absolute Permmeter (Model 42105), the permeability of an uncoated sand sample is first determined. Next, the coatings applied, dried and the sample is retested. The Permmeter then automatically calculates the differential of these two values, which is the permeability of the coating. This value then appears on the Permmeter display.

3.4.5 Refractory Coating Accessory (Model 42105E)

Specifications	Additional Permeability Accessory
Diameter	90 mm (3.5”)
Height	121 mm (4.75”)
Weight	ca. 1 kg (2.2 lbs.)

This accessory to the Digital Absolute Permmeter (Model 42105) determines permeabilities of core or mold coatings imparted upon the included screens and through a controlled orifice.



Specifications	Refractory Coating Accessory
Diameter	ca.152mm (6”)
Height	ca.152mm (6”)
Weight	ca. 2 kg (4.5 lbs.)

4 Unpacking and Installation

4.1 Unpacking

NOTICE *Your new laboratory equipment has been closely inspected before being shipped to your plant. However, damage can occur en route, 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 Digital Absolute Permmeter (Model 42105) is shipped in one piece and is intended to be used as received; no further assembly/disassembly is required. No lifting equipment for handling is required. Its weight, 15 kg, is easy to handle. This step may require two people because of bulky dimensions of the machine and tight-fitting crate. The approximate instrument dimensions are 260 mm x 325 mm x 415 mm. Its shipping weight (in a crate) is 22 kg.

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. Carefully remove apparatus from the packing crate and place it on stable bench.
2. Once removed from the crate, proceed by taking off any protective wrap and unpackage the included accessories.
3. The packaging remains the property of the customer and may be used for returning the apparatus if some repair is required.

4.2 Components

Included in your new Digital Absolute Permmeter are the following:

- Digital Absolute Permmeter Base Unit
- Pneumatic Regulator/Filter
- Pneumatic Tubing - approximately 1 m (3')
- Pneumatic Fitting to connect pneumatic tubing to the pneumatic regulator/filter outlet.
- Power Cord

If any of the above components are missing, contact your local Simpson Technologies office.

NOTICE *Do not store the device 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.

In order to guarantee effective performance, a solid surface that is free of excessive vibration is recommended.

Place the apparatus on a stable bench. The machine should be in a level condition. The machine can be leveled by making adjustments to the four adjustable rubber feet located at each bottom corner of the tester.

NOTICE *The Permmeter must be leveled from both left to right and front to back. It is vital that the Permmeter is on a solid vibration-free work surface for proper operation.*

The Digital Absolute Permmeter would likely be occupied by one operator at a time. It is used in a foundry sand laboratory. It should also be placed in an ergonomically correct position to allow the operator to comfortably handle the sand sample as well as the control buttons.

For convenience, the Permmeter has a 1/8G (BSPP) Threaded Drain Port (Item 6, Figure 1) located on the back of the unit to facilitate draining the Liquid Chamber. A small shut-off valve may be attached as close to the drain port as possible and flexible tubing from the shut-off valve to a bucket large enough to contain at least 4 liters. Follow federal and local regulations when disposing of the water/glycol solution.

4.4 Electrical and Pneumatic Power Connection

Electrical Requirements:100 - 240 Volts, 50-60 Hz + Ground (5Ω or less).

Connect the equipment to a grounded electrical outlet.

Pneumatic Requirements: Compressed air that is filtered and regulated between 2.5 to 3.0 bar (35 psi to 45 psi).

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

Verify that the voltage marked on the serial number nameplate is the same as the electrical outlet to be used for the machine. The outlet must be properly grounded! Failure to follow safety procedures could result in serious injury.

A pressure regulator/filter and length of pneumatic hose required to connect the Digital Absolute Permmeter to the regulator/filter has been included with the Digital Absolute Permmeter.

NOTICE *The compressed air should be free of dirt, debris and condensate. Debris and condensate will cause damage to the Digital Absolute Permmeter.*

4.5 Connecting Power and Set-Up

1. Verify the voltage on the specification plate located on the back of the Digital Absolute Permmeter. Connect the power cable supplied with the tester into the Power Plug Receptacle located on the back of the Digital Absolute Permmeter (Item 3, Figure 1).

Some areas may require an electrical plug that is not supplied with the power cord to properly conform to the specific electrical outlet. These special electrical plugs will need to be purchased separately by the customer.

2. Verify the proper voltage of the electrical outlet before plugging the power cord into the outlet. Connect power cord to the AC electrical outlet that is free of disturbances/fluctuation and is properly grounded.

NOTICE *It is highly recommended that a voltage stabilizer/filter (line conditioner) is installed between the electrical outlet and the inlet of the Digital Absolute Permmeter. This device will help to ensure proper performance of the Digital Absolute Permmeter.*

3. Assemble the provided pneumatic regulator/filter according to the original equipment manufacturer's instructions supplied with the regulator/filter.
4. Connect the assembled pneumatic regulator/filter to the incoming compressed air line.
5. Connect the Digital Absolute Permmeter to the pneumatic regulator/filter using the pneumatic air hose and fittings included with the unit. Connect the air hose from the outlet of the regulator/filter to the air inlet (Item 5, Figure 1) located on the back side of the Digital Absolute Permmeter. Secure the air hose to the air inlet with the provided connector that is attached to the air inlet.
6. Using the supplied air regulator/filter adjust the air pressure to 2.5 bar (36 psi). Refer to the manufacturer's manual for the regulator/filter for instructions on regulating air pressure.

4.6 Filling the Digital Absolute Permmeter with Liquid

1. Gently remove the Gasometric Drum (Item 12, Figure 3) from the Permmeter.

NOTICE *Be careful not to bend the Position Indication Rod (Item 11, Figure 3) or to lift or transport the drum using the Position Indication Rod. Bending or flexing the rod may affect how the rod is sensed. Be extremely careful when setting the Gasometric Drum down after removing from the Permmeter. Never allow excessive pressure/force to be applied to the Position Indication Rod. If the rod is bent, the Permmeter will not function correctly.*

NOTICE *It is highly recommended to use an antifreeze that provides corrosion protection (automotive modern antifreeze).*

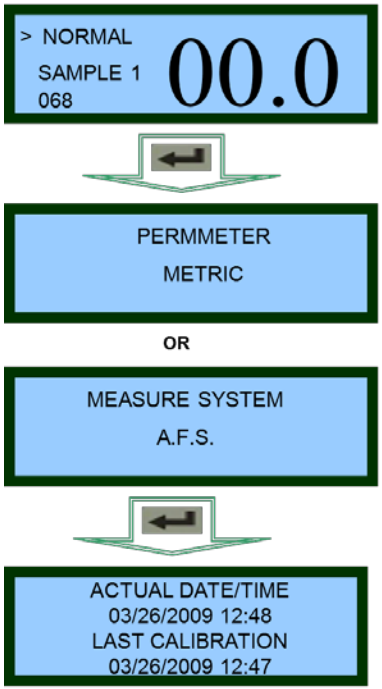
2. Plug the air chamber tube with a cork (or similar plug) to prevent moisture from entering the air chamber (Item 14.2, Figure 4).
3. Prepare a 2850ml mixture of 10% antifreeze and 90% distilled water.
4. Pour the ethylene glycol/distilled water mixture into the Liquid Chamber (Figure 4).
5. Verify that the liquid mixture is up to the midpoint of the Water Level Sensors (Item 13, Figure 4).
6. If the liquid mixture is not up to this level, measure out another 100ml solution of 90% distilled water and 10% antifreeze and add to the Liquid Chamber (Figure 4) accordingly.

4.7 Changing the Digital Absolute Permmeter Internal Time

The Digital Absolute Permmeter is calibrated, and the time is set just before shipment. If the Permmeter resides in a time zone that is different than the factory, the time can be set to the proper local time.

1. Turn the Permmeter on by pressing the Power Switch (Item 1, Figure 1) to the “on” position.

2. The Permmeter will begin its startup sequence and its screen will stabilize after a few seconds.
3. From the "Normal" mode (Item 9.1-3), Figure 6), press the Enter Button ↵ two times until the "Actual Date/Time" and "Last Calibration" date are displayed as shown in Graphic 1. (Note: Values shown in Graphic 1 may differ by machine.)



Graphic 1: Showing sequence of operation to enter into the Actual Date/Time and Last Calibration screen.

4. Press the Right Arrow Button » until the digit that needs to be changed is underlined.
5. Press the Down Arrow Button » or Up Arrow Button « to modify the value accordingly.

6. If only one digit needs to be changed, press the Enter Button  once and it will return the Permmeter to the Normal Mode (9.1-3, Figure 6) screen. Otherwise, return to Step 2.
7. The equipment is ready to start operation.

4.8 Airborne Noise Emission

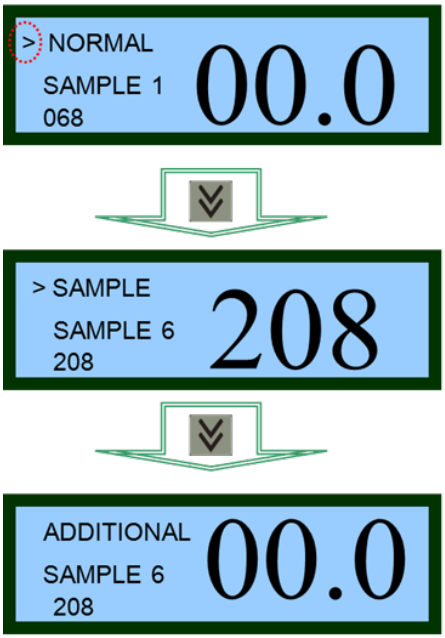
Regarding airborne noise emission by the Digital Absolute Permmeter, there is no motor or other noise emitted by this machinery other than the click of a solenoid valve being operated. As such, the equivalent continuous A-weighted sound pressure level at the workstation does not exceed 70dB(A).

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 Navigating the Various Modes of Operation

1. Ensure that the pneumatics and power are connected and set properly.
2. Ensure the Permmeter is turned on.
3. The default screen is considered the “Normal” mode which is shown in Graphic 2. The mode can be determined by looking at the Mode of Permmeter (Item 9.1-3, Figure 6).
4. By pressing either  or  (Items 9.4 & 9.5, Figure 5) on the Control Panel (Item 9, Figure 2), the various “Normal”, “Sample” and “Additional” modes can be cycled through.



Graphic 2: Showing display progression of the "Normal", "Sample" and "Additional" screens.

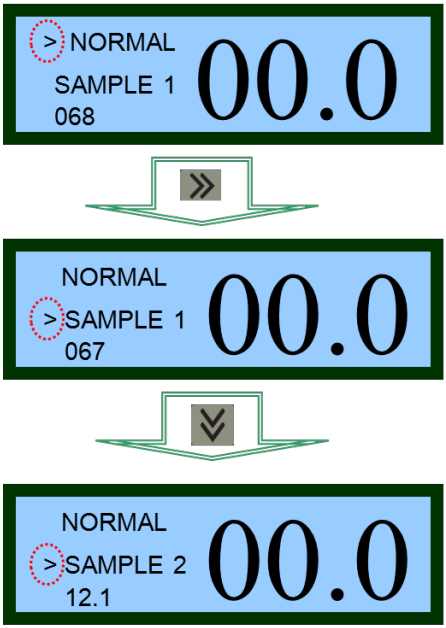
5.2 Changing the Sampling Location

The Digital Absolute Permmeter is capable of storing six (6) Sample Names (Item 9.1-4, Figure 6) and values deemed "Sample 1" through "Sample 6". These are indicated by the Location Name (Item 9.1-4, Figure 6) and Previous Location Value (Item 9.1-5, Figure 6).

TO CHANGE THE SAMPLE NAME:

1. Ensure the pneumatics and power are connected and set properly.
2. Ensure the Permmeter is turned on.
3. The Selection Indicator circled in Graphic 3, shows if the mode of the Permmeter or the location Name is selected. By pressing the Right Button (Item 9.6, Figure 5) on the Control Panel, the two can be cycled through.

4. Once the Location Name is selected [indicated by the blinking Selection Indicator], the Sample Name and its stored value can be cycled.
5. By pressing either ⩔ or ⩓ on the Control Panel, the various Location Names can be cycled through.
6. Once the Permmeter is cycled and the sample permeability is captured, it will be stored in the displayed Location Name shown on the display.



Graphic 3: Showing the changing Location Name (9.1-4) in "Normal" mode.

5.3 Permeability Direct Measurement (Normal Mode)

This section applied to using the following accessories:

- Standard green sand specimen 50mm x 50mm (2" x 2" AFS)
- Shell Permeability Accessory (Model 42105A)
- Base Permeability Accessory (Model 42105C)

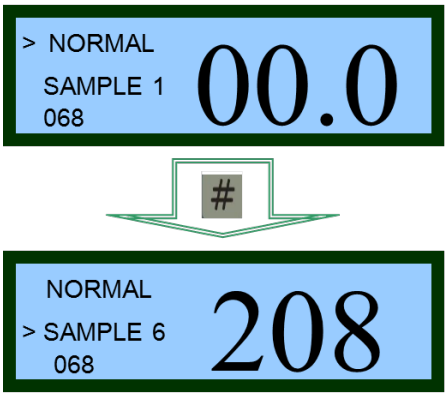
The Digital Absolute Permmeter uses this mode to check the permeability of a standard 50mm x 50mm (2” x 2” AFS) sand sample, that is prepared in a Sand Rammer (Model 42100) or Pneumatic Squeezer (Model 42160) shell permeability, and base sand permeability.

TO PERFORM A DIRECT PERMEABILITY IN THE NORMAL MODE:

1. Ensure that the pneumatics and power are connected and set properly.
2. Ensure the Permmeter is turned on.
3. Ensure the Permmeter is in the “Normal” mode of operation as directed in Section 5.1 and as shown in Graphic 4.
4. Place the Specimen Tube containing the prepared sand specimen onto the Specimen Tube Support (Item 8, Figure 2) by pushing the tube down onto the rubber support to create an airtight seal between the two components.
5. Press the Start Button # (Item 9.2, Figure 5).
6. The Gasometric Drum will ascend up to a fixed height and then it will start descending and passing 500 ml of air through the specimen.
7. When the flow is finished, the Value of Permeability (9.1-1, Figure 6) will show on the Display, which will remain until the Start Button # is pressed again, or the Power Switch (Item 1, Figure 1) is turned off.

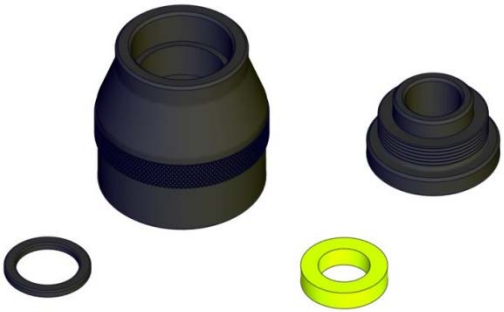
The stored values in the various sample names will be stored in memory - even when turned off.

8. The test is now complete, and the sample can be removed, and another sample can be tested by repeating the steps above.



Graphic 4: Showing initial display and value after testing a sample of sand.

5.4 Shell Permeability Accessory



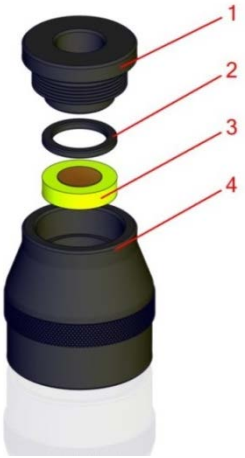
Part No. 0042105A

5.4.1 Description

This is an accessory to the Digital Absolute Permmeter (Model 42105), which determines permeability in mold samples of coated shell sands.

The samples, prepared by the Test Pieces Blower (Model 42109), have a height and diameter that keep the relationship between height and cross section of standard samples. In this way, comparison between values is uniform.

Lateral tightness in the specimen is achieved by pressing the specimen into the Specimen Retaining Ring. The unit is supplied with a Base, Spacer, a Knurled Nut, and one Specimen Retaining Ring (shown with a standard shell sand sample).



42105A Assy

Item No.	Description
1	Knurled Nut
2	Spacer
3	Specimen Retaining Ring
4	Base

5.4.2 Operation

1. Prepare the sand sample with the Test Pieces Blower, or other standard method, and place the specimen within the Specimen Retaining Ring, taking care not to erode the edges.

Sand Specimen

Sand Specimen inserted into the Specimen Retaining Ring

2. Place the sample with the Specimen Retaining Ring in the Shell Permeability Accessory, then place the Spacer on top of the Specimen Retaining Ring. Fasten the Knurled Nut to avoid any air leakage.

Specimen Retaining Ring with Sand Specimen inserted into accessory

Specimen Retaining Ring with Sand and Spacer inserted. into accessory

Accessory with Knurled Nut in place

3. With the Digital Absolute Permmeter ready to operate, place the Shell Permeability Accessory on the sample support and start the equipment as instructed in Section 5.3.

Accessory mounted on Pedestal of Permmeter

4. Make three readings and take the average.
5. Remove the Shell Permeability Accessory from the Digital Absolute Permmeter, unfasten the Knurled Nut, change the sample to be tested and repeat the procedure.

5.5 Mold Permeability Accessory

Part No. 0042105B

5.5.1 Description

This accessory, when used with the Digital Absolute Permmeter (Model 42105), determines molding permeabilities on foundry line molds.

It has a Probe which is applied on the mold's surface, attached by a rubber hose to another head that fits in the Digital Absolute Permmeter. This accessory has a Connecting Hose for the Permmeter, made of soft rubber, and a Measuring Probe with a Rubber Gasket. A longer tube may be used if test conditions require it.

The air used for measuring is diffused in the body of the mold in an undefined manner. Without being able to comply with all parameters that affect permeability, this determination is mainly useful to control the porosity of the superficial compactness of the part of the mold being tested.

In all cases, the parasitic resistance of the unit must first be determined by setting the Permmeter in the "Sample" mode with its Measuring Probe in the air. Afterwards, with the apparatus set in the "Additional Permeability" mode, the Probe is pressed against the surface of the mold, and the final reading can be made.

5.5.2 Operation

When the permeability of a porous body cannot be directly measured, it is necessary to add to the percolating air circuit some kind of device that imposes an additional resistance. This is the case for the Mold Permeability Device (Part No. 0042105B).

Proceed as follows:

1. Ensure that the pneumatics and power are connected and set properly.
2. Ensure the Permmeter is turned on.
3. Ensure the Permmeter is in the “Sample” mode of operation as directed in Section 5.1 and as shown in Graphic 5.
4. Place the Mold Permeability Accessory (Part No. 0042105B) onto the Specimen Tube Support (Item 8, Figure 2).
5. Form a seal with one hand over the sampling probe of the Mold Permeability Accessory as shown in Figure 5.5.1.

Figure 5.5.1 – Showing sealing of the Mold Permeability Accessory with hand

6. While continuing to seal the Mold Permeability Accessory with one hand, use the other hand to press the Start Button # .

7. The Gasometric Drum will ascend up to its apex as shown in Figure 5.5.2. IMMEDIATELY following this ascent, release the seal on the sampling Probe on the Mold Permeability Accessory and allow the Gasometric Drum to ascend. The air resistance of the Mold Permeability Accessory is now stored in the Permmeter and is shown as "0000".

Figure 5.5.2: Gasometric drum ascending to its apex.

8. Change the Permmeter into the "Additional" mode of operation directed in Section 5.1 and as shown in Graphic 5.
9. Rest the sampling Probe over the portion of the mold or specimen to be tested.

NOTICE *The pressure applied must be sufficient enough to assure air tightness between the elastic rubber edge of the sampling Probe and the surface of the mold or specimen but not so high as to deform it.*

10. While still holding the sampling Probe on the mold or specimen, press the Start Button #.

Figure 5.5.3: Showing sample of a specimen and the starting of the Permmeter

11. When the flow is finished, the Value of Permeability (Item 9.1-1, Figure 6) will show on the display. This will remain displayed until the Start Button # is pressed again of the Power Switch (Item 1, Figure 1) is turned off. This value is the absolute permeability of the sample with the effects of the fixture interference.

The stored values in the various sample names will be stored in the memory even when turned off.

12. The test is now complete, and the sample can be removed, and another sample can be tested by repeating the steps above.

5.6 Base Permeability Accessory

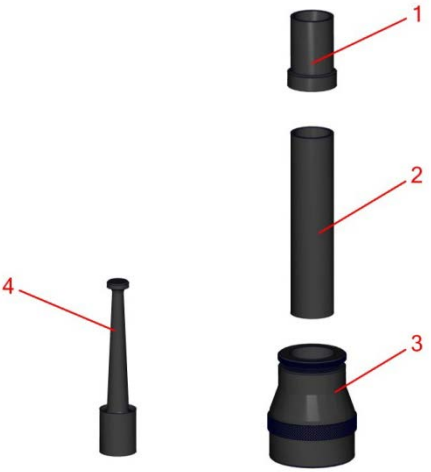
Part No. 0042105C-M / 0042105C

5.6.1 Description

Using this device as an accessory to the Digital Absolute Permmeter (Model 42105), the base permeability of loose porous sand masses can be determined. It consists of a 2-piece metallic Tube, a Screen fit into a metallic Base, and a metallic Weighted Foot.

NOTICE

BEFORE USE: This accessory is shipped with a light coating of oil for rust prevention. Remove this oil by washing with alcohol and allowing it to dry thoroughly. If the oil is not removed the sand will stick to it.

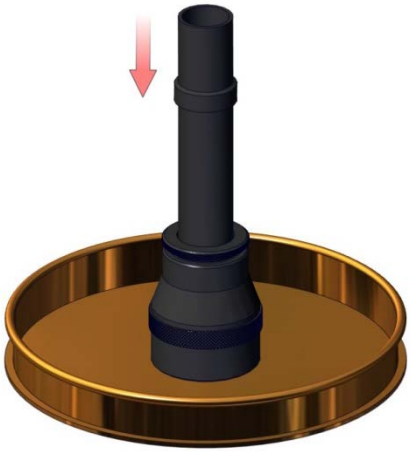


42105C Assy

Item No.	Description
1	Upper Tube
2	Lower Tube
3	Base
4	Weighted Foot

5.6.2 Operation

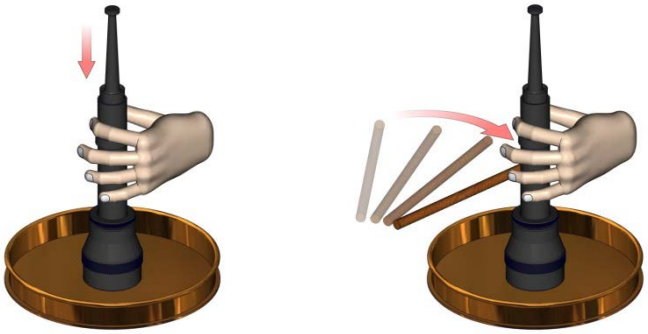
1. Remove accessory from tube pedestal of Permeability Machine. Place removable Upper Tube onto Lower Tube. Place the assembly onto a tray. This will catch the sand that spills.



2. While holding the Upper Tube in place at the top of the tube, fill the Lower Tube with the sand to be tested until the sand level is mid-way up the Upper Tube section of the accessory.

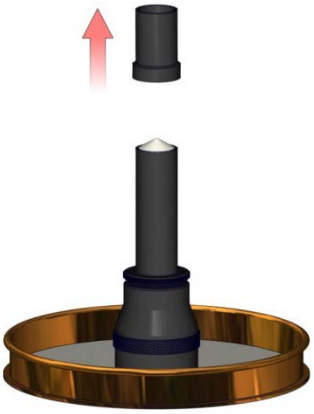
3. Place the Weighted Foot on top of the sand. Hold the Upper Tube in place and tap the tube until the Weighted Foot stops setting (this takes approximately one minute).

If the Weighted Foot does not settle properly, large variations in the results will occur. For tapping the tube, it is recommended to use a hardwood dowel approximately 10mm x 200mm. The density of a hardwood dowel will give a firm tapping action.

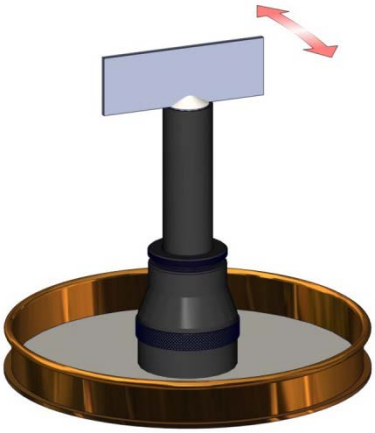


4. While holding the Upper Tube section, carefully remove the metallic Weighted Foot.

5. Remove the Upper Tube, letting the sand spill into the tray.



6. Strike off the top of the Lower Tube with a straight edge.



7. Carefully place the tube onto the Base Permeability Machine pedestal.

8. Follow the procedure online for the Permeability Direct Measurement (Normal Mode) as online in Section 5.3.
9. Multiply the digital readout by 10. This answer is the test result for the Base Sand Permeability.

This procedure Works for both Metric and AFS tubes.

5.7 Additional Permeability Accessory

Part No. 0042105D

5.7.1 Description

This accessory to the Digital Absolute Permmeter (Model 42105) determines permeabilities in standardized cylindrical samples prepared from core or self-curing sand according to metric standard of 50mm x 50mm or 2” x 2” AFS standards.

5.7.2 Operation

1. Place the core specimen into the Specimen Holder Assembly down from the upper end (the conical mouthpiece containing the screws**).**
2. Inflate the Internal Rubber Sleeve by squeezing the rubber Inflation Bulb. When the Internal Rubber Sleeve is sealed tightly against the Sand Specimen, close the valve located on the outlet of the rubber Hand Bulb.

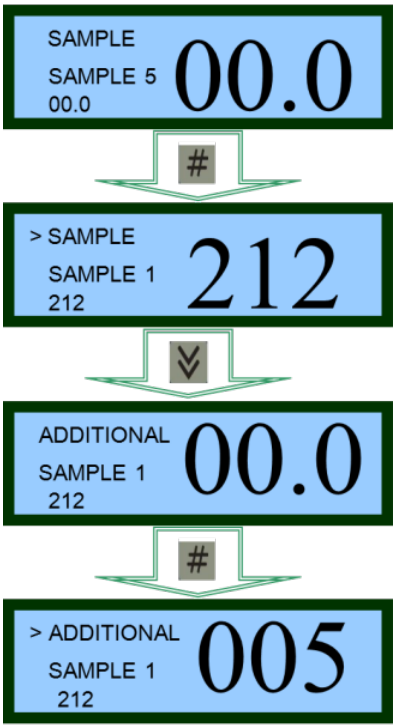
The Inflation Internal Rubber Sleeve is inflated to tighten the lateral cylindrical surface of the core sample. Thus the measuring air of the Permmeter will flow through the sample only from the lower to the upper flat face, in the same way as with a standard sample within the Sample Tube.

3. Insert the Additional Permeability Accessory (Part No. 0042105D) on the Specimen Tube Support (Item 8, Figure 2).
4. Ensure that the pneumatics and power are connected and set properly.
5. Ensure the Permmeter is turned on.
6. Ensure the Permmeter is in the "Sample" mode of operation as directed in Section 5.1 and as shown in Graphic 5.
7. Press the Start Button #.
8. The Gasometric Drum will ascend up to a fixed height and then it will start descending and passing 500 ml of air through the specimen.
9. When the flow is finished (approximately 3 to 10 seconds later), the Value of Permeability (Item 9.1-1, Figure 6) will display the permeability value. This will remain displayed until the Start Button # is pressed again or the Power Switch (Item 1, Figure 1) is turned off).
10. Change the Permmeter into the "Additional" mode of operation as directed in Section 5.1 and as shown in Graphic 5.
11. Remove the Additional Permeability Accessory from the Pedestal.
12. Remove the core sample from the Additional Permeability Accessory by opening the valve and deflating the rubber sleeve.
13. Coat the core specimen using the foundry standard coating procedure.
14. Once the core specimen and coating are dry, follow Steps 1-3.
15. Press the Start Button #.
16. When the flow is finished (approximately 3 to 10 seconds later), the Value of Permeability will display the permeability value. This will

remain displayed until the Start Button # is pressed again or the Power Switch (Item 1, Figure 1) is turned off. This value is the absolute permeability of the coating without the effects of the core specimen.

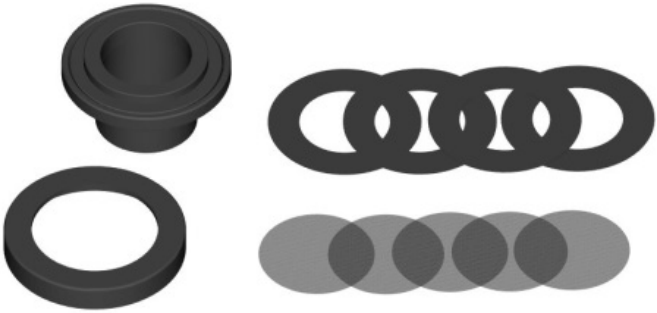
The stored values in the various sample names will be stored in the memory - even when turned off.

17. The test is now complete, and the sample can be removed, and another sample can be tested by repeating the steps above.



Graphic 5: Showing the order of operations for using the Digital Absolute Permmeter with the 42105D

5.8 Refractory Coating Accessory



Part No. 0042105E

5.8.1 Description

This accessory to the Digital Absolute Permmeter (Model 42105) determines permeabilities of core or mold coatings imparted upon the included screens and through a controlled orifice (pictured with spare parts).

42105E Assy

Item No.	Description
1	Clamping Ring
2	Centering Ring
3	Metal Screen
4	Base
5	Rubber Gasket

5.8.2 Operation

1. Select a clean screen for testing.

NOTICE

The included stainless-steel screens are reusable. However, they must be cleaned with a cleaner recommended by the coating manufacturer and dried thoroughly. The rings also must be flat before coating. Through shipping, handling or simple wear and tear, these may be bent and should be straightened prior to use. Over time, the screens will degrade and should be replaced accordingly.

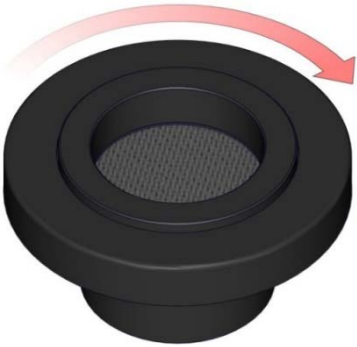
2. Holding one edge of the metal screen with a small pair of tongs, dip the screen in a representative sample of the coating to be tested.
3. Hang the coated screen and allow it to dry for the normal time permitted per the coating manufacturer's instructions.
4. If the Clamping Ring is screwed on the Coating Accessory Base, simply turn the ring counterclockwise until the ring is free.
5. Place one (1) rubber gasket on the Coating Accessory Base so that the center hole is lined up with the Coating Accessory Hole.

6. Place the coated screen in the center of the gasket.

7. Place another rubber gasket over the center of the screen and in line with the first rubber gasket.

8. Place the Clamping Ring over the rubber gaskets and screen.

9. While holding the Centering Ring in place with one hand, turn the Clamping Ring clockwise until the rubber gaskets are compressed on the screen.



NOTICE *Do not overtighten the Clamping Ring. Over-tightening will destroy the gaskets and coated sample.*

10. Carefully place the Coating Permeability Accessory on the Absolute Digital Permmeter.
11. Follow the procedure outline for the Permeability Direct Measurement (Normal Mode) as outlined in Section 5.3.
12. Once the test is completed, the Coating Permeability Accessory can be disassembled, and the screen cleaned and prepared for another test.

6 Maintenance and Calibration

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 permeability meter is a precise mechanical device and needs appropriate care.

Before performing any maintenance, turn off the Lock-out air supply valve and remove the electrical power cord from the wall receptacle. The Digital Absolute Permmeter must be put into Zero Mechanical State (ZMS). Follow Lockout and Tagout procedures before servicing.

*Replace all panels before operating the machine. A hazardous voltage is present, can cause electric **shock** or **burn**, and will result in serious injury.*

6.1 Weekly Maintenance

1. Check the liquid level and, if necessary, add the liquid solution as described in Section 4.6, Paragraph 6. A higher level will introduce errors of measurement**.**
2. Check the compressed air filter and drain out the condensate.
3. Verify the general performance, using the permeability standard specimen (Part No. 0042132) as described in Section 6.3.
4. Check air pressure at the regulator/filter and adjust as required.
5. Remove and clean any loose sand/dirt from the outside of the tester.

6.2 Quarterly Maintenance (every three months)

1. Using the top of the drum (see Figure 3), gently remove the Gasometric Drum (Item 12, Figure 3).

NOTICE *Be careful not to bend the Position Indication Rod (Item 11, Figure 3) or to lift or transport the drum using the Position Indication Rod. Bending or flexing the rod may affect how the rod is sensed. Be extremely careful when setting the Gasometric Drum down after removing from the Permmeter. Never allow excessive pressure/force to be applied to the Position Indication Rod. If the rod is bent, the Permmeter will not function.*

2. Empty and properly disposed of (according to local regulations) the sealing liquid (10% ethylene glycol/90% distilled water).
3. Gently clean the central stem of the Gasometric Drum with 00 grade (very fine) steel wool until they are completely free of any stains.
4. Gently clean the central Teflon bearings with a clean and dry cloth.
5. Gently clean the Liquid Chamber (Figure 4) and be sure to remove any residue from the side walls.
6. Change the sealing liquid (10% ethylene glycol anti-freeze and 90% water) as described in Section 4.6.
7. Replace the Gasometric Drum and verify that the Position Indication Rod (Item 11, Figure 3) and Gasometric Drum (Item 12) descend smoothly and continually. If they do not, they may have been bent or misaligned. If this occurs, it is recommended that the unit be sent back to Simpson for repair.

6.3 Calibration

The periodic calibration of the Digital Absolute Permmeter by the user requires a Calibration Kit (Model 42113) or both a Permeability Standard (Model 42132) and Pressure Manometer (Model 42133). If the user does not have the kit or the necessary pieces, the apparatus should be sent periodically to the manufacturer, or a technical service should be requested.

A complete calibration should be made every six months.

6.3.1 Calibration Accessories

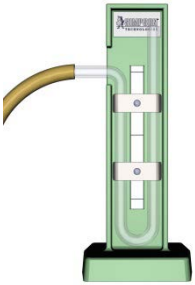
1. Permeability Standard (Part No. 0042132)

The Permeability Standard is used to verify and calibrate the Digital Absolute Permmeter. The accuracy of the Permmeter can be verified in seconds.

Specifications	Permeability Standard
Diameter	ca. 64 mm (2.5”)
Height	ca. 121 mm (4.75”)
Weight	ca. 1.5 kg (3.3 lbs.)

2. Pressure Manometer (Part No. 0042133)

The Pressure Manometer is used to calibrate the Digital Absolute Permmeter. The Manometer is required to accurately verify and adjust the drum weight on the Permmeter.



Specifications	Permeability Standard
Length	ca. 419 mm (16.5”)
Width	ca. 203 mm (8”)
Height	ca. 311 mm (12.25”)
Weight	ca. 10 kg (22 lbs.)

6.3.2 Levelling

Before calibration can begin, the Permmeter needs to be level as described in Section 4.3.

6.3.3 Water Level

In order to verify the Permmeter is operating correctly, the water level must be verified to be satisfactory as outlined in Section 4.5.

6.3.4 Hermeticity

This procedure requires a Permeability Standard (Model 42132) - also supplied in the Calibration Kit (Model 42113).

1. Place the Permeability Standard (Part No. 0042132) on the Specimen Tube Support (Item 8, Figure 2).
2. Plug the top of the Permeability Standard with the included rubber stopper. Make sure there is a good seal between all the mating components.
3. Ensure that the pneumatics and power are connected and set properly.
4. Ensure the Permmeter is turned on and in Normal Mode as shown in Section 5.1.

5. Press the Start Button #. The Gasometric Drum will ascend up to the superior dead point and should remain there without going up or down. If it does not descend after reaching its highest point after 10 seconds, the unit's hermetic seal is functioning correctly.
6. If it starts descending, there is a leakage in the air circuit. This leakage must be found and corrected. If this cannot be found, please contact your local Simpson office for further help.

6.3.5 Permeability Standard

This procedure requires a Permeability Standard (Model 42132) - also supplied in the Calibration Kit (Model 42113).

1. Insert the Permeability Standard (Part No. 0042132) on the Specimen Support (Item 8, Figure 2).
2. Ensure that the pneumatics and power are connected and set properly.
3. Ensure the Permmeter is turned on and in Normal Mode as shown in Section 5.1.
4. Check the fluid level as this will have an effect on the permeability reading as indicated in Section 4.6.
5. Press the Start Button #.
6. After the cycle has completed, record the Value of Permeability (Item 9.1-1, Figure 6) on Display (Item 9.1, Figure 5) of the Permmeter with the value printed on the Permeability Standard.
7. Repeat Steps 4 and 5 a total of three times.
8. Average these three values.
9. Compare the average calculated in Step 8 with the value printed on the Permeability Standard (Model 42132). The average must not differ more than 5% from the certified value of the Permeability Standard. If the calculated value is out of tolerance, then proceed with the Percolating Pressure Control procedure in Section 6.3.6.

The Permeability Standard (Model 42132) is calibrated to both AFS and metric values. Make certain the correct certified permeability value is noted from the Permeability Standard. If the Permmeter is set to AFS mode, use the AFS certified calibration number; if the Permmeter is set to metric mode, use the metric certified calibration number.

6.3.6 Percolating Pressure Control

This procedure requires a Pressure Manometer (Model 42133) - also, supplied in the Calibration Kit (Model 42113).

1. Place the Pressure Manometer U-Tube (Item 16, Figure 7) on a level surface.
2. Prepare a solution of distilled water combined with just a few drops of liquid soap.
3. Fill the Pressure Manometer U-Tube to the center Zero Levels on both branches.
4. Insert the Stopper Valve (Item 18, Figure 7) into the specimen tube.
5. Insert the Rubber Hose Nipple on the Stopper Valve into one end of the Rubber Hose (Item 17, Figure 7).
6. Insert the other end of the Rubber Hose into the Rubber Hose Nipple on the Pressure Manometer U-Tube.
7. Ensure there is no leakage in the arrangement.
8. Insert the specimen tube on the Specimen Support (Item 8, Figure 2).
9. Ensure that the pneumatics and power are connected and set properly.
10. Ensure the Permmeter is turned on and in Normal Mode as shown in Section 5.
11. Press the Start Button #. The Gasometric Drum (Item 12, Figure 3) will ascend up to the superior dead point and should remain there without going up or down.

12. Slowly open the Control Valve (Item 18.1, Figure 9) on the Stopper Valve (Item 18, Figure 7) so that the Gasometric Drum slowly descends.
13. On the Digital Display (Figure 6), watch just below the Mode of Permmeter (9.1-3) display; one, two and then three dots will be displayed as the Gasometric Drum descends. **Close the Control Valve on the Stopper Valve when two dots appear**.
14. Read the Pressure Manometer U-Tube (Figure 8). The liquid meniscus level should be at the lower left level mark and at the upper right level mark which correlates to a pressure of 100mm of water column ($10g/cm^2$). **If this is the case, the Percolating Pressure Control Calibration is completed.** Otherwise, proceed to the next step.
15. If the pressure is greater or smaller than the set value, correct it by removing the lid of the Calibration Weight receptacle (Item 10.1, Figure 10).
16. If the liquid meniscus level is lower than the left mark, remove several plumb pellets and reassemble the Calibration Weight Receptacle.

    OR

    If the liquid meniscus level is higher than the left level mark, add several plumb pellets and reassemble the Calibration Weight Receptacle.
17. Go back to Step 9 and repeat this procedure until the Percolating Pressure Control Calibration is complete.

7 Apparatus Layout

Figure 1: Back view of Permmeter

Item	Description
1	Power Switch
2	Fuse Holder
3	Power Cord Receptacle
4	RS232 Port
5	Compressed Air Inlet
6	Threaded Drain Port

Figure 2: Front View of Permmeter

Item	Description
7	Leveling Feet (4)
8	Specimen Tube Support
9	Control Panel
10	Gasometric Drum Top

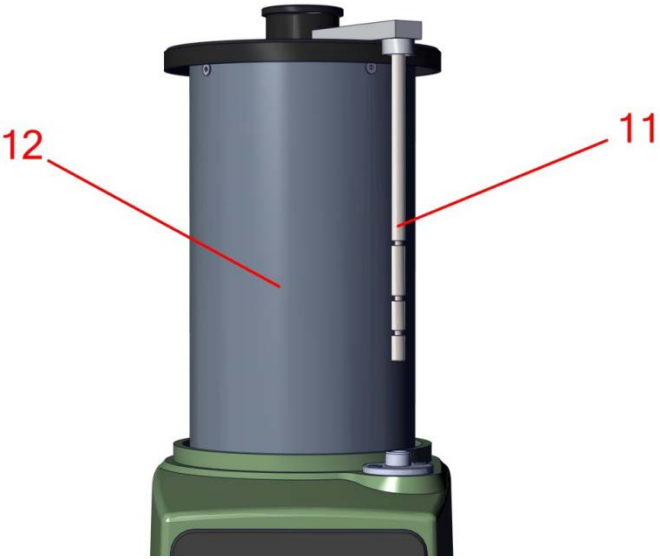


Figure 3: Gasometric Drum being removed from the Permmeter.

Item	Description
11	Position Indication Rod
12	Gasometric Drum

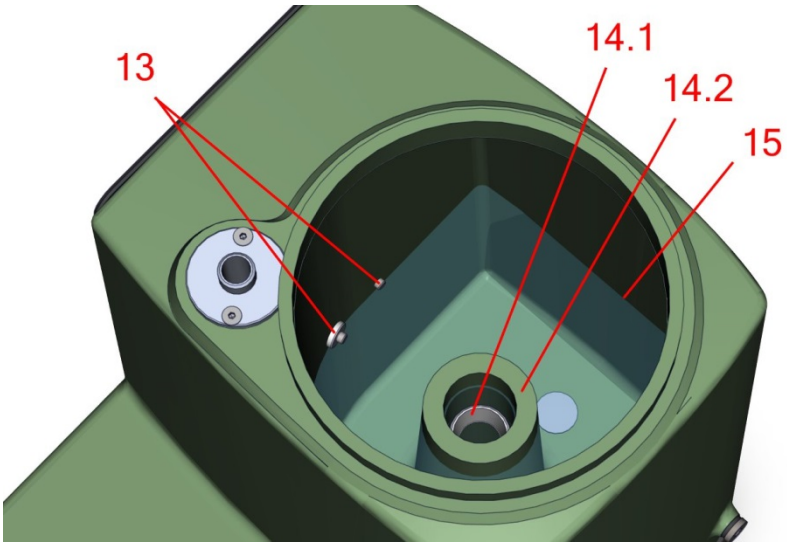


Figure 4: Showing top of Permmeter with Gasometric Drum removed and approximately 2850mL of a 90% distilled water/10% ethylene glycol solution inside the Permmeter.

Item	Description
13	Water Level Indicator Sensors
14.1	Teflon Bearing
14.2	Air Chamber Tube
15	Water Solution Level

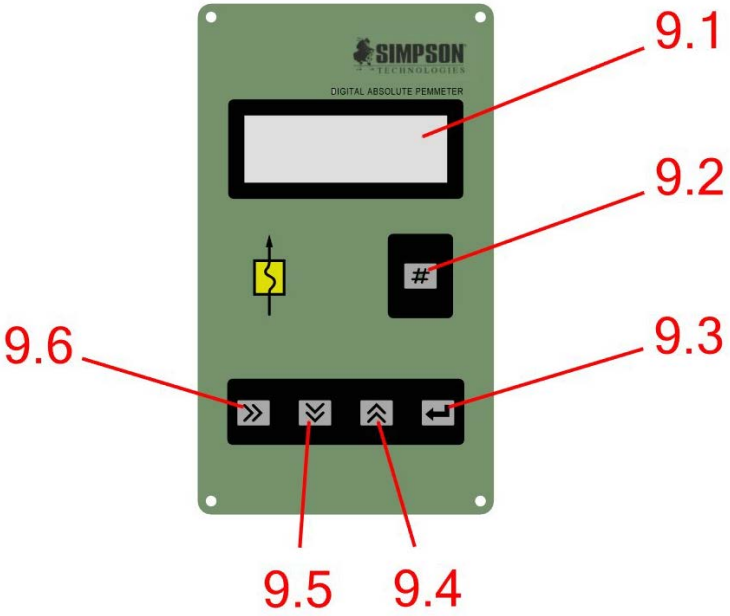


Figure 5: Showing (9) Control Panel for the Permmeter

Item	Description
9.1	Digital Display
9.2	Start Button
9.3	Enter Button
9.4	Up Arrow Button
9.5	Down Arrow Button
9.6	Right Arrow Button

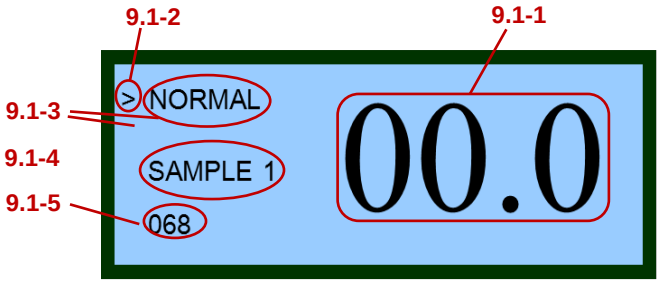


Figure 6: Close up of Digital Display (9.1) on the Permmeter

Item	Description
9.1-1	Value of Permeability
9.1-2	Selection Indicator
9.1-3	Mode of Permmeter
9.1-4	Location Name
9.1-5	Previous Location Value

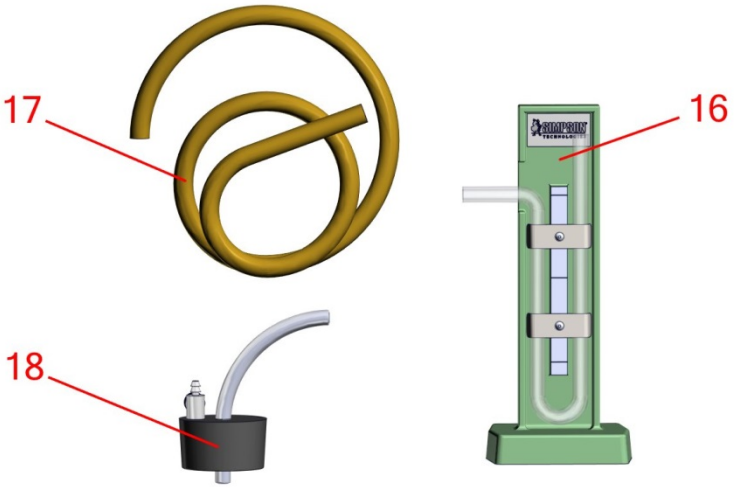


Figure 7: Showing unassembled components of Pressure Manometer Assembly (PN: 0042133)

Item	Description
16	Pressure Manometer U-Tube
17	Rubber Hose
18	Stopper Valve

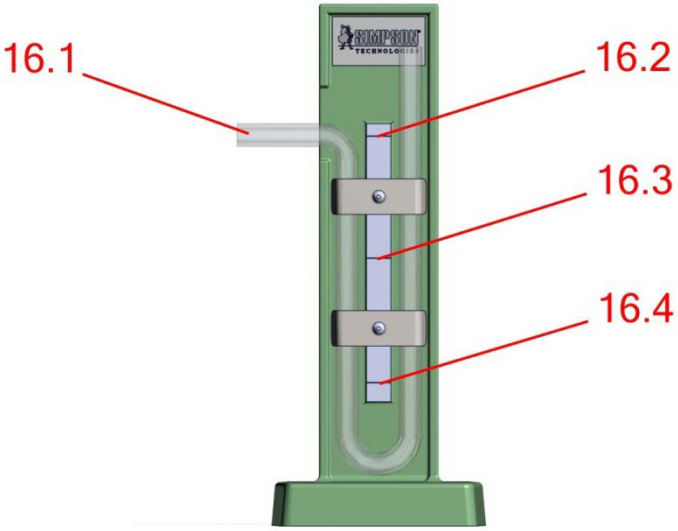


Figure 8: Showing Pressure Manometer "U"-Tube (16) of Pressure Manometer Assembly

Item	Description
16.1	Rubber Nose Nipple (1)
16.2	Upper-Level Line
16.3	Zero Level Line
16.4	Lower-Level Line

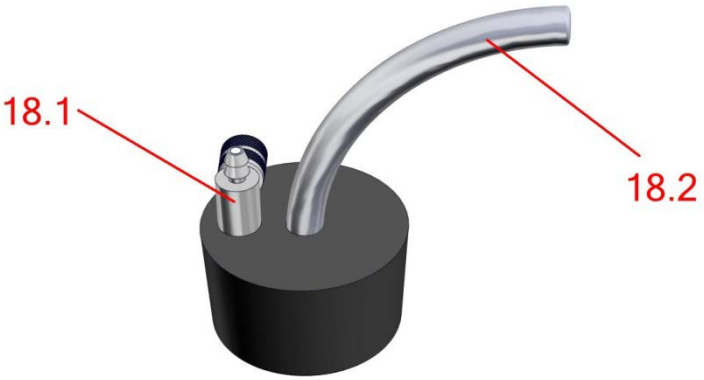


Figure 9: Showing Stopper Valve (18) of Pressure Manometer Assembly

Item	Description
18.1	Control Valve
18.2	Rubber Hose Nipple (2)

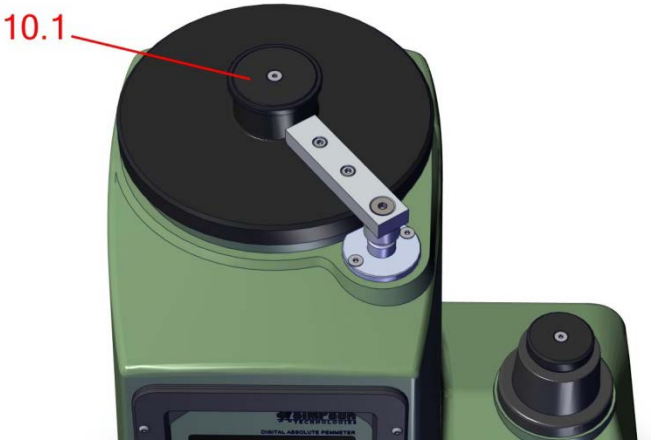


Figure 10: Showing top of Gasometric Drum (10) with Calibration Weight receptacle (10.1)

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
0046034	Rubber Pedestal
0045802	Rubber Foot
214200	Replacement Electronic Pack for Digital Absolute Permmeter

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 www.simpsongroup.com on the "Contact" page.

Parts may be ordered from the sales department via email 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 service@simpsongroup.com:

8.3 Return 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 ensure 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:

- **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, fax, 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 Digital Absolute Permmeter and peripheral equipment.

Electrical Power: Disconnect the electrical power source and verify there is no power on all components being decommissioned.

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

WASTE DISPOSAL

The Machinery and Controls Consists of:

- Iron
- Aluminum
- Copper
- Plastic
- Electronic Components and Circuit Boards

Dispose of the parts in accordance with the applicable regulations.

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