Package Test System
Lippke 4000/4500
User Guide EN

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Lippke 4000/4500

User Guide

EN

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Dansensor A/S

Rønnedevej 18, DK-4100 Ringsted
Denmark
Tel.: +45 57 66 00 88
Fax: +45 57 66 00 99
E-mail: info@dansensor.com
Internet: www.dansensor.com

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1. General Information

Register your product

Thank you for purchasing a **Dansensor** product, we hope that the product will fulfil your needs.

In order to learn more about our customers and the markets we serve, we kindly ask you to fill out the product registration form available on-line at

www.dansensor.com/register

In return we can offer to send important product information to you.

About this Manual

Intended Use of this Manual

- This manual describes the common use and maintenance procedures of the **Lippke 4000/4500** package test systems.
  It is intended for the daily users and should be kept with the equipment for reference at all times.

Reservations

- This manual was written and illustrated using the best possible information available at the time of publication.
- Any differences between this manual and the equipment reflect improvements introduced after the publication of the manual.
- Changes, technical inaccuracies and typographic errors will be corrected in subsequent editions.
- As a part of our policy of continuous improvement, we reserve the right to alter design and specifications without further notice.

Important!

Safety and Use

- Prior to using the equipment it is assumed that it has been properly installed and configured as described in this manual.
- The manufacturer cannot be held responsible for any damage caused by incorrect use of this equipment.

Notes, cautions, warnings and tips!

Throughout the manual notes, cautions, and warnings are indicated with various icons and written in bold like the example below:

CAUTION! Never use hard tools or abrasive materials when cleaning any part of the device.

Explanation

NOTE! The operator should observe and/or act according to the information in order to obtain the best possible function of the equipment.

CAUTION! The operator must observe and/or act according to the information in order to avoid any mechanical or electrical damage to the equipment.

WARNING! The operator must observe and/or act according to the information in order to avoid any personnel injury.

Tips and recommendations

Tips, recommendations and “best practise” advises are indicated as shown in the example below:

TIP! You can choose not to use the rubber mat, as cleaning of the base plate is easier without it.

Safety Instructions

Personnel operating and maintaining the device must be familiar with all aspects of its operation and be proficient in maintenance.
Such personnel should review the following precautions to promote safety awareness.

General

- Always refer to the manual before operating or maintaining the equipment.
- Observe all WARNINGS, CAUTIONS and NOTES.
- Do not open the device. In case of technical problems please contact your service provider.
- Do not cover the machine with a cloth or piece of plastic to protect it from dust, as this prevents free air circulation around the machine and might lead to overheating.
- Do not expose the equipment to heavy moisture or heat and keep it away from direct sunlight.
- Never short circuit or remove safety devices.

Installation

- To ensure the best installation with the least technical problems, please install equipment as described in this manual.
- Only operate the system with the mains voltage indicated on the nameplate.
- Never install the equipment in explosive environments.
- Always use correct fittings when connecting compressed air to the device.
- Provide adequate space around the equipment for proper ventilation.
- The units are Class 1 appliances and must be connected to an earthed mains connection.
- It is the responsibility of the owner and operator(s) of the equipment, that the installation is made in accordance with local rules and regulations.
- The manufacturer cannot be held responsible for any damage caused by incorrect installation of this equipment.

Operation and Maintenance

- Be sure to disconnect compressed air supply hoses and electrical power cables before performing any cleaning or maintenance.
- All panels and protective guards must be in place before operating the equipment.
- When operating or maintaining the equipment always obey the relevant rules and regulations for workers safety.
- Repair or replace damaged power cords immediately.
- Never block gas outlets.

2. Introduction

Lippke 4000/4500

The **Lippke 4000/4500** is an integrated package test system that measures the seal strength and integrity of flexible, rigid or semi-rigid packages. The seal strength and integrity of the package is measured by inflating it using compressed air.

The system consists of a console and one or more accessory kits, each of which is used to test the most commonly used types of packages such as closed packages, open packages, screw top tubes, and IV bags - see "3. Measurement Accessory Kits" on page 17 for details.

Fig. 1. Lippke 4000/4500 Package Test Systems

On 4000-models setting up and testing is done using the controls and display on the instrument front panel whereas the 4500-models use a PC-based software application.
The entry, selection and management of all test parameters is easily and quickly accomplished and multiple test configurations can easily be created and recalled using alphanumeric names.

Test Capabilities

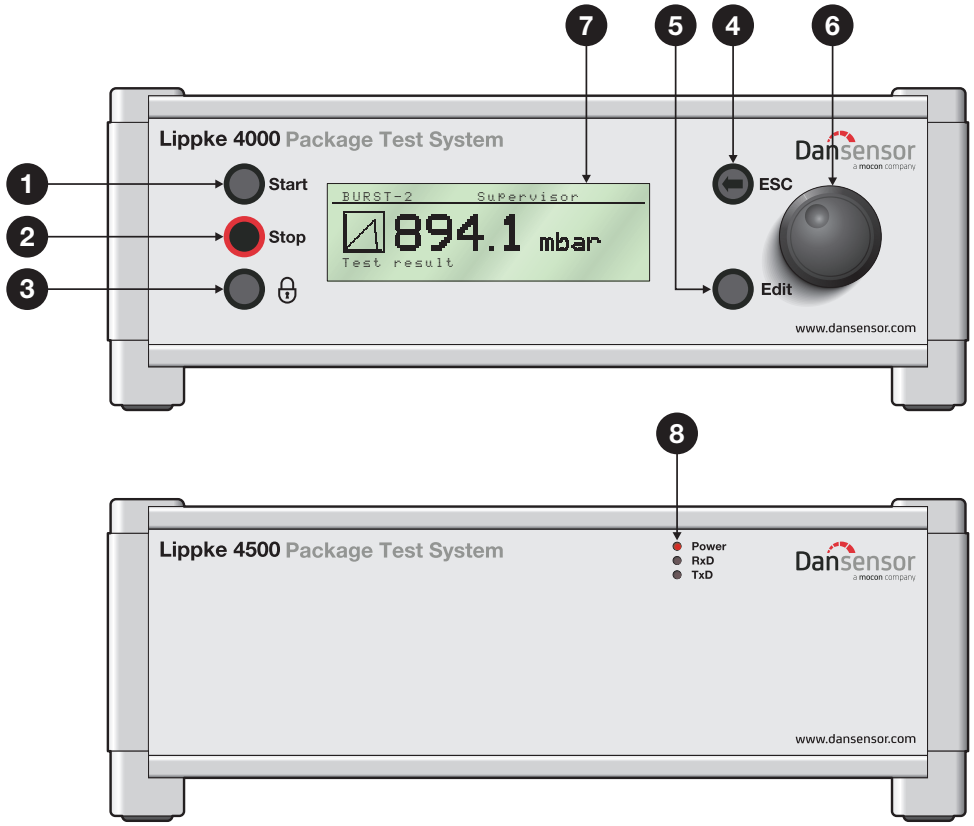
The system can perform a variety of seal strength and package integrity tests.
See "4. Tests" on page 35 for detailed descriptions of each test procedure.

High Flow Valve

The device can be equipped with a High Flow Valve as an option.
The High Flow Valve enables burst testing of larger packages that are more porous.

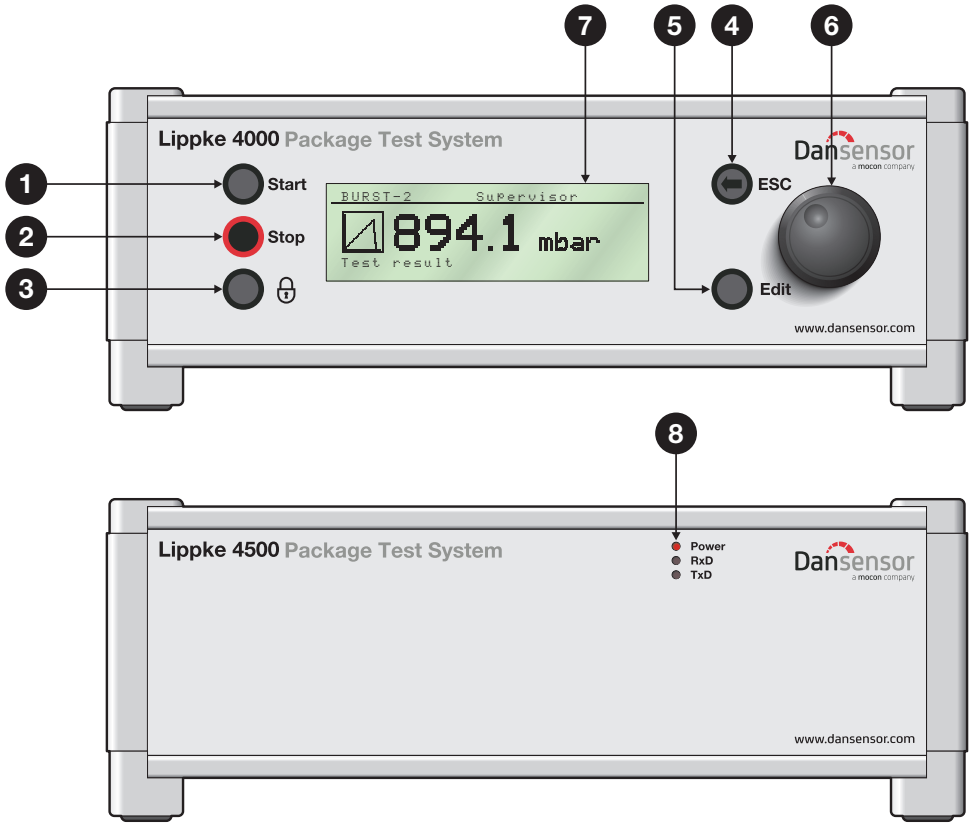
NOTE! A higher flow results in lower sensitivity for low pressures and small packages. When regulating the pressure it might not manage to hit the desired pressure level for a test without overshooting.

Device overview



Device front

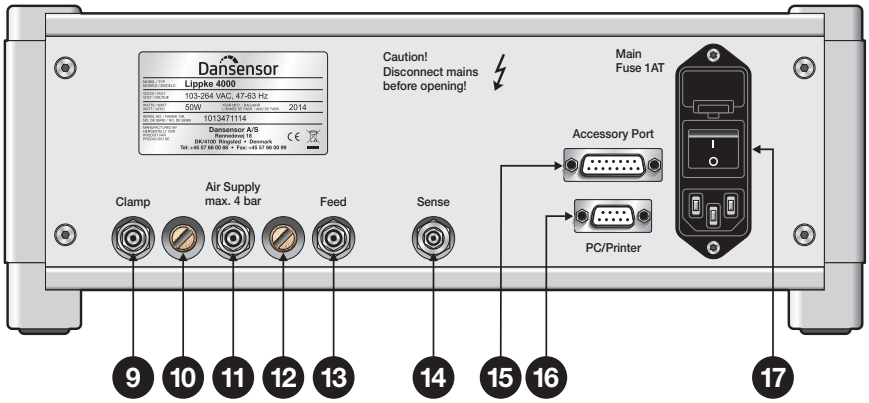
1. **"Start" button** (4000-models only)
   Use button to start a test
2. **"Stop" button** (4000-models only)
   Use button stop a test that is in progress
3. **Key button** (4000-models only)
   Use button to log out an operator when **User Login** is enabled.
4. **"ESC" button** (4000-models only)
   Use button to move back, or up one level in the menu structure.
5. **"Edit" button** (4000-models only)
   Use button for the following functions:
   - Selecting a parameter list for editing.
   - Accepting changes to numeric and alphanumeric fields.
6. **Scroll wheel** (4000-models only)
   Use wheel to scroll through the menu structure (turn) and to select menu items (press).
   It can also be used to edit numeric and alphanumeric fields.



7 **Display** (4000-models only)
Monochrome display for setting up of test parameters and for displaying test progresses and results.

8 **LED indicators** (4500-models only)
The 3 LED indicators indicate the following:

- **Power** (Red) Lit when the instrument is turned on
- **RxD** (Green) Lit when the instrument is receiving data from the computer.
- **TxD** (Green) Lit when the instrument is transmitting data to the computer



Device back

9 **"Clamp" connector**
The "Clamp" output is mainly used for automatic control of the lower clamp bar of the optional PPC 300 II unit and for controlling the valves on the MultiCheck test head.

10 **Ventilation outlet for "Clamp"**
The outlet is fitted with a noise filter.

11 **"Air Supply" connector**
Connector for the device's compressed air supply.

CAUTION! The supply pressure must not exceed the max. pressure indicated on the device.

12 **Ventilation outlet for "Feed"**
The outlet is fitted with a noise filter.

13 **"Feed" connector**
Connector for the measurement accessory air supply outlet.

14 **"Sense" connector**
Pressure measurement inlet connector.

15 **"Accessory Port"**
For connection of a communication cable from PacCheck 3XX (when using the MultiCheck system) of for connection of an external device (ex. a foot switch) for start and stop of the device.

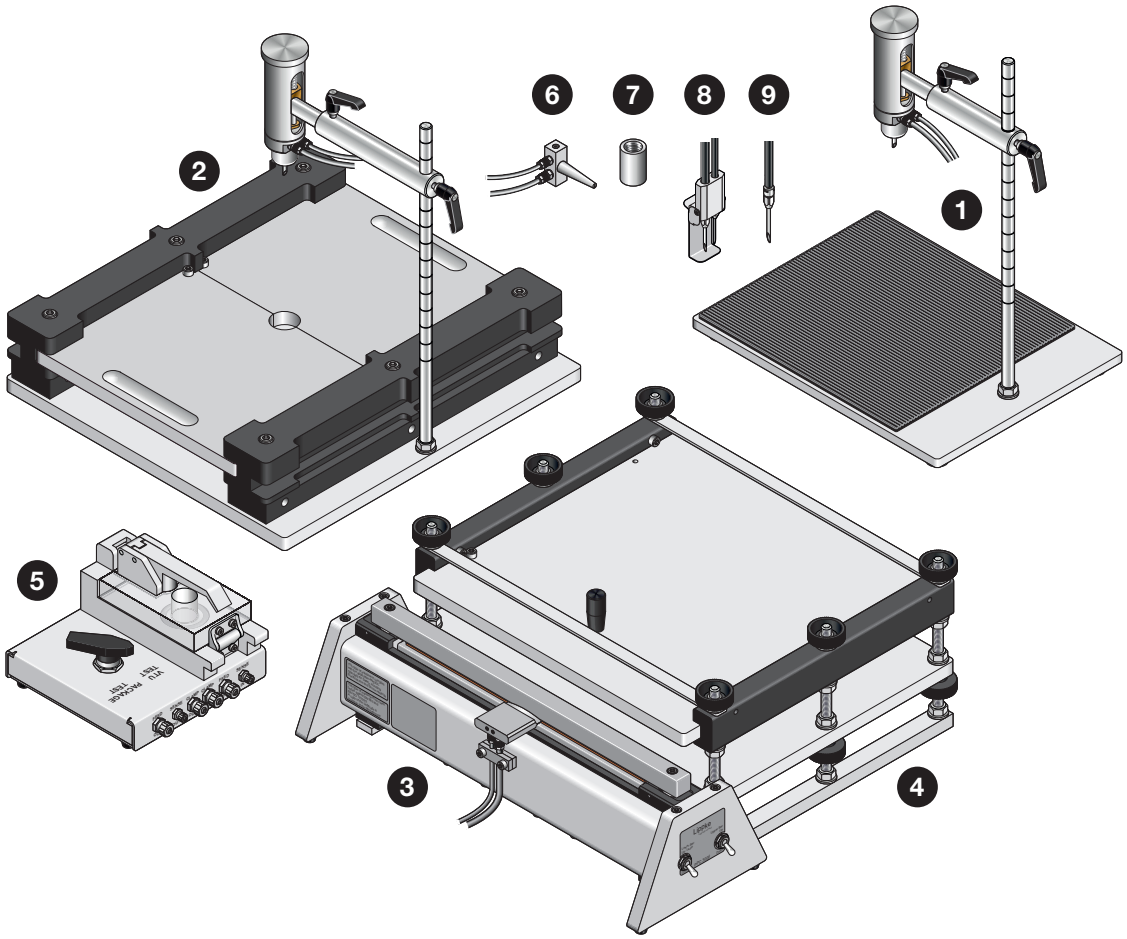
16 **"PC/Printer"**
RS-232 port for connection to a printer or a computer.

17 **Power input module**
The power input module contains the connector for the power cord, the fuse holder and the power ON/OFF switch.

Accessories

A variety of measurement accessory kits are available for the **Lippke 4000/4500** test system.
Each measurement accessory kit is specially designed for testing of the most commonly used types of packages, such as closed packages, open packages, screw top tubes and IV bags.

The kits are:



3. Measurement Accessory Kits

Stand, basic

The basic stand is used to test fully sealed (closed) rigid and semi rigid packages.
There are various kits with different contents available depending on the application, but basically a kit consists of:

1 Adjustable stand

2 Test head

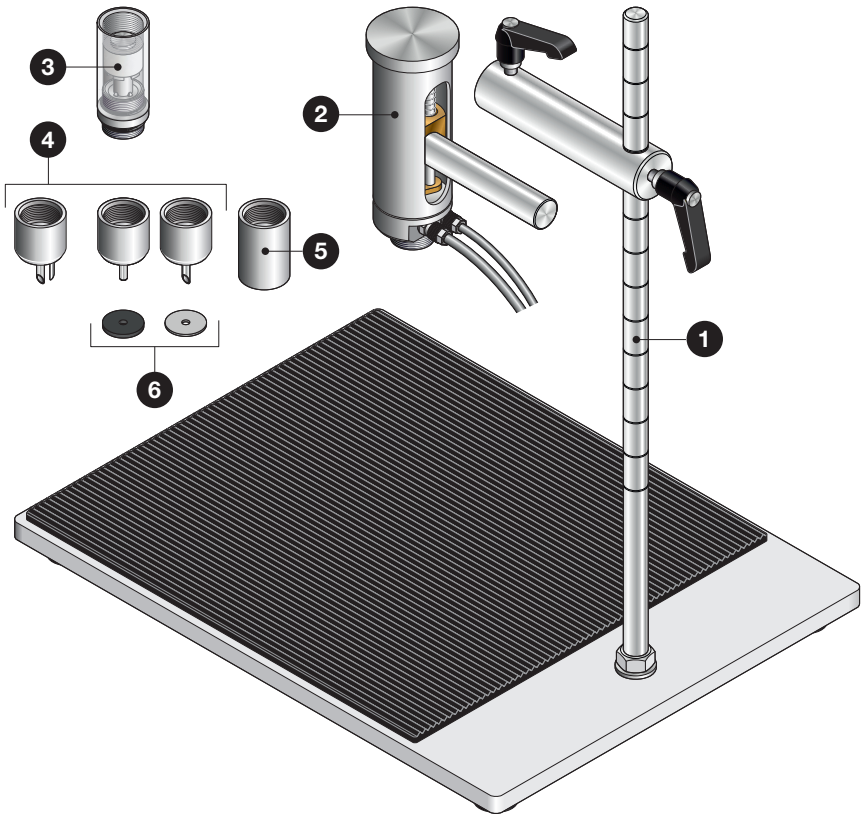
and one or more of the following items:

3 Filter (see page 33 for details)

4 Needle (see page 31 for details)

5 Tube adapter (see page 30 for details)

6 Septa (see page 34 for details)



Setting Up

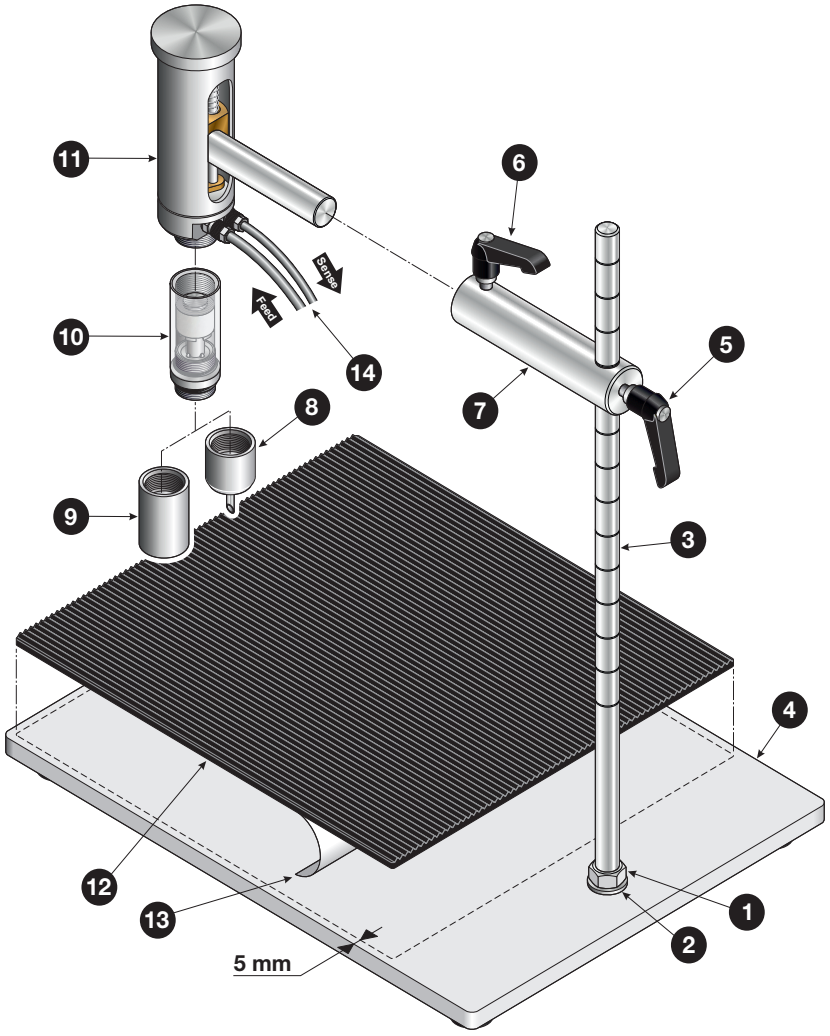
1. Mount the nut ❶ and the washer ❷ on the vertical rod ❸, then screw the rod into the base plate ❹ as far as it goes. Tighten assembly by screwing the nut ❶ against the base plate ❹.
2. Fit the two handles ❺ and ❻ to the connector rod ❼ and slide it onto the vertical rod ❸. Tighten the handle ❺ to position the connector rod ❼ on the vertical rod ❸.
3. Fit the needle ❽ (or tube adapter ❾) and the filter ❿ (if any) on the test head ⓫, then insert test head into the connector rod ❼ and tighten handle ❻ to keep it in position.

CAUTION! Filters and needles should only be hand tightened - do not use any tools.

4. Apply the self-adhesive rubber mat ⓬ by removing the protective paper ⓭ and position the mat approx. **5 mm** from the front and side edges of the base plate ❹.

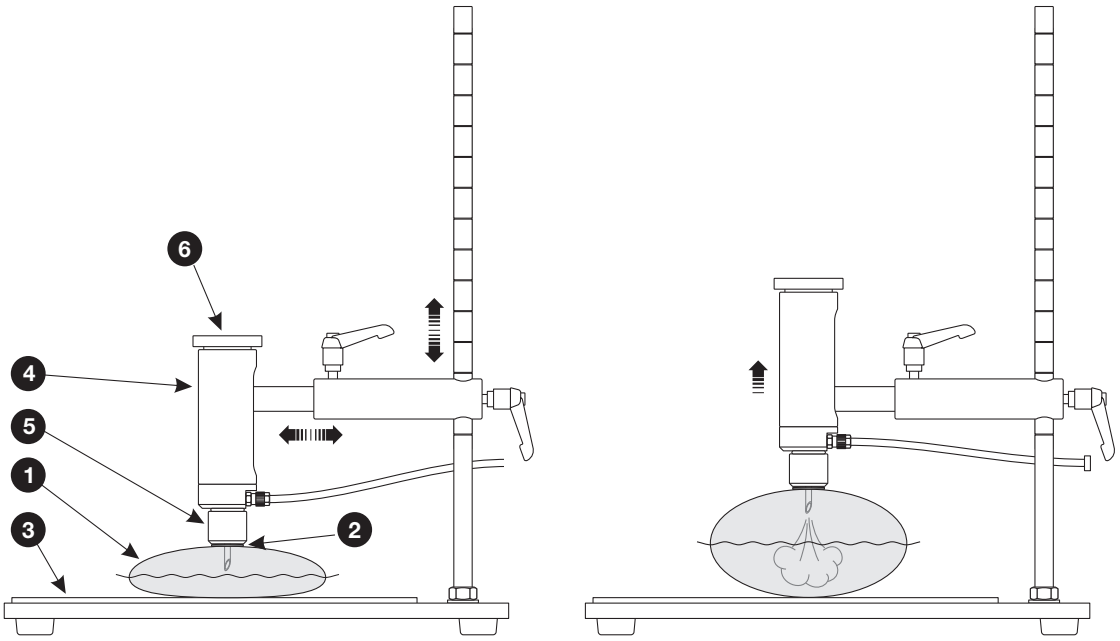
NOTE! You can choose not to use the rubber mat, as cleaning of the base plate is easier without it. Still we recommend to use it, as it provides better friction for the test items.

5. Connect air supply (Feed) and pressure measurement (Sense) hoses ⓮ to the Lippke 4000/4500 device - see page 53 for details.



How does it work?

1. Prepare the package ❶ with a septum ❷ and place it on the base plate ❸.
2. Move the test head ❹ downwards to penetrate the package ❶ making sure that the needle ❺ is fully seated onto the septum ❷. Lock the test head in this position taking into consideration that the test head should be allowed to move upwards as the package inflates.
   If, for some reason, you want to restrict the test head movement, you can do this by means of the knob ❻.
3. Perform the test.



Fixture for ASTM restraining

This fixture is used to perform restrained tests on closed packages compliant with ASTM F2054. As the name says they restrain the package to ensure that the pressure affects the package sealings in the correct way.

The device is mostly used for burst tests, but it can also be used for testing leaks in the package sealing. If device is used for a full leak test of a package, a Tyvec foil can be placed below and above the package to enable leaked gas to escape from the top and bottom area of the package as well.

There are various kits with different contents available depending on the application, but basically a kit consists of:

❶ **ASTM restraining plates**

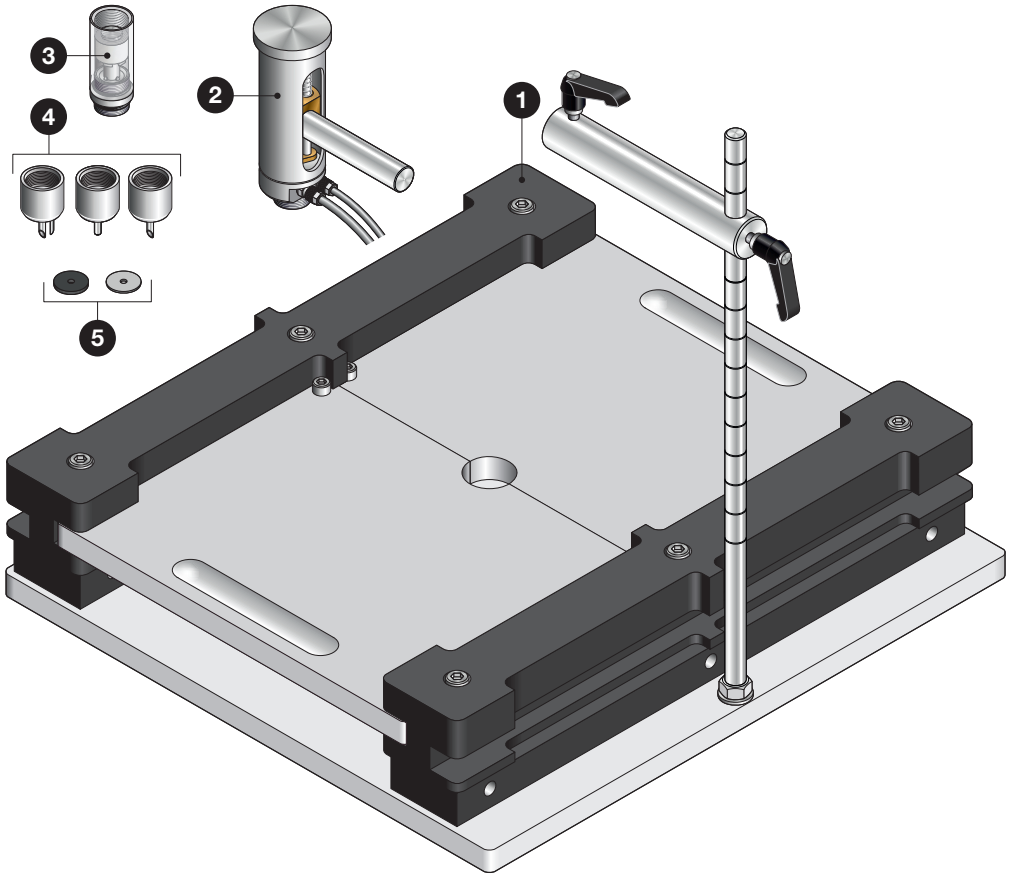
❷ **Test head**

and one or more of the following items:

❸ **Filter** (see page 33 for details)

❹ **Needle** (see page 31 for details)

❺ **Septa** (see page 34 for details)

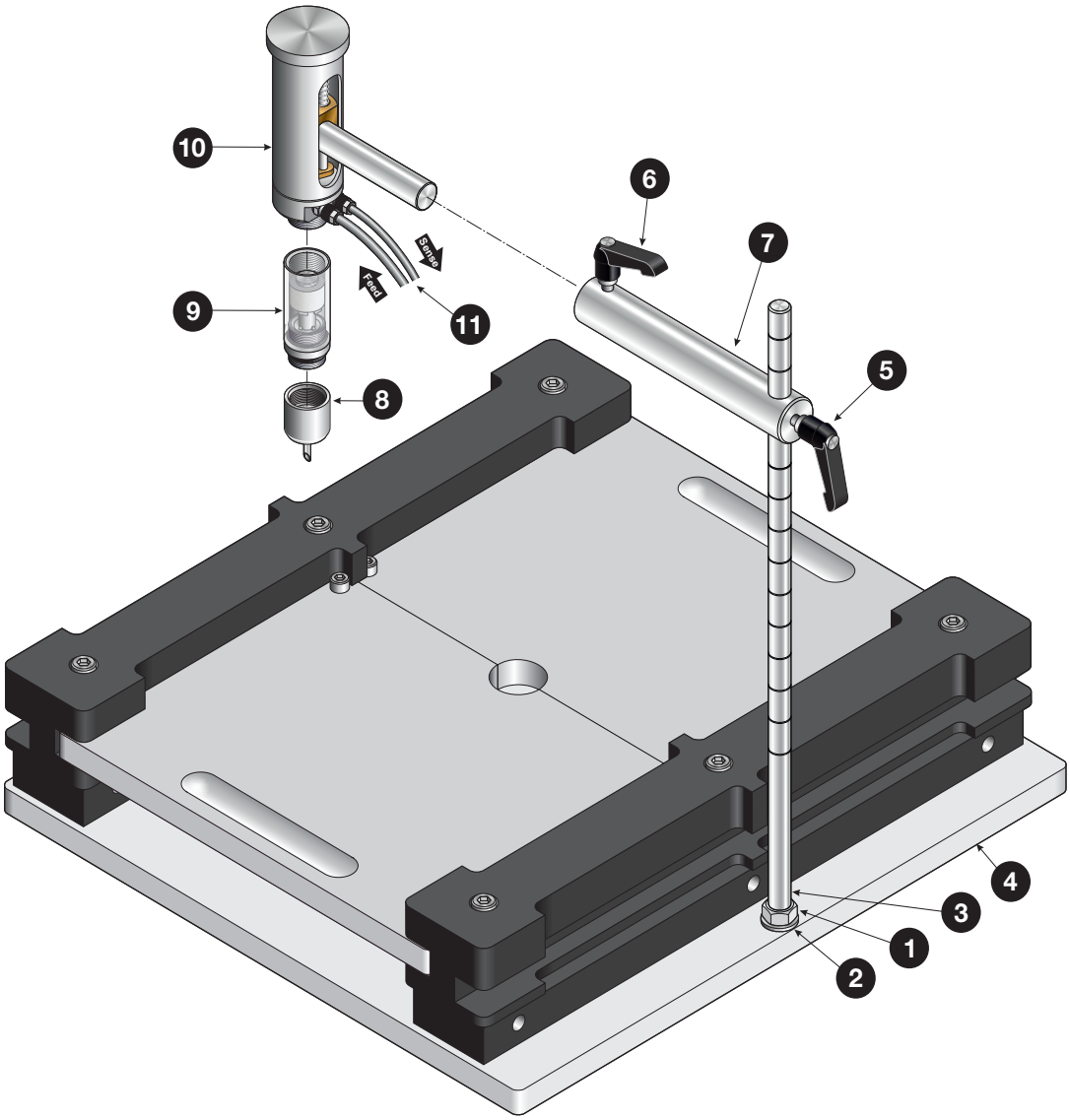


Setting Up

1. Mount the nut ❶ and the washer ❷ on the vertical rod ❸, then screw the rod into the base plate ❹ as far as it goes. Tighten assembly by screwing the nut ❶ against the base plate ❹.
2. Fit the two handles ❺ and ❻ to the connector rod ❼ and slide it onto the vertical rod ❸. Tighten the handle ❺ to position the connector rod ❼ on the vertical rod ❸.
3. Fit the needle ❽ and the filter ❾ (if any) on the test head ❿, then insert test head into the connector rod ❼ and tighten handle ❻ to keep it in position.

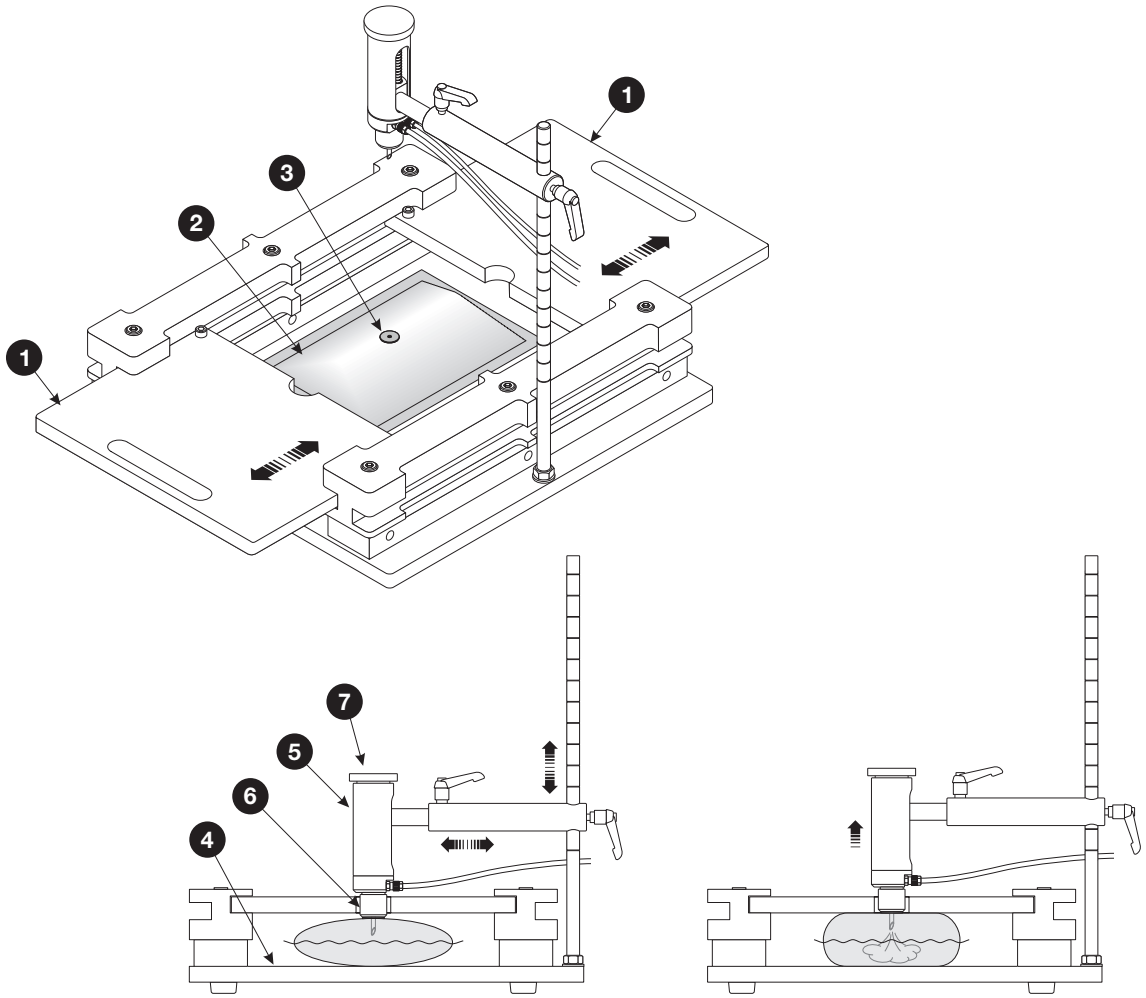
CAUTION! Filters and needles should only be hand tightened - do not use any tools.

4. Connect air supply (Feed) and pressure measurement (Sense) hoses ⓫ to the Lippke 4000/4500 device - see page 53 for details.



How does it work?

1. Adjust the restraining height - see "Adjusting the restraining height (ASTM)" on page 23 for details.
2. Open the restraining plates ❶ by sliding them away from each other.
3. Prepare the package ❷ with a septum ❸ and place it on the base plate ❹.
4. Move the test head ❺ downwards to penetrate the package ❷ making sure that the needle ❻ is fully seated onto the septum ❸.
5. Close the restraining plates ❶. Lock the test head in the current position taking into consideration that it should be allowed to move upwards as the package inflates.
   If, for some reason, you want to restrict the test head movement, you can do this by means of the knob ❼.
6. Perform the test.

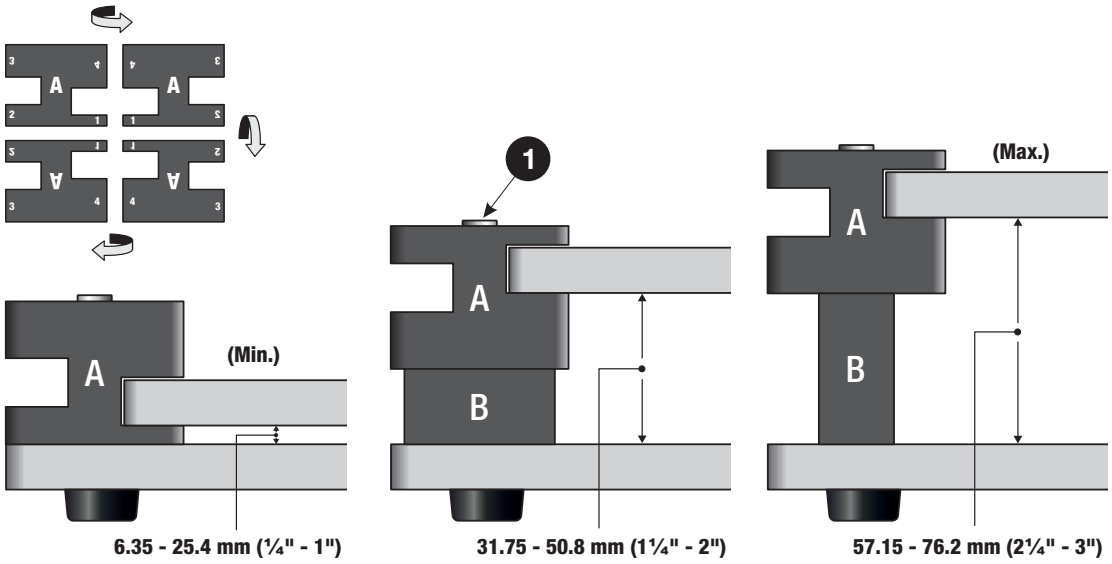


Adjusting the restraining height (ASTM)

The ASTM restraining fixture can be adjusted to various package restraining heights from 6.35 to 76.2 mm (¼" to 3") in steps of 6.35 mm (¼").

The 12 different height settings are achieved by combining the side bars **(A)** and **(B)** as illustrated below.

For each of the 3 combinations of the bar **(B)** (none, lying or standing) there is a matching set of screws ❶.



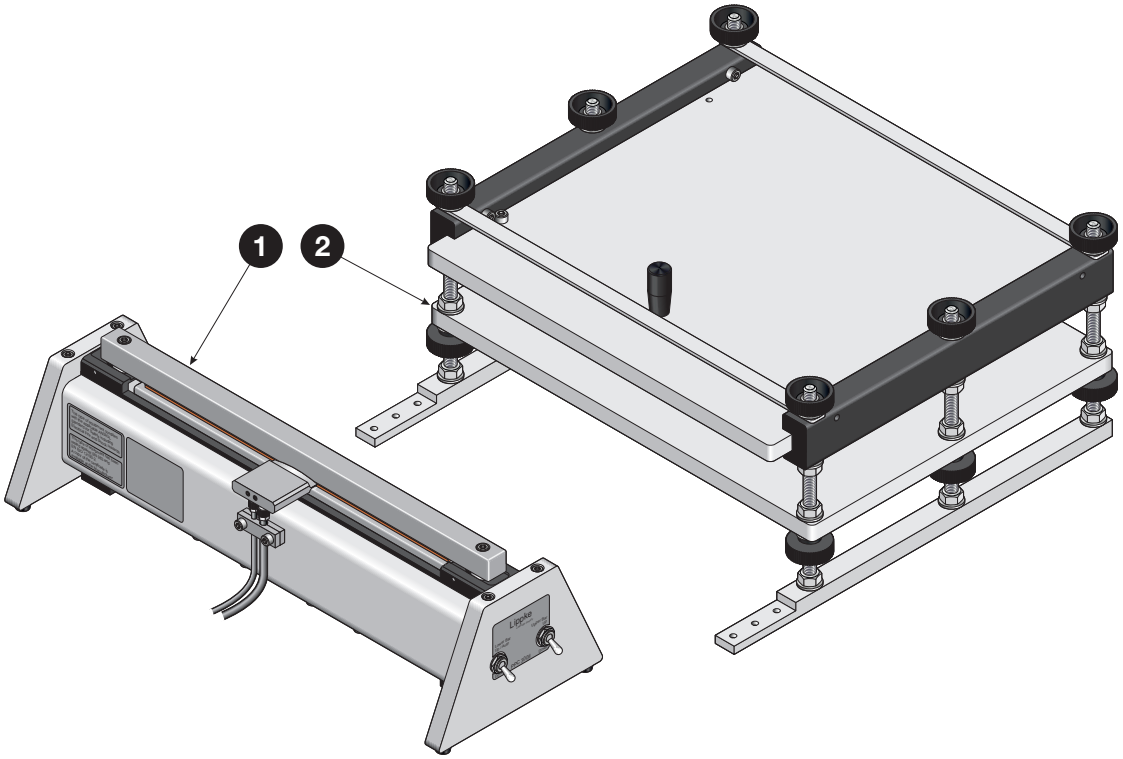
PPC 300 II

The PPC 300 II device is designed for performing burst tests on most types of packages, bags or pouches that are open on one side.

The device seals the open side of the package, enabling a test to be performed according to the ASTM F1140 standard.

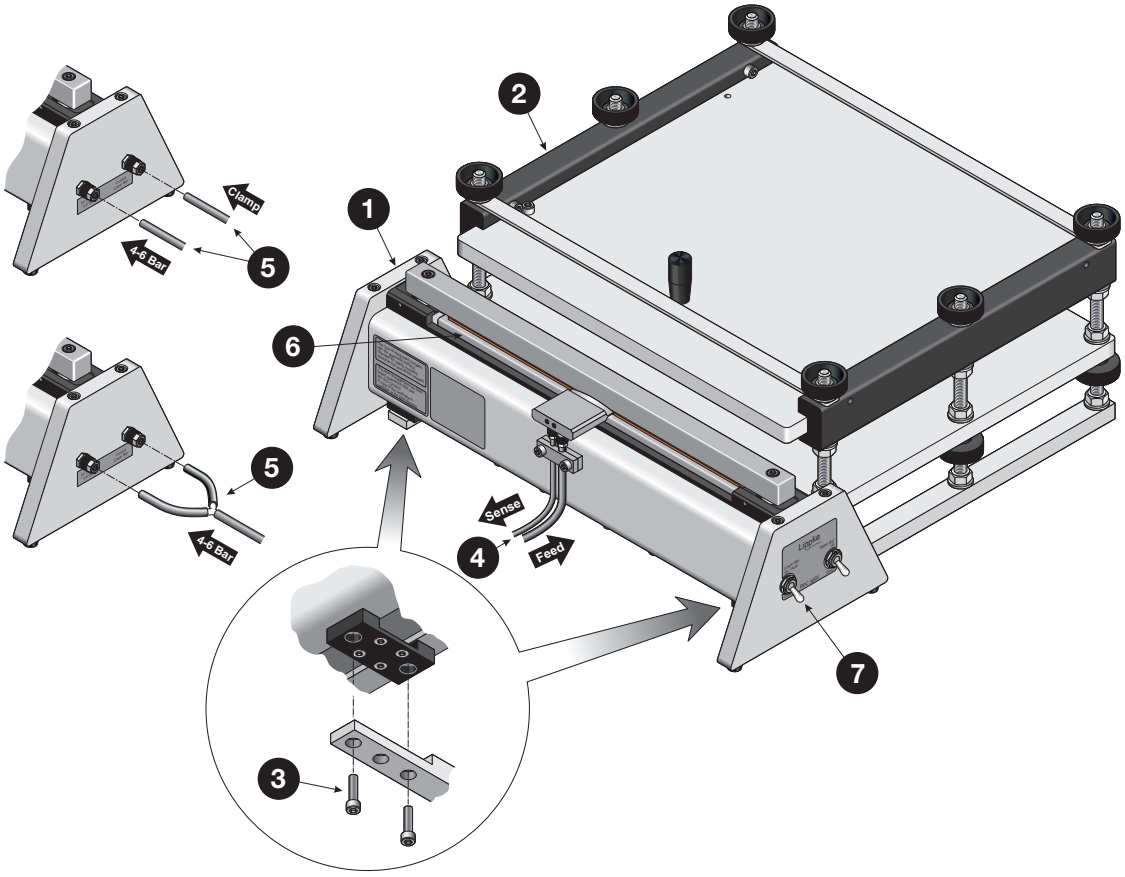
The PPC 300 II unit ❶ can be used with or without the optional fixture for package restraining ❷.

WARNING! The device should only be operated by one person at a time.



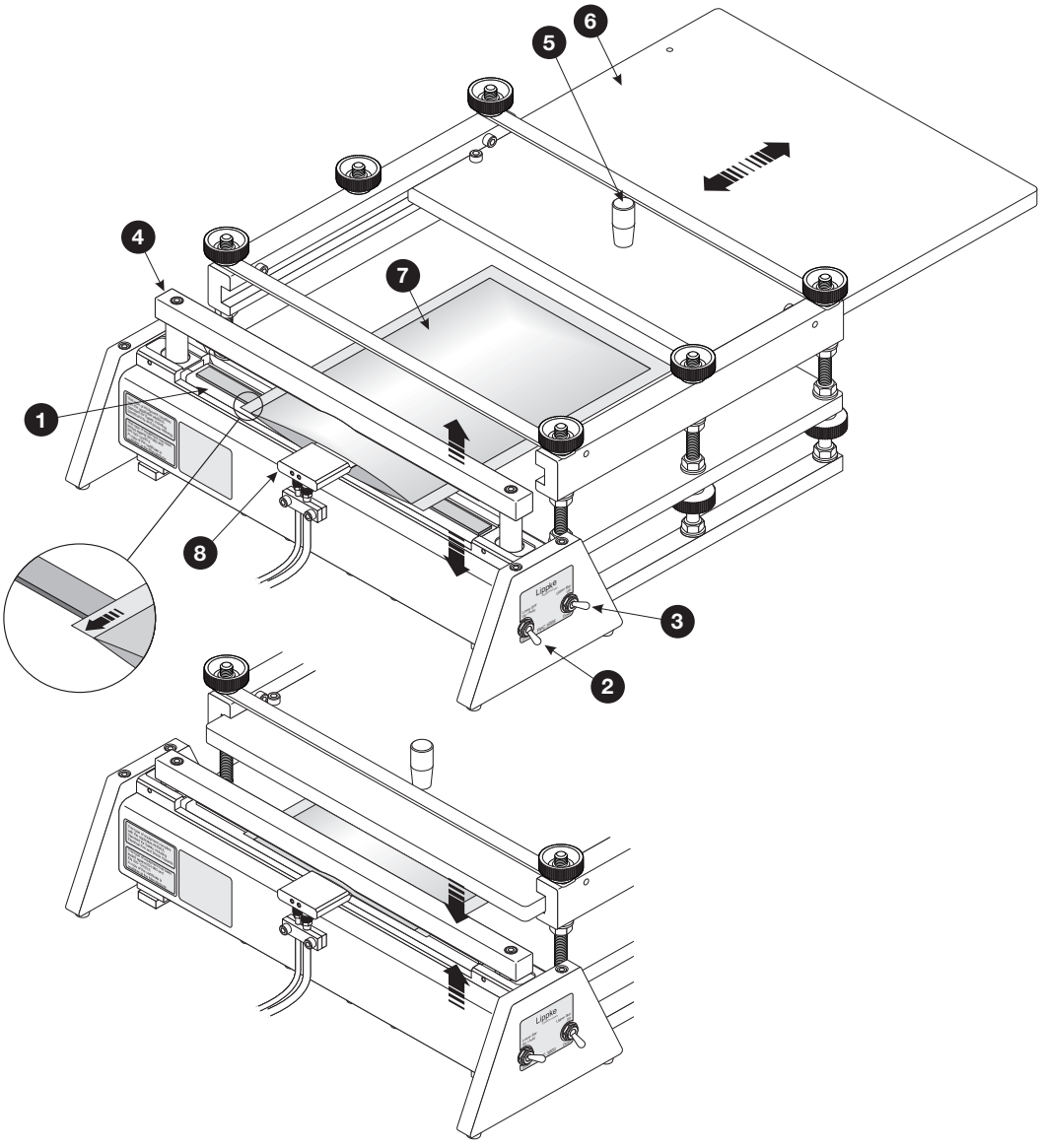
Setting Up

1. If the PPC 300 II ❶ is to be used together with the fixture for package restraining ❷ the two units must be assembled using the screws ❸.
2. Connect the unit's air supply (Feed) and pressure measurement (Sense) hoses ❹ to the Lippke 4000/4500.
3. Connect air supply hoses ❺ for the clamp control:
   - If you want the Lippke 4000/4500 to control the lower clamp bar ❻, connect an external air supply hose to "Air Supply 4-6 Bar" inlet and a hose from "Clamp" outlet on the Lippke 4000/4500 to the "Control Lower Bar" inlet on the PPC 300 II.
   - If you want to control the lower clamp bar ❻ yourself by means of the switch ❼, connect external air supply hose(s) (4-6 Bar) to each of the "Air Supply 4-6 Bar" and "Control Lower Bar" inlets on the PPC 300 II.



How does it work?

1. If necessary adjust the restraining height - see "Adjusting the restraining height (PPC 300 II)" on page 27 for details.
2. If the lower bar ❶ is controlled by the Lippke 4000/4500 it will already be lowered, otherwise use the switch ❷ to move it down, then use the switch ❸ to move the upper bar ❹ upwards.
3. Use knob ❺ to slide the upper plate ❻ away to open the restraining device.
4. Place the pouch ❼ around the air block ❽ as shown. Make sure that the whole front edge of the pouch extends past the front edge of the rubber band on the lower bar ❶ (see detail).
5. Close the restraining device.
6. Use switch ❸ to move the upper bar ❹ down.
7. If the lower bar ❶ is controlled by the Lippke 4000/4500, it will automatically be moved upwards to close the clamp around the pouch ❼ and air block ❽ when you start the test. Otherwise use the switch ❷ to move it up.
8. Perform the test.

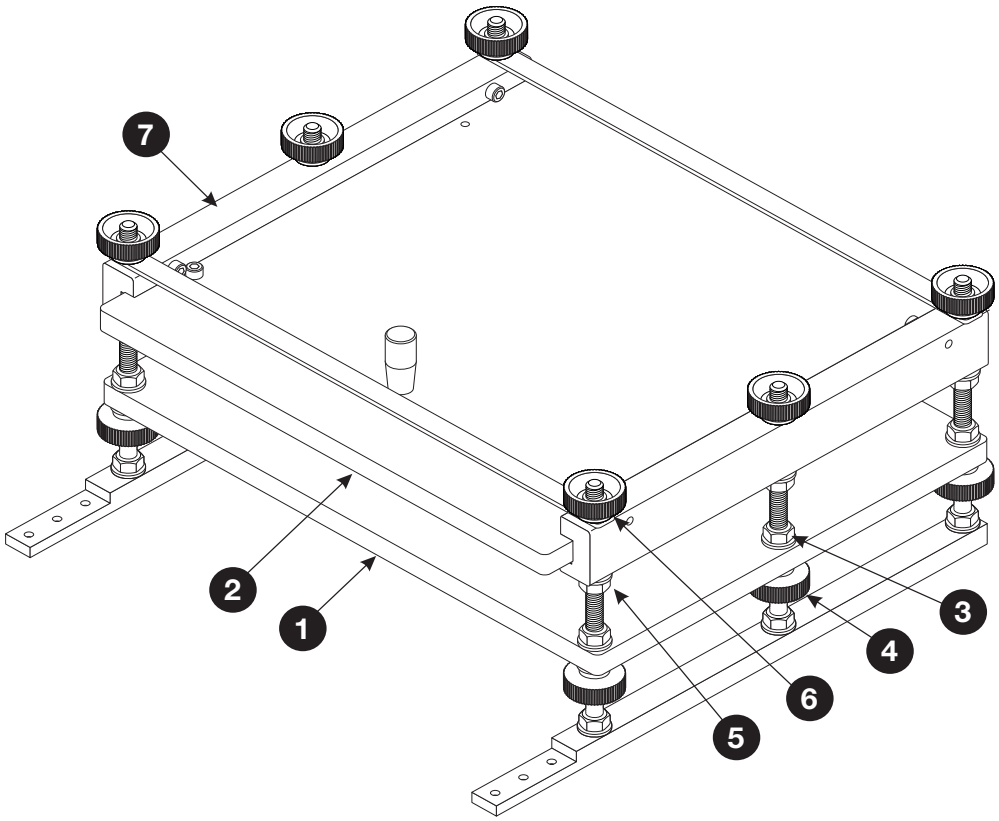


Adjusting the restraining height (PPC 300 II)

The package restraining fixture for the PPC 300 II can be adjusted to various package restraining heights.

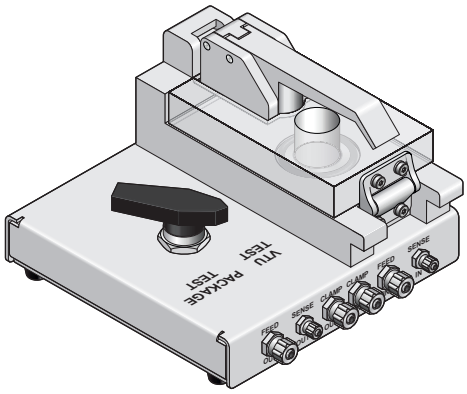
The restraining height is achieved by adjusting the distance between the two plates ❶ and ❷.
Use the nuts ❸ and finger nuts ❹ to adjust the position of the lower plate ❶, then use the nuts ❺ and finger nuts ❻ to adjust and lock the position of the side bars ❼ and thereby the position of the upper plate ❷.

NOTE! Make sure to adjust the side bars ❼ to the same height so that the upper plate ❷ can move freely.



Valve Test Unit (VTU)

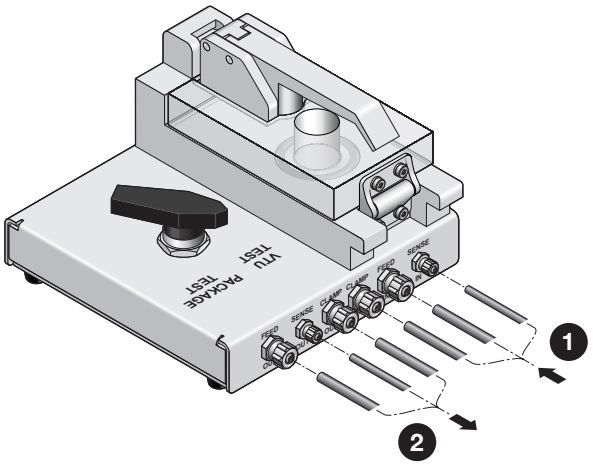
The Valve Test Unit (VTU) can be used to perform tests on “Degassing Valves” Degassing valves are used on some coffee and food products to prevent a pressure build-up inside the product packaging.
The VTU can be used either to test the cracking or burst pressure of the valve or to verify that there is no “reverse leakage”.



Setting Up

1. Connect the supplied hoses between the “Clamp”, “Feed” and “Sense” connectors on the Lippke 4000/4500 to the corresponding IN connectors ❶ on the VTU.
2. Connect the hoses from the measurement accessory f.ex. test head on the Stand for Closed Packages to the “Clamp”, “Feed” and “Sense” OUT connectors ❷ on the VTU.

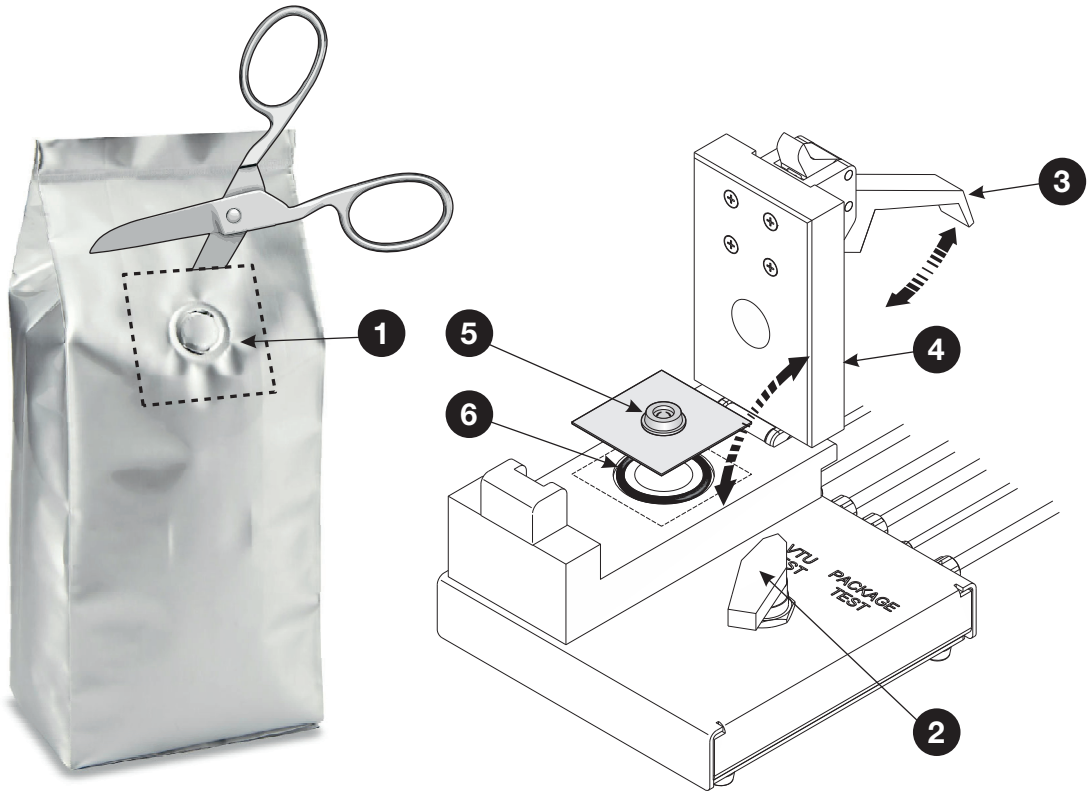
NOTE! The “Clamp” connections are only to be used in cases where you want the Lippke 4000/4500 device to control the lower clamp bar on the PPC 300 II or for a MultiCheck system.



How does it work?

1. Cut out the sample ❶ from the package. The sample should have a size of app. 60 x 60 mm (must cover the O-ring ❻) and the valve must be placed in the centre of the sample.
2. Turn the selector knob ❷ to the "VTU TEST" position.
3. Release the handle ❸ and open the transparent lid ❹.
4. Place the sample in the device as shown making sure that the valve ❺ is centred inside the O-ring ❻:
   - To perform a valve "Burst" test, place the sample with the "outside" surface oriented up.
   - To perform a valve "Leak" test, place the sample with the "outside" surface oriented down.

   NOTE! The "outside" surface of the sample is the side that was on the exterior surface of the package before cutting out the sample.
5. Close the lid ❹ and lock the handle ❸.
6. Perform the test.



When you need to bypass the VTU unit to perform tests on packages using the auxiliary connected equipment the selector knob ❷ must be turned to the "PACKAGE TEST" position.

IV-Bag adapter

This is an adapter for testing of IV-Bags. The conical shape of the adapter's mouthpiece allows for easy connection to most types of IV-bags.

Connect air supply (Feed) and pressure measurement (Sense) hoses to the adapter.

Tube adapter

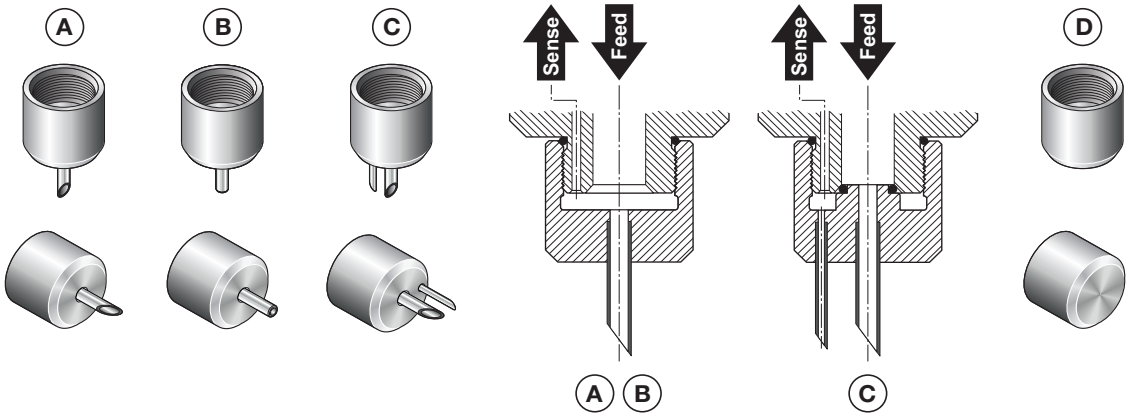
The tube adapter allows for tubes with threaded closures to be tested. The illustration shows how the adapter is used to connect the tube to the test head.
As there is a large number of tubes with different types of threads, the adapter is normally custom made for the specific type of tube.

Needles

A needle is used to penetrate and inflate a package with compressed air to perform a test. There are two types of needles: The test head needles and the handheld needles.

Test head needles

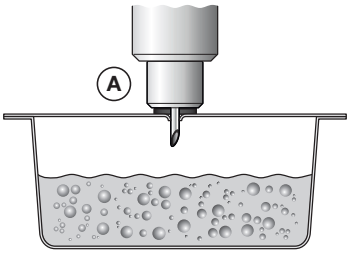
The test head needles are designed to be fitted to the test heads on the “Stand, basic” and the “Fixture f. ASTM restraining” measurement accessories.
Three different needles are available, the “Sharp” **(A)** and “Flat” **(B)** mono needles and the “Twin” **(C)** needle.



The mono needles **(A)** and **(B)** are suitable for almost all types of packages and should be used together with septa (see page 34).

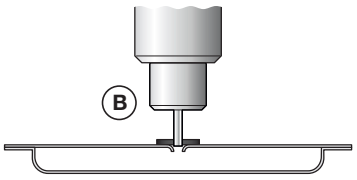
The “Sharp” **(A)** needle can pierce the package by itself and is primarily used for packages providing enough headspace to pierce the package without damaging the bottom of the package or touching any product that might be present in the package.

Press the needle through the hole in the septum and into the package making sure that the needle is fully seated onto the septum.



The “Flat” **(B)** needle is recommended for slim packages in order to avoid undesired damage to the underside of the package.

When using the “Flat” **(B)** needle, first make a small hole with ex. a knife and place a black septum over the hole. Insert the needle into the septum but not into the package.

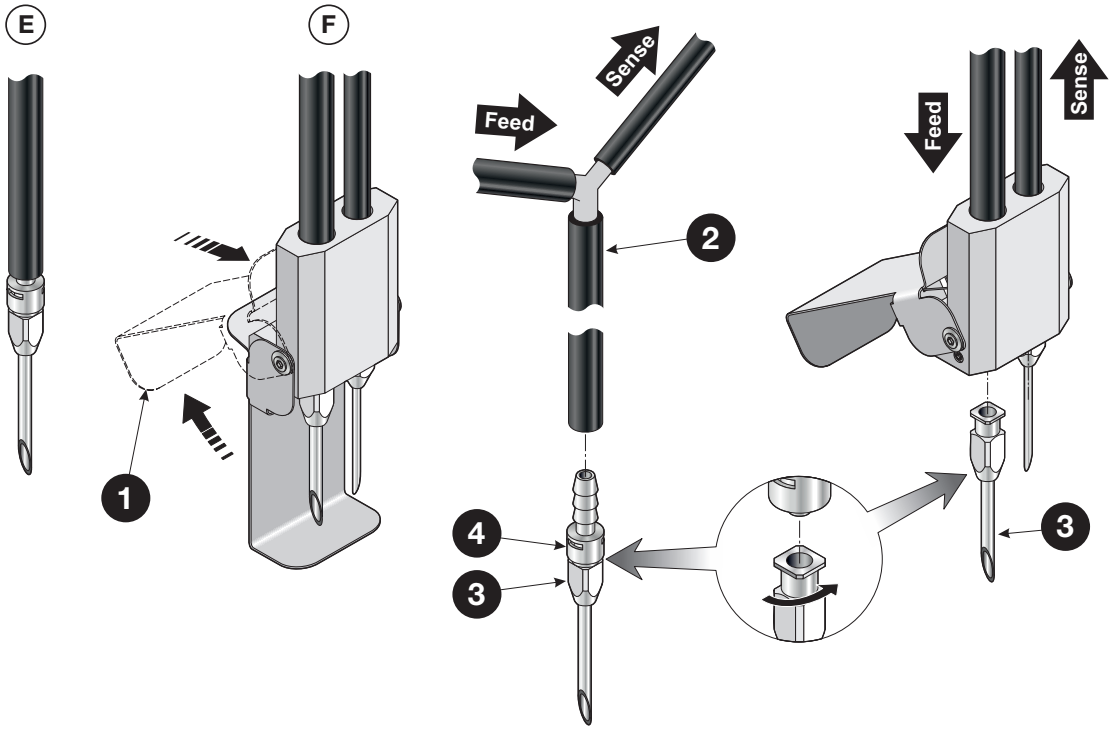


The “Twin” **(C)** needle is used for burst tests on porous packages. Since the higher flow required for this type of measurement can influence negatively on the pressure measurement, the “Twin” needle uses a separate needle for this measurement and an O-ring inside the needle head provides sealing of the two air channels. You can not use a septum together with the “Twin” needle.

The “Blind” **(D)** needle head can be used for testing if there are internal leaks in the system.

Handheld needles

The handheld needles can be used independently of any other accessory and are connected directly to the Lippke 4000/4500 by means of hoses.



The handheld needles come as a “Mono” needle **(E)** or a “Twin” needle **(F)** with a security cover ❶. To expose the needles of the “Twin” needle **(F)** simply press the backside of the cover upwards.

The handheld needles are used for the same applications as the corresponding test head needles as described on page 31.

The mono needle hose ❷ splits into a hose for air supply (Feed) and a hose for pressure measurement (Sense).

A needle ❸ is assembled with a hose connector ❹ by pushing the needle into the connector while turning it app. 1/3 of a round.

Filter

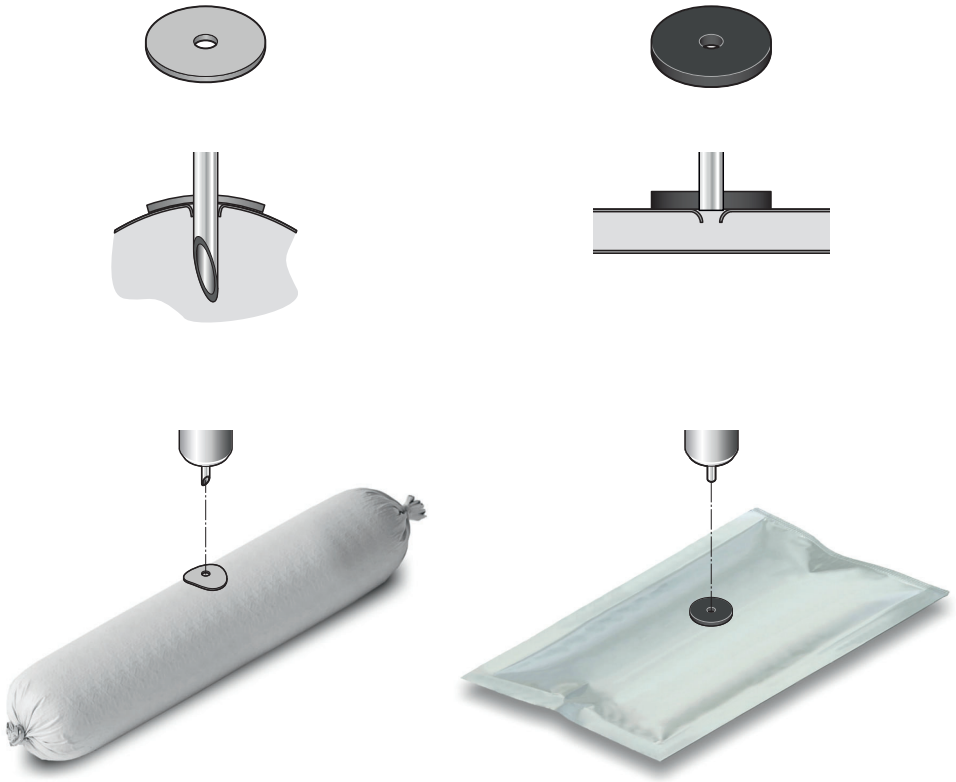
When testing packages filled with powder or liquid substances, particles or fluids can move backwards into the system causing damage to the instrument.
In these cases it is highly recommended to install the filter between the test head and the needle.

NOTE! The filter does not protect the device from fluid, but you can see the liquid in the filter and stop the test.

The filter can be used together with the test head needle types (mono only) - see "Needles" on page 31 for details and the Tube adapter (see page 30).

Septa

In order to ensure a linear pressure increase in the package and to avoid unnecessarily high consumption of air it may be necessary to seal the package's piercing point with a septum. A septum also protects the package from tearing at the piercing point.



Two types of septa are available: A **Black** septum and a **Grey** septum.

The **Black** septum is 3 mm thick. Besides being the most all-round septa of the two, it is especially recommended for testing flat packages, as the thicker rubber material allows for the **Flat** mono needle to be used. This needle head provides good sealing without requiring penetration of the needle tip into the interior of the package - see "Needles" on page 31 for details.

The **Grey** septum is 1 mm thick and very flexible, which makes it especially suited for packages that become round when inflated.

When choosing a piercing point on a package you should avoid seams and areas with labels and adhesives. The package should, if anyway possible, be pierced in the middle in order to ensure that the package inflates evenly.

4. Tests

Test types

Standard tests

The following standard tests can be performed:

- **Burst Test/Seal Strength – see page 36**
- **Leak Test/Pressure Loss – see page 39**

Creep tests

When the **Creep Test option** has been purchased, a **Creep test** or a **Creep2Fail test** can be performed according to ASTM F1140. The creep test evaluates the strength of the seal on a package.

- **Creep test – see page 42**
- **Creep2Fail test – see page 45**

Combined testing

When the **Multi-Test option** has been purchased (requires the **Creep Test option**), the **Creep**, **Leak** and **Burst** tests can be combined in various ways and performed as a single test. The results of each individual test will be reported at the end of the test sequence. Combined testing can simplify operator setup and reduce the number test samples required.

The following combined tests to be performed:

- **Combined Creep/Burst**
- **Combined Creep/Leak**
- **Combined Creep/Leak/Burst**

Bubble test

When the **Bubble Test option** has been purchased (requires the **Creep Test option**), a bubble test can be performed according to ASTM 2096.
The test can be used to see where a leak is placed or to check the barrier of for example a Tyvek package - see page 48 for details.

Test values

Testing of a new type of package always starts with finding the approximate burst pressure of the package as this pressure is the basis for all other tests.
The burst reference pressure is found by trial and error and when an approximate reference value has been found, the test is repeated 10-15 times to check whether stable test results are achieved using this value.

Burst test

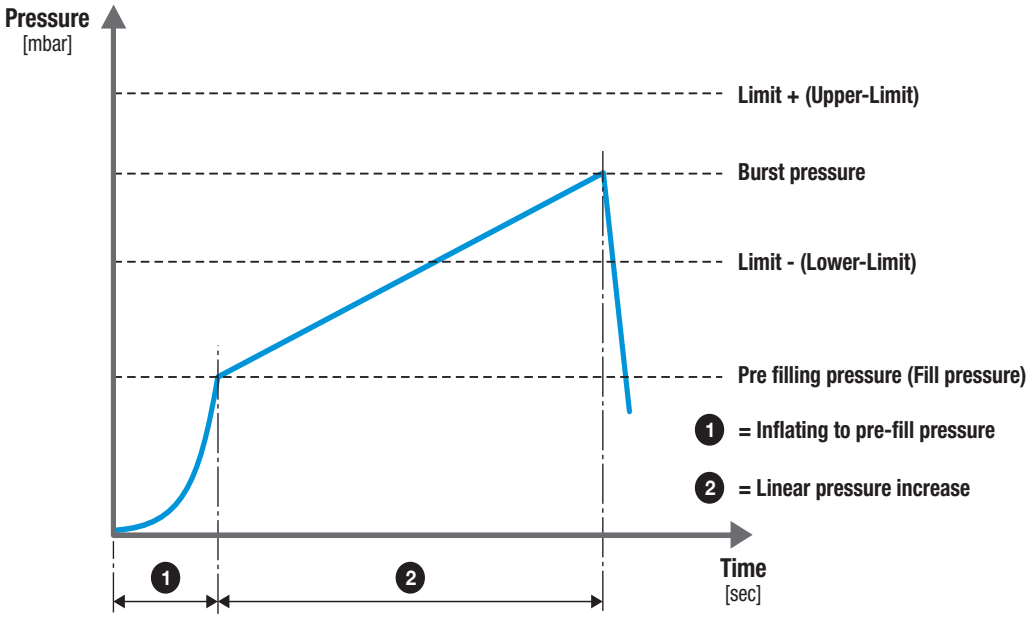
A **Burst test** checks the strength of a package sealing by increasing the pressure in the package until it bursts. The **Burst test** is compliant with ASTM F2054.

CAUTION! As the bursting of the test package may lead to considerable noise, we recommend wearing hearing protection.

NOTE! When testing filled packages, precautions may be necessary to ensure that the product does not contaminate the operator or the system. Depending on the package contents, the use of safety glasses may be advisable. A protective hood placed over the package may offer additional protection.

A **Burst test** is divided into 2 phases:

1. The package is inflated to the set pre-fill pressure.
2. The pressure in the package is increased at the pre-set rate until the package bursts or until the maximum specified pressure is reached.



The results from the **Burst test** are:

- **Measured burst pressure** (if the package bursts)
- **Package burst time** (2)
- **PASS** - if the package bursts within the pre-set burst limits
- **FAIL** - if the package bursts outside the pre-set burst limits.

CAUTION! If the package did not burst, it is still under pressure! Remove the package carefully; a sudden pressure drop will occur when it is removed.

Measurement accessory kits

The following measurement accessory kits can be used for a **Burst test**:

- **Stand, basic** (with any test head and needle or tube adaptor, with or without filter)
- **Fixture f. ASTM restraining** (with any test head and needle or tube adaptor, with or without filter)
- **PPC 300 II** (with or without restraining plate)
- **Tube adapter**
- **IV-Bag adapter**
- **Valve Test Unit (VTU)**
- **Handheld needle, mono**
- **Handheld, needle, twin**

Burst test settings

For a Lippke 4500 the test parameters are set in the PC program and for a Lippke 4000 the parameters are set on the device display.

* = parameter only available in the Lippke 4500 PC Software
Names in parenthesises are the corresponding Lippke 4000 parameter names

Parameters:

Date last modification *	Filled out automatically	
User *	Filled out automatically	
Name (Name)	Test name	
Name 1 *	Can be used to give additional information about the test	
Name 2 *	Can be used to give additional information about the test	
Pressure, rising rate [mbar/sec] (Pressure rate)	During the measurement the pressure in the package is increased linearly at the set rate from the pre-fill pressure until the max. pressure	
Package type (Package Type)	**- Normal**	This is the recommended standard setting. Should be used whenever possible.
	- Porous	Use for porous packages like Tyvek.
	- Sensitive	Use this setting if the package bursts in the form of a small hole and the normal setting is having problems detecting the burst. The sensitive setting changes the burst limit from a % of the pressure to a % of the valve setting.
Pre filling pressure [mbar] (Fill pressure)	If a package for example changes shape when it is filled, then set the prefill pressure so that this will happen during the prefill time. This avoids false burst detections.	
Maximum pressure [mbar] (Max Pressure)	The maximum pressure the package is filled to. If the package doesn't burst then the test stops then the max pressure is reached.	

Pressure drop [%] (Stop-Threshold)	If there is a problem with false burst detections you can increase the pressure drop value. Also check that the prefill pressure is high enough. Recommended setting: 10%
With oxygen measurement *	Requires a PacCheck 3XX - If checked the O_2 level is measured.
Limit oxygen [%] (O2 Limit)	Upper limit for acceptable O_2 measurement.
With CO2 measurement *	Requires a PacCheck 3XX - If checked the CO_2 level is measured.
Limit CO2 [%] *	Upper limit for acceptable CO_2 measurement.
Displayed limits in chart:	
Pressure, upper limit in chart [mbar] *	Upper pressure value for the [mbar] axis in the resulting graph chart
Pressure, lower limit in chart [mbar] *	Lower pressure value for the [mbar] axis in the resulting graph chart
Limits:	
Limit + [mbar] (Upper-Limit)	Upper limit for an ok package. The package should burst below this limit.
Limit - [mbar] (Lower-Limit)	Lower limit for an ok package. The package should burst above this limit.

Leak test

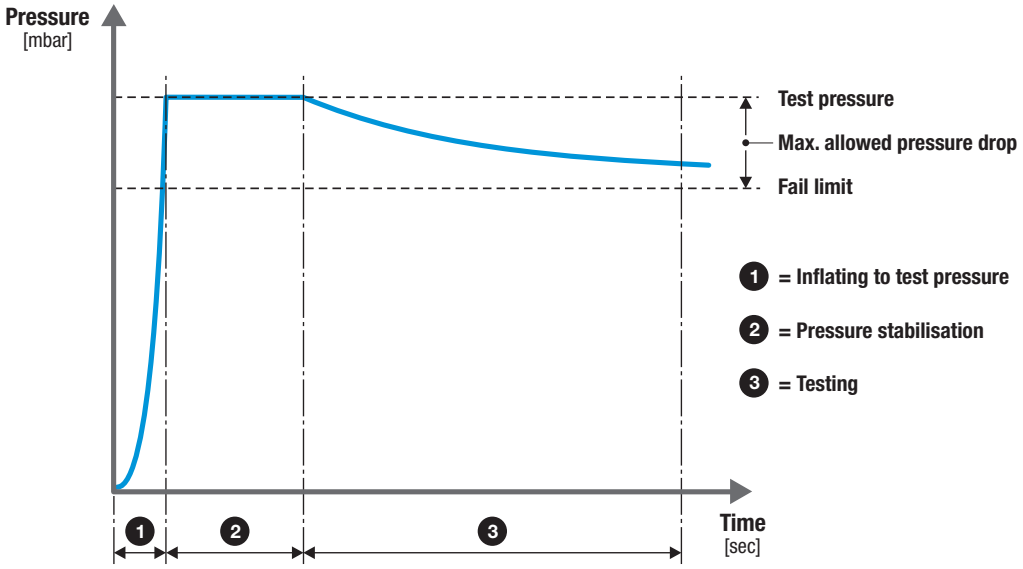
A **Leak** test checks a package for leaks. The package is inflated to a predetermined pressure (about 30-50% of the package's burst pressure) and then the pressure loss is monitored to determine whether or not there is a leak. The **Leak** test is compliant with ASTM F2095.

CAUTION! During a Leak test the package will normally not burst and so the pressure in the package may not drop to a low level immediately after the test.

NOTE! When testing filled packages, precautions may be necessary to ensure that the product does not contaminate the operator or the system. Depending on the package contents, the use of safety glasses may be advisable. A protective hood placed over the package may offer additional protection.

A **Leak** test is divided into 3 phases:

1. The package is inflated to the test pressure.
2. The test pressure is maintained and stabilised.
3. Pressure regulation stops and valves are closed. The pressure drop is measured during the test time. The test passes if the pressure drop is below setting and fails if pressure drop is larger than setting.



The results from the **Leak** test are:

- **Pressure drop**
- **PASS** - if the pressure drops less than allowed
- **FAIL** - if the pressure drops more than allowed

Measurement accessory kits

The following measurement accessory kits can be used for a **Leak** test:

- **Stand, basic** (with any test head and needle or tube adaptor, with or without filter)
- **Fixture f. ASTM restraining** (with any test head and needle or tube adaptor, with or without filter)
- **Tube adapter**
- **IV-Bag adapter**
- **Valve Test Unit (VTU)**
- **Handheld needle, mono**
- **Handheld, needle, twin**

Leak test settings

For a Lippke 4500 the test parameters are set in the PC program and for a Lippke 4000 the parameters are set on the device display.

* = parameter only available in the Lippke 4500 PC Software
Names in parenthesises are the corresponding Lippke 4000 parameter names

Parameters:

Date last modification *	Filled out automatically	
User *	Filled out automatically	
Name **(Name)**	Test name	
Name 1 *	Can be used to give additional information about the test	
Name 2 *	Can be used to give additional information about the test	
Package type **(Package Type)**	**- Normal**	This is the recommended standard setting. Should be used whenever possible.
	- Porous	Use for porous packages like Tyvek.
	- **Sensitive**	Not used for a leak test
Test pressure [mbar] **(Test pressure)**	Pressure at which the test is performed (Typically 30-50% of the burst pressure)	
Settling time [sec] **(Settling Time)**	The period of time where test pressure is maintained and stabilised to ensure a stable start for the leak test.	
Test time [sec] **(Test Time)**	The period of time where the actual leak test is performed. The pressure is not regulated during the test time.	
Hole length [mm] **(Hole length)**	Length used to calculate a theoretical hole size. Often it is the length of the package sealing.	
Volume [ml] **(Volume)**	The volume of the package. This is used to calculate a theoretical hole size.	
With oxygen measurement *	Requires a PacCheck 3XX - If checked the O_2 level is measured.	
Limit oxygen [%] **(O2 Limit)**	Upper limit for acceptable O_2 measurement.	

With CO2 measurement *	Requires a PacCheck 3XX - If checked the CO_2 level is measured.
Limit CO2 [%] *	Upper limit for acceptable CO_2 measurement.
Displayed limits in chart:	
Pressure, upper limit in chart [mbar] *	Upper pressure value for the [mbar] axis in the resulting graph chart
Pressure, lower limit in chart [mbar] *	Lower pressure value for the [mbar] axis in the resulting graph chart
Limits:	
Limit [mbar] (Pressure drop)	The maximum allowed pressure drop during the leak test.

Creep test

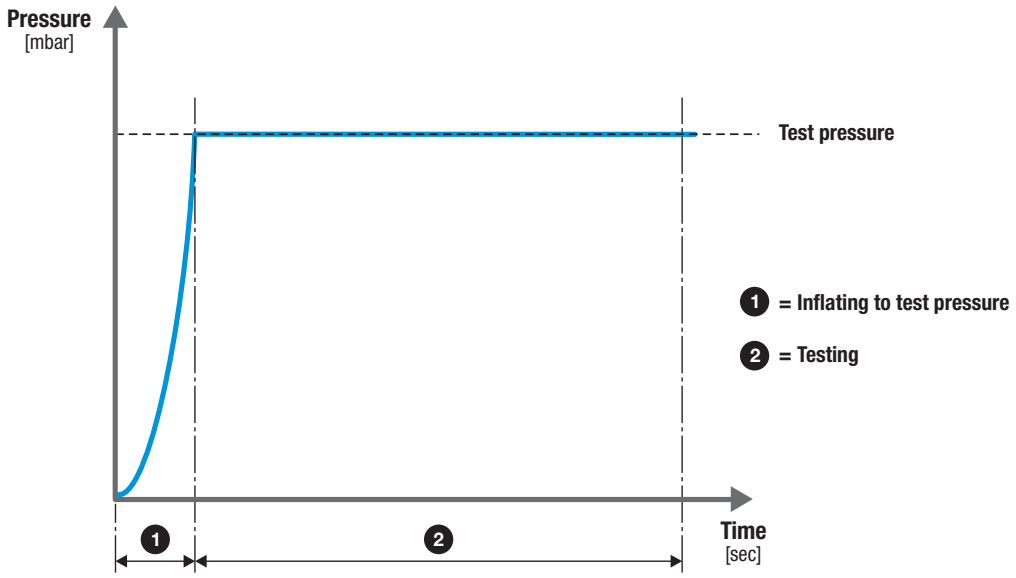
A **Creep** test can be used to evaluate the seals on a package. A **Creep** test inflates the package to a specific pressure (typically app. 80% of the burst pressure) and maintains this pressure for a specified time period. The package passes the test if it does not burst during the test. The **Creep** test complies with ASTM F1140.

CAUTION! It is possible that the package will burst during a Creep test. Please note that the pressure may not drop to a low level immediately after the test.

NOTE! When testing filled packages, precautions may be necessary to ensure that the product does not contaminate the operator or the system. Depending on the package contents, the use of safety glasses may be advisable. A protective hood placed over the package may offer additional protection.

A **Creep** test is divided into 2 phases:

1. The package is inflated to the test pressure.
2. The test pressure is maintained for a fixed period of time.



The results from the **Creep** test are:

- **PASS** - if the package does not burst
- **FAIL** - if the package bursts

CAUTION! If the package did not burst, it is still under pressure! Remove the package carefully; a sudden pressure drop will occur when it is removed.

Measurement accessory kits

The following measurement accessory kits can be used for a **Creep** test:

- **Stand, basic** (with any test head and needle or tube adaptor, with or without filter)
- **Fixture f. ASTM restraining** (with any test head and needle or tube adaptor, with or without filter)
- **Tube adapter**
- **IV-Bag adapter**
- **Valve Test Unit (VTU)**
- **Handheld needle, mono**
- **Handheld, needle, twin**

Creep test settings

For a Lippke 4500 the test parameters are set in the PC program and for a Lippke 4000 the parameters are set on the device display.

* = parameter only available in the Lippke 4500 PC Software
Names in parenthesises are the corresponding Lippke 4000 parameter names

Parameters:

Date last modification *	Filled out automatically	
User *	Filled out automatically	
Name (Name)	Test name	
Name 1 *	Can be used to give additional information about the test	
Name 2 *	Can be used to give additional information about the test	
Package type (Package Type)	**- Normal**	This is the recommended standard setting. Should be used whenever possible.
	- Porous	Use for porous packages like Tyvek.
	- Sensitive	Do not use for a Creep test.
Test pressure [mbar] (Test pressure)	Pressure at which the test is performed (Typically 80% of the burst pressure)	
Creep time [sec] (Creep Time)	The period of time where test pressure is maintained.	
With oxygen measurement *	Requires a PacCheck 3XX - If checked the O_2 level is measured.	
Limit oxygen [%] (O2 Limit)	Upper limit for acceptable O_2 measurement.	
With CO2 measurement *	Requires a PacCheck 3XX - If checked the CO_2 level is measured.	
Limit CO2 [%] *	Upper limit for acceptable CO_2 measurement.	

Displayed limits in chart:

Pressure, upper limit in chart [mbar] *	Upper pressure value for the [mbar] axis in the resulting graph chart
Pressure, lower limit in chart [mbar] *	Lower pressure value for the [mbar] axis in the resulting graph chart

Creep2Fail test

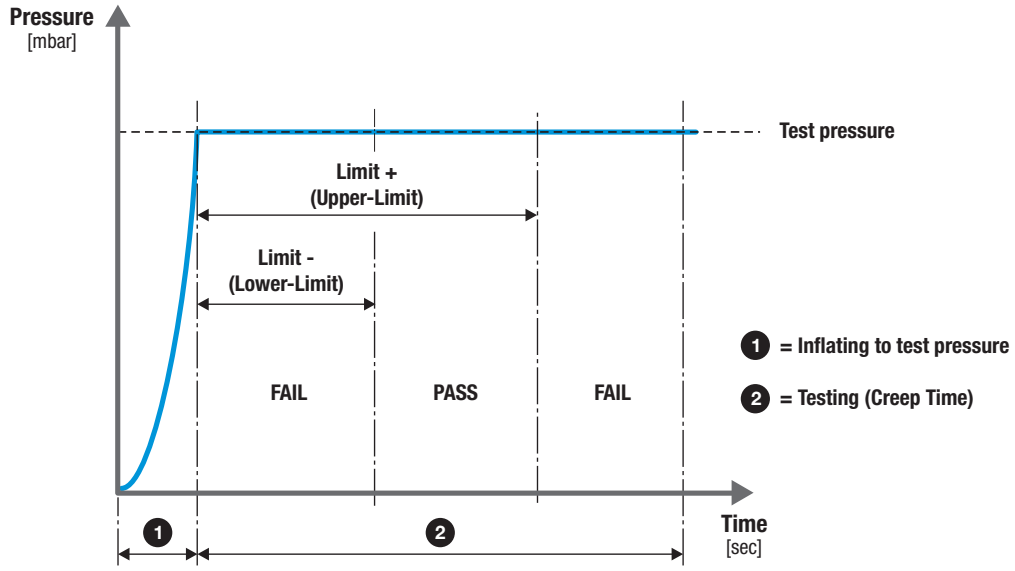
The **Creep2Fail** is test is similar to the **Creep** test, but it uses a test pressure between 95%-100% of the burst pressure. The test pressure should be high enough to cause a slow but progressive failure during the specified test time. The **Creep2Fail** test is compliant with ASTM F1140.

CAUTION! It is possible that the package will burst during a Creep2Fail test. Please note that the pressure may not drop to a low level immediately after the test.

NOTE! When testing filled packages, precautions may be necessary to ensure that the product does not contaminate the operator or the system. Depending on the package contents, the use of safety glasses may be advisable. A protective hood placed over the package may offer additional protection.

A **Creep2Fail** test is divided into 2 phases:

1. The package is inflated to the test pressure.
2. The test pressure is maintained for a fixed period of time.



The results from the **Creep2Fail** test are:

- **PASS** - if the package bursts within the set time limits
- **FAIL** - if the package bursts outside the set time limits

CAUTION! If the package did not burst, it is still under pressure! Remove the package carefully; a sudden pressure drop will occur when it is removed.

Measurement accessory kits

The following measurement accessory kits can be used for a **Creep2Fail** test:

- **Stand, basic** (with any test head and needle or tube adaptor, with or without filter)
- **Fixture f. ASTM restraining** (with any test head and needle or tube adaptor, with or without filter)
- **Tube adapter**
- **IV-Bag adapter**
- **Valve Test Unit (VTU)**
- **Handheld needle, mono**
- **Handheld, needle, twin**

Creep2Fail test settings

For a Lippke 4500 the test parameters are set in the PC program and for a Lippke 4000 the parameters are set on the device display.

* = parameter only available in the Lippke 4500 PC Software
Names in parenthesises are the corresponding Lippke 4000 parameter names

Parameters:

Date last modification *	Filled out automatically	
User *	Filled out automatically	
Name (Name)	Test name	
Name 1 *	Can be used to give additional information about the test	
Name 2 *	Can be used to give additional information about the test	
Package type (Package Type)	**- Normal**	This is the recommended standard setting. Should be used whenever possible.
	- Porous	Use for porous packages like Tyvek.
	- Sensitive	Do not use for a Creep2Fail test.
Test pressure [mbar] (Test pressure)	Pressure at which the test is performed (Typically 95-100% of the burst pressure)	
Creep time [sec] (Creep Time)	The period of time where test pressure is maintained.	
With oxygen measurement *	Requires a PacCheck 3XX - If checked the O_2 level is measured.	
Limit oxygen [%] (O2 Limit)	Upper limit for acceptable O_2 measurement.	
With CO2 measurement *	Requires a PacCheck 3XX - If checked the CO_2 level is measured.	
Limit CO2 [%] *	Upper limit for acceptable CO_2 measurement.	

Displayed limits in chart:

Pressure, upper limit in chart [mbar] *	Upper pressure value for the [mbar] axis in the resulting graph chart
Pressure, lower limit in chart [mbar] *	Lower pressure value for the [mbar] axis in the resulting graph chart

Limits:

Limit + [mbar] (Upper-Limit)	Upper time limit - the package should burst before this time limit.
Limit - [mbar] (Lower-Limit)	Lower time limit - the package should burst after this time limit.

Bubble test

(Requires the **Creep Test option**)

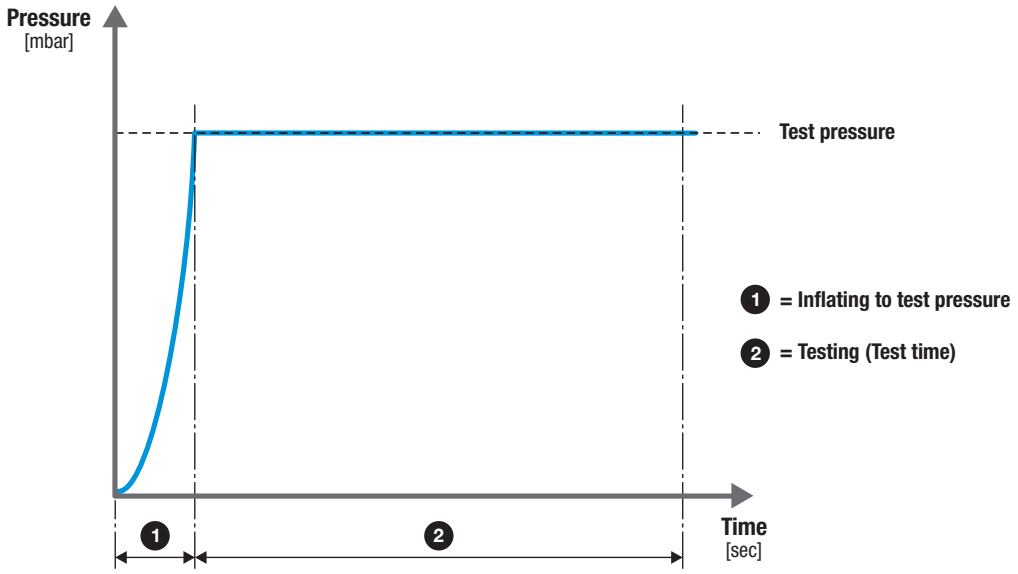
The **Bubble** test is only available for the **Lippke 4500** and has two purposes; one is to locate the placement of a hole in a package. To do this place the package (with septum and needle) under water. Secondly you can test for example that a Tyvek package functions as intended, meaning that it only leaks within a specific pressure range. This test also requires for the package to be under water.
A **Bubble** test inflates the package to a specific pressure and maintains this pressure for a specified time period. The **Bubble** test is compliant with ASTM F2096.

CAUTION! It is possible that the package will burst during a Bubble test. Please note that the pressure may not drop to a low level immediately after the test.

NOTE! When testing filled packages, precautions may be necessary to ensure that the product does not contaminate the operator or the system. Depending on the package contents, the use of safety glasses may be advisable. A protective hood placed over the package may offer additional protection.

A **Bubble** test is divided into 2 phases:

1. The package is inflated to the test pressure.
2. The test pressure is maintained for a fixed period of time.



When test ends you must select whether the test was passed or not.

CAUTION! If the package did not burst, it is still under pressure! Remove the package carefully; a sudden pressure drop will occur when it is removed.

Measurement accessory kits

The following measurement accessory kits can be used for a **Bubble** test:

- **Stand, basic** (with any test head and needle or tube adaptor, with or without filter)
- **Tube adapter**
- **IV-Bag adapter**
- **Handheld, needle, twin**

Bubble test settings

The test parameters are set in the PC program.

Parameters:

Date last modification	Filled out automatically	
User	Filled out automatically	
Name	Test name	
Name 1	Can be used to give additional information about the test	
Name 2	Can be used to give additional information about the test	
Package type	**- Normal**	This is the recommended standard setting. Should be used whenever possible.
	- Porous	Use for porous packages like Tyvek.
	- Sensitive	Not used for Bubble tests
Test pressure [mbar]	Pressure at which the test is performed	
Test time [sec]	The period of time where test pressure is maintained.	

Displayed limits in chart:

Pressure, upper limit in chart [mbar]	Upper pressure value for the [mbar] axis in the resulting graph chart
Pressure, lower limit in chart [mbar]	Lower pressure value for the [mbar] axis in the resulting graph chart

5. Setting Up

Compressed air connections

Compressed air supply requirements

The compressed air supply must be dry, clean and free from oil - see specifications in "Air supply" on page 71.

CAUTION! If the specified maximum pressure is exceeded, there is a danger of bursting of tubing and other components.

NOTE! Operation to within specification is not guaranteed if the Air Supply pressure is below the specified minimum input pressure.

Filter recommendations

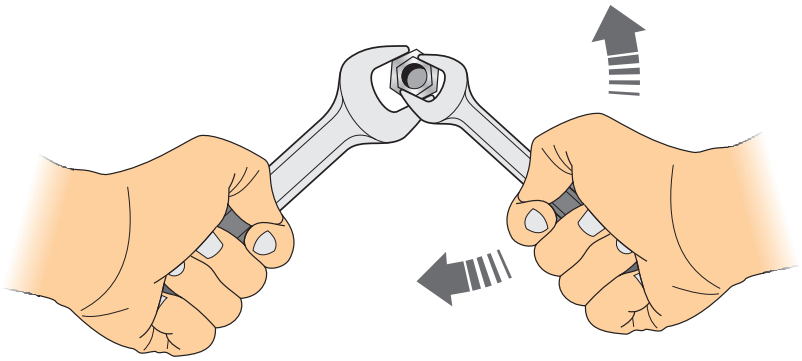
In cases where a filter is required to clean the air enough to fulfil the required specifications, we recommend the following two types which can be used in most cases:

- **Festo LFMB-D-MINI (162626)**
- **Zander Min-DRY MDK and KT 2016**

NOTE! Even when using the above filter types it is still the responsibility of the owner to ensure that the compressed air supply fulfils the requirements as specified in "Air supply" on page 71.

Correct mounting/dismounting of fittings

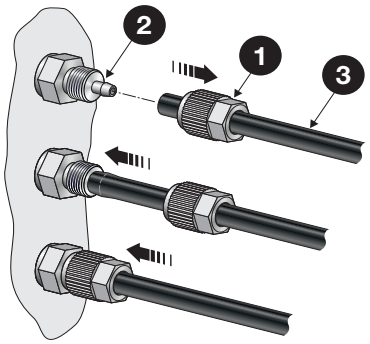
CAUTION! When mounting/dismounting fittings in order to connect compressed air hoses or to replace fittings, it is very important that you hold against on the already mounted fittings to avoid damaging the existing assemblies.



Correct use of hose connectors

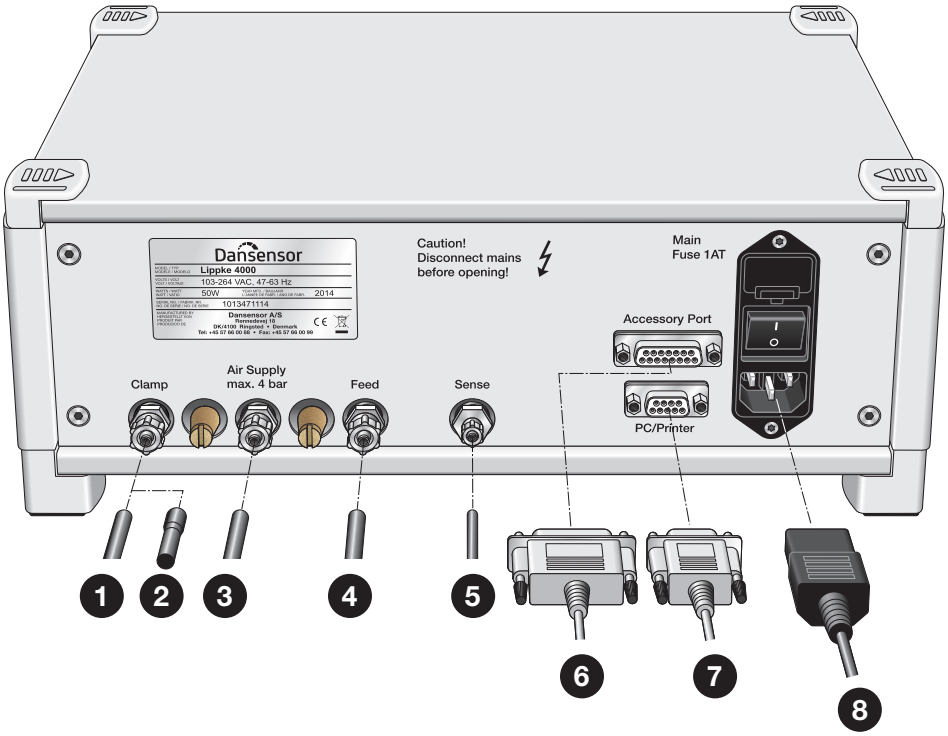
Follow procedure below to ensure correct and tight hose connections:

1. Unscrew the union nut ❶ from the hose connector ❷ and slide it onto the hose ❸.
2. Press the hose ❸ onto the hose connector ❷ as far as it goes.
3. Finally slide the union nut ❶ onto the hose connector ❷ and tighten properly.



Connecting hoses and cables

NOTE! The Lippke 4000/4500 device and the various accessories must be placed on an even and steady surface with sufficient working area for the type of packages to be tested.



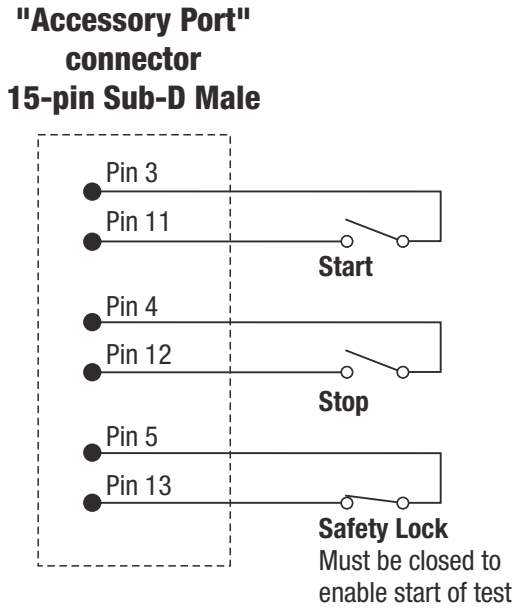
1. You have 3 connection possibilities for the “Clamp” connector:
   - If you are using the device together with a PPC 300 II unit and you want the device to control the lower clamp bar of the PPC 300 II, connect a hose ❶ from the “Clamp” outlet to the “Control Lower Bar” inlet on the PPC 300 II.
   - If you are using the device as a part of the MultiCheck system, connect a hose ❶ from the “Clamp” outlet to the MultiCheck test head.
   - If the “Clamp” outlet is not to be used, it must be plugged using the special rubber plug ❷ that comes with the device.
2. Connect the compressed air supply ❸ to the “Air Supply” inlet connector - see "Compressed air supply requirements" on page 51 for details.
3. Connect the hose from the “Feed” outlet connector ❹ to the appropriate accessory air supply connector.
4. Connect the hose from the “Sense” inlet connector ❺ to the appropriate accessory pressure measurement outlet connector.
5. The “Accessory Port” connector has 2 functions:
   - If you are using the device as a part of the MultiCheck system, connect the 15-pin Sub-D communication cable ❻ from the PacCheck 3XX to the “Accessory Port” connector.
   - If you want to start and stop the device from an external source (ex. a foot switch) connect the 15-pin Sub-D cable ❻ between the “Accessory Port” connector and the control device. See "Connection of external control device" on page 54 for details.

6. If a printer is to be used, unpack it and set it up using the provided instructions.
7. Connect one end of the interface ❼ cable to "PC/Printer" port.
8. Connect the “Null Modem” adapter to the other end of the interface ❼.
9. Plug the Null Modem adapter into the printer.
10. Connect the power cable ❽ to a suitable power source.

NOTE! Check to insure that all hoses are firmly and tightly connected. Please use the union nuts provided with the system. This will help insure that all the connections are safe and leak free.

Connection of external control device

It is possible to start and stop the Lippke device from an external source.
The 15-pin Sub-D cable must be configured as illustrated below.



6. Operation

General

The **Lippke 4500** uses the **Package Test System Lippke 4500** PC software application to set up and perform all tests. Details on how to operate this software can be found in the **Help** section of the software.
An electronic copy of the **Help** system document is included on the installation CD and is installed on the computer when the application is set up.

Navigation and button functions

Use wheel to
- scroll through menu items (turn).
- select menu items (press).
- edit field values (turn to select and press to confirm).

Use button to
- move back.
- move up one level in the menu structure.
  (This can also be achieved by selecting ← in the display's upper left corner).

Use button to
- select records (tests and users) for editing.
- accept changes to alphanumeric fields ex. test record names and user names.

Use buttons to start a test.

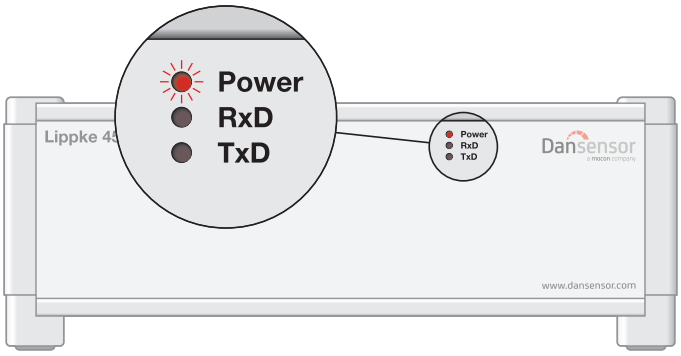
Most of the tests automatically stop after a preset time period. The button can be used to manually stop a test if required.

If user login is required this button logs out the current user and returns the device to the **User Selection** screen.
If user login is disabled the button takes you directly to the **Main Menu**.

Start up

Lippke 4500

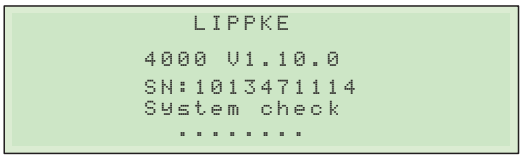
1. Switch power on by means of the mains switch at the back of the device.
2. When power is applied to the unit, the red “Power” indicator on the front will be lit.



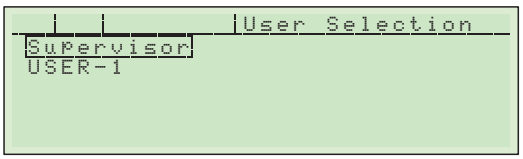
3. Start the **Package Test System Lippke 4500** application from the PC’s **Start Menu**.
   User Name and **Password** is required to access the application.
   Select the appropriate name by opening the **User name** list box. The default **Password** for the **Administrator** user is **admin**.

Lippke 4000

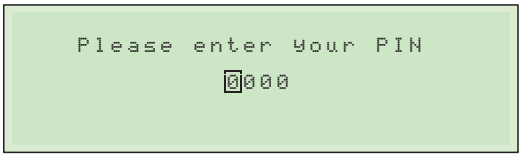
1. Switch power on by means of the mains switch at the back of the device.
2. The display will show the start-up screen, indicating the device model, the currently installed firmware version and the device serial no.



3. After a short internal self diagnosis the device will be ready and If **User Login** is required the display will show the **User Selection** screen (if **User Login** is disabled, the display will change to show the **Main Menu**).



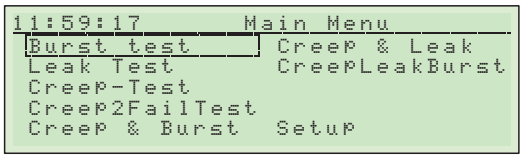
   Select user ex. **Supervisor**.
4. Now you will be asked to enter the appropriate **PIN** code.



   Enter **PIN** code (**Supervisor** has been set to **0000** from the factory, but this may have been changed).

Entering a correct **PIN** code will take you to the **Main Menu**.

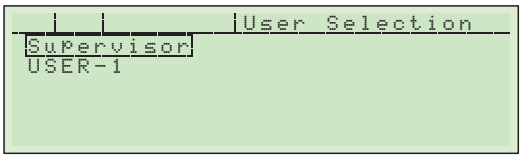
5. From the **Main Menu** you can select each of the available tests and the **Setup** menu.



NOTE! If the Creep Test option and the Mult-Test option has not been purchased the only items displayed in the "Main Menu" will be Burst Test, Leak Test and Setup.

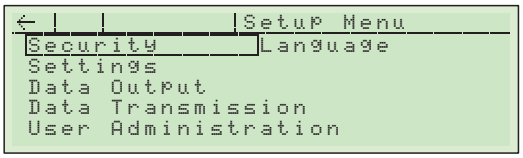
NOTE! If you are logged in as a user without supervisor privileges and setup protection is enabled, the Setup item will not be displayed in the Main Menu.

6. If you want to change the user press the button. This will logout the current user and take you to the **User Selection** screen where you can select a different user.



Setup

Selecting **Setup** from the **Main menu** will display the **Setup Menu** with the available setup parameters such as **Data Transmission**, **User administration**, **Language** etc.



Each menu item has a submenu with available set-up parameters for the selected item.

Security:

Batch inquiry	**Yes**	User has to enter a batch number after choosing a test record.
	No	Function disabled.
User Login	**Yes**	User has to log in with user name and **PIN** code
	No	Function disabled.
Logout after	When set time runs out the current user is automatically logged out. Function is disabled if **User Login** is set to **No** or if time is set to **00:00.**	
Setup Protected	**Yes**	Only supervisor users have access to the **Setup menu**. Even though user login is disabled, you will be asked to login at start-up. In this case selecting **to Mainmenu** from the **User Selection** screen will log you in as a user without supervisor privileges.
	No	All users have access to the **Setup** menu.

Settings:

Date	Set current date	
Time	Set current time	
Acustic Signal	**On**	Enable function.
	Off	Disable function.
	2s - 60s	Set the duration of the tone after each test.
Pressure Unit	Select unit for pressure values: **mbar**, **mmHG**, or **psi**	

NOTE! Observe that the device always uses mbar internally. If you switch to psi it still operates in mbar but calculates the psi value for the display.
If f.ex. the 1 mbar step from 34 to 35 mbar is bigger than the 0.01 psi step, then you jump from 0.49 to 0.51 psi.

Ventilate	Select how to ventilate the package after a test: **auto**, **manual** or **Off**. **NOTE! If set to "auto" the package will be ventilated through the device. In this case you must make sure that the package does not contain a product that can be pulled back through the device.**
Ext. Inputs	It is possible to start and stop the device from an external source. To do this use the 15-pin Sub-D "Accessory Port" connector on the back. See "Connection of external control device" on page 54 for details.
Pressure Cal.	Only for Service Technicians - do not use!
Data Output:	
Test Number Output	With every printout an incremental test number is printed. The value can not be changed.
Output to	**Printer** or **PC**
Printouts	Set number of printouts for each test
Baud Rate	Select transfer speed: **9600** or **19200**
Cutting Signal	Signal in HEX to activate the cutting on the printer (See also printer manual)
Line Feed	Number of line feeds at the end of a page
Form Feed	Number of form feeds at the end of a page
Data Transmission	
User Database	Send/receive User data (User administration)
Parameter DB	Send/receive the test database
System config.	Send the serial number, hour counter and the calibration factors to a PC or printer.
User Administration	See "User administration" on page 60 for details
Language	Select the instrument interface language: - **English** - **German** - **French** - **Spanish**

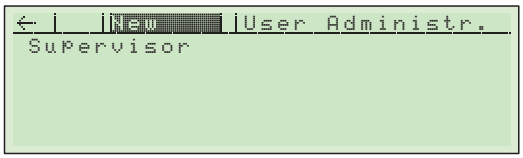
User administration

Select **User Administration** from the **Setup Menu** to maintain the user database.

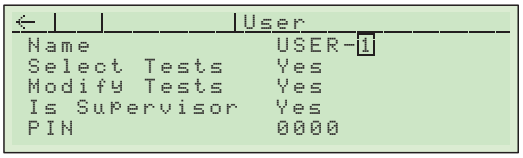
You can see the list of existing users, create or delete users, and edit the settings for an existing user.

Create user

1. From the **Setup Menu** select **User Administration**.



2. Select **New**.

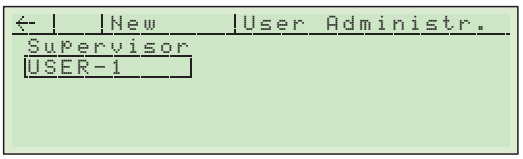


3. Make appropriate settings for the user:

Name	Unique user name (max. 13 characters)
Select Tests	Select if user is allowed to select a test from the **Main Menu**.
Modify Tests	Select if user is allowed to modify test settings. If set to **Yes** the **Select Tests** parameter will automatically be set to **Yes** as well.
Is Supervisor	Select if user should have supervisor privileges. If set to **Yes** the **Select Tests** and **Modify Tests** parameters will automatically be set to **Yes** as well. If set to **Yes** the user will always have access to the **Setup** menu.
PIN	Create a unique 4-digit login **PIN** code.

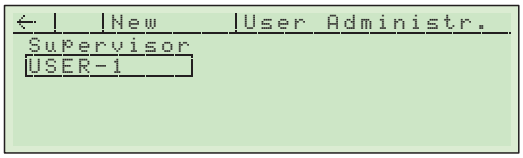
4. When you are done press **ESC** key (or select and press ↵). You will be asked to save the file.

5. Select and press **Yes** to save file and return to the users list.

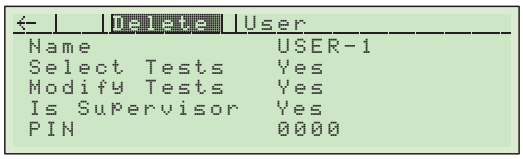


Delete user

1. From the **Setup Menu** select **User Administration**.

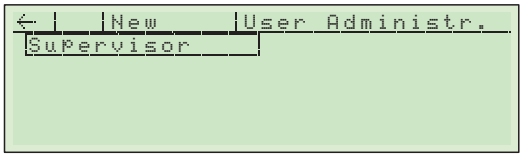


2. Select the user you want to delete ex. **USER-1**.



3. Select and press **Delete**.

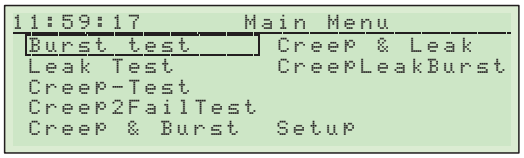
4. Select and press **Yes** to delete file and return to the users list.



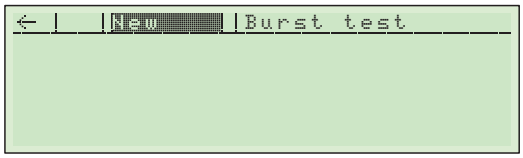
Test setup

Create a test record with parameter settings

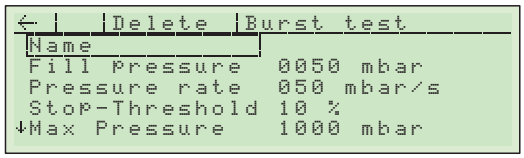
1. Select ex. **Burst test** from the **Main Menu**.



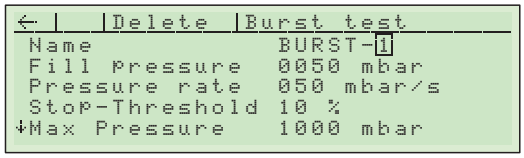
2. The display will change to show the **Burst test** records list, which will be empty when entering for the first time.



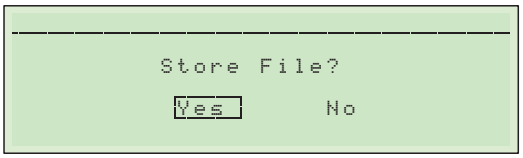
3. Select **New** to create a new record.



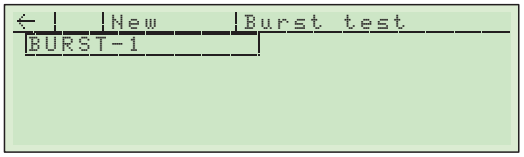
4. Start by naming the record to ex. **BURST-1**, then set up all parameters as required - see "Burst test settings" on page 37 for details.



5. When you are done press **ESC** key to return to the records list. You will be asked to save the record file.

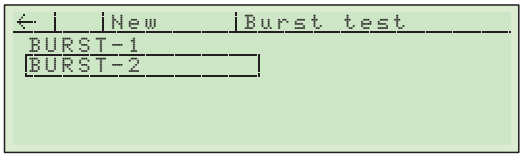


6. Select and press **Yes** to save file and return to the records list.

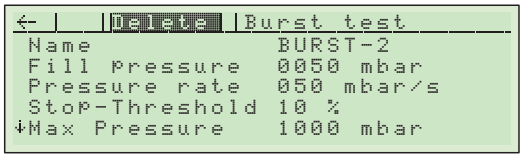


Delete test

1. From the **Main Menu** select the test type ex. **Burst test**.

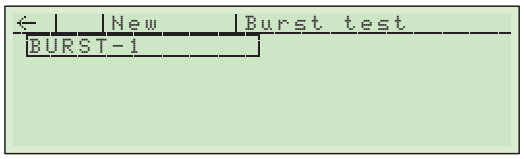


2. Select the test record you want to delete ex. **BURST-2** and press **Edit** button.



3. Select and press **Delete**.

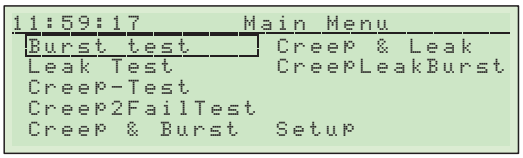
4. Select and press **Yes** to delete file and return to the records list.



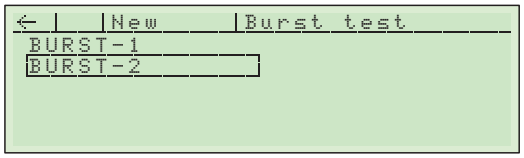
Performing a test

Before you start to perform tests, it is recommended that you familiarize yourself with the use of the various accessories as described in "3. Measurement Accessory Kits" on page 17 and the various test types as described in "4. Tests" on page 35.

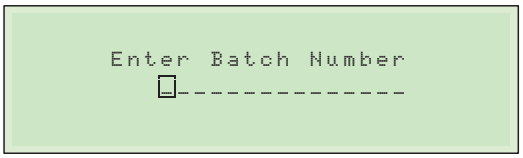
1. Prepare the package for the test.
2. Go to the **Main Menu**.



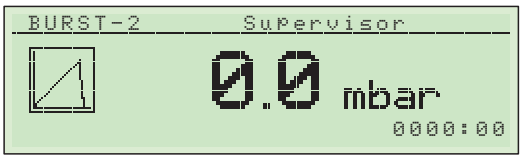
3. Select test type ex. **Burst test**.



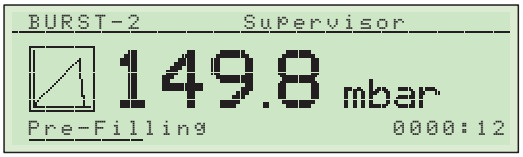
4. Select and press a test record ex. **BURST-2**.

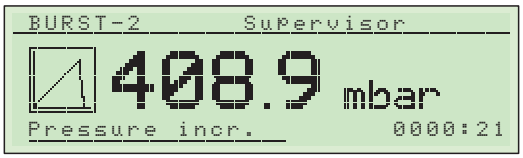


5. If the **Batch Inquiry** function is turned on in the **Setup -> Security** menu you must enter a batch number. You can enter up to 15 characters by turning and pushing the scroll wheel. **ESC** goes back, **Edit** is Enter. The batch number will be printed out after the test.
6. After entering the batch number the start screen of the selected test appears.
   The selected test record (BURST-2) and the current user (Supervisor) is displayed in the top of the screen.

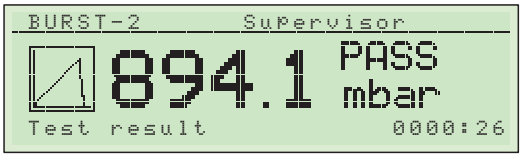


7. Press **Start** button to start the test.
   The test starts and each test phase will be displayed while executed (Pre-filling, Pressure incr. etc.) together with the read-out of the current package pressure.





8. When the test terminates (in this case when the package bursts) the screen will display the result of the test (in this case the result is the burst pressure of the package).



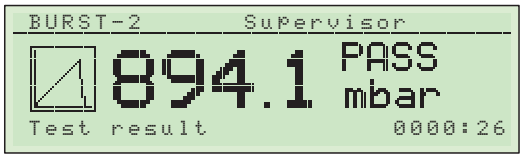
9. If a printer is connected and the **Setup -> Data Output -> Printouts** parameter is set to ex. **2** the printer will print 2 copies of the test result.

Display of test results

At the end of each test the test result will be displayed on the screen.

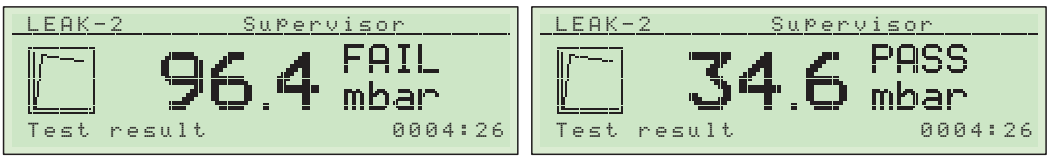
Burst test result

A **Burst test** can either be failed or passed. The test result is displayed as the pressure where the package bursts and whether the test is passed or failed. The test is passed if the package bursts at a pressure that is within the set pressure limits - see detailed test description in "Burst test" on page 36.



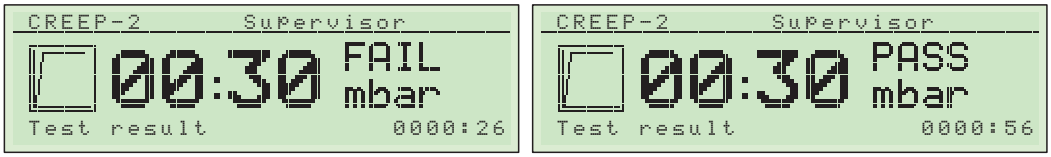
Leak test result

A Leak test can either be failed or passed. The test is failed if the pressure drop in the package is too high over a set period of time - see detailed test description in "Leak test" on page 39.



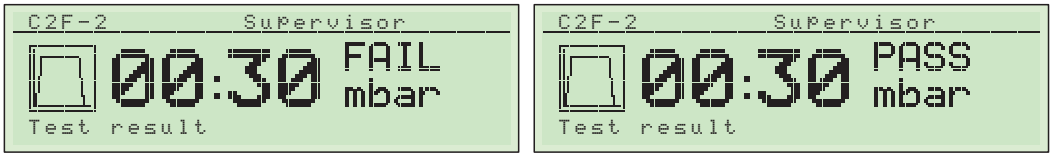
Creep test result

A Creep test can either be failed or passed. The test is failed if the package bursts within a set period of time - see detailed test description in "Creep test" on page 42.



Creep2Fail test result

A Creep2Fail test can either be failed or passed. The test is failed if the package bursts outside the set time limits - see detailed test description in "Creep2Fail test" on page 45.



7. Cleaning and Maintenance

General

NOTE! Performing cleaning and maintenance regularly reduces the chances of equipment failure.

CAUTION! Personnel performing any maintenance or cleaning must familiarize themselves with the "Safety Instructions" on page 9 before attempting any of these procedures.

NOTE! For correct mounting/dismounting of fittings please see "Correct mounting/ dismounting of fittings" on page 51.

The **Lippke 4000/4500** control units are maintenance-free. This particularly applies to the pneumatics and electronic control systems.

Cleaning and maintenance of other items such as measurement accessories and needles etc. is described in the following.

Parts

Parts required for maintenance purposes are listed in "Consumables and accessories" on page 75.

Cleaning

All control unit and measurement accessory surfaces should be cleaned using a mild soap solution and a wrung cloth.

CAUTION! Never use hard tools or abrasive materials when cleaning any part of the device.

WARNING! Never use cleaning agents containing chlorinated solvents or acetic or phosphoric acid. These constitute a health hazard and could damage the instrument.

Needles and test heads

Disassemble needles and test heads from time to time and check whether they are completely clean and that all openings are free from dirt and residues. Any residues can be removed carefully by means of a needle and liquids should be best blown out using compressed air.
Flushing with water and alcohol is also possible. After that, all parts should be blown out thoroughly with compressed air to make sure that no liquids remain.

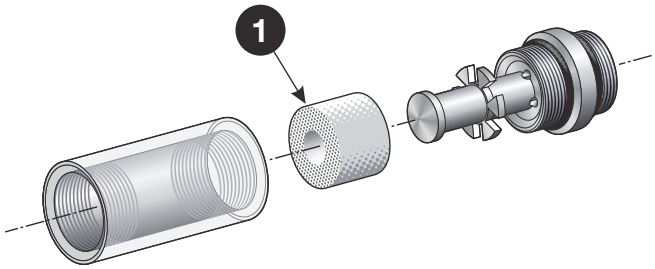
Hoses

All hoses should be disconnected regularly and blown through using compressed air.

Maintenance

Filter

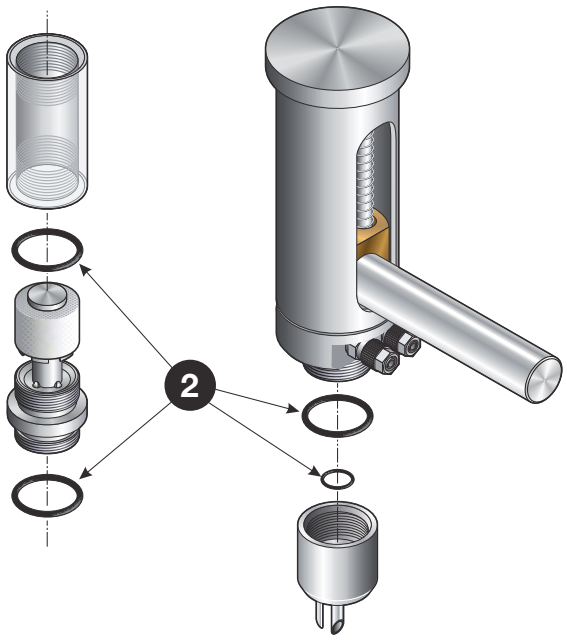
The filter foam material ❶ in the optional filter should be replaced at regular intervals or if it is soiled.



O-rings

The O-rings ❷ for the filter, needles and test heads guarantee tightness and functioning of the system and must therefore be replaced periodically.
Applying some silicone grease on the O-rings may prolong their service life and durability and may increase system tightness.

CAUTION! Do not use mineral grease for the O-rings.



8. Troubleshooting

NOTE! The following list of possible error causes and their remedies is not necessarily complete. If problems or errors occur, that are not described in this section, please do not hesitate to contact us.

System Errors

Problem	Cause	Remedy
4000 models: No display after switching on the control unit 4500 models: Power LED is not lid after switching on the control unit	- Loose power cable - Defective fuse	- Check the connection. - Replace the 1A fuse in the power input module at the back of the device. - Call Service

Interface Errors

NOTE! The following errors refer to a printer, but they also apply to a PC.
Please observe that all errors are output just once, i.e., the output cannot be repeated.

Problem	Cause	Remedy
No printer output	- Loose interface cable - Printer not switched on - Printer is OFF line	- Check the connections - Switch on printer - Switch printer ON line
Output not in desired language	- Wrong configuration	- Change language setting in Setup (see page 58)
“Strange” characters, (e.g. ”ü”) not displayed	- Wrong character set	- Check settings of printer (see manual)

Problems during Measurement

Problem	Cause	Remedy
The system does not build up pressure during a measurement	- The package is leaking around the needle and or septum - The Pressure Rise setting may be too high - The package is very porous - No compressed air supply	- Check the connections - Switch on printer - Switch printer ON line
Package is not inflated fully even though a pressure rise is displayed	- Clogged needle	- Stop measurement and clean needle
Pressure loss too high in a package	- The package is leaking around the needle - Poor adhesion of the septum caused by a dirty package surface - Leaks in needle/test head caused by defective or porous O-rings	- Check settings of printer (see manual)
Measurement does not terminate automatically after bursting of the package	- Auto-Stop Threshold value set too high	- Set Auto-Stop Threshold value to a lower value

9. Technical Information

Technical specifications

Electrical specifications

Supply voltage	103-264 VAC, 47-63 Hz
Power consumption	50 W

Air supply

Air supply pressure	Devices w/ 5 bar “Feed” valve: max. 4.0 bar (58 psi) Devices w/ 10 bar “Feed” valve: 4.0 - 8.0 bar (58 - 116 psi) [1] The input pressure must be at least 1 bar (14.5 psi) above measurement pressure [2]
Air quality	Compliant with DIN ISO 8573 Class 2 [3]

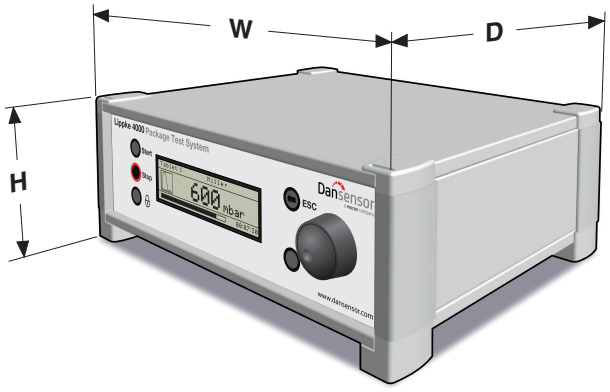
[1] Can be used in range 1 - 4 bar (14.5 - 58 psi) with reduced specifications

[2] A separate pressure regulator is recommended

[3] See "Filter recommendations" on page 51

Mechanical data

Control unit size	130 x 344 x 262 mm (5.1 x 13.5 x 10.3”) (H x W x D)



Control unit weight	6.5 kg (14.3 lbs)
“Air supply” inlet	Hose Ø6/4 mm
“Feed” outlet	Hose Ø6/4 mm
“Clamp” outlet	Hose Ø6/4 mm
“Sense” inlet	Hose Ø4/2.6 mm

Accessories data

Stand, basic	Dimensions (H x W x D):	407 x 250 x 330 mm (16 x 9.8 x 13”)
	Weight:	3.6 kg (7.9 lbs)
Fixture f. ASTM restraining	Dimensions (H x W x D):	412 x 400 x 405 mm (16.2 x 15.7 x 15.9”)
	Weight:	13.5 kg (29.8 lbs)
	Restraining height:	6. 35 - 76.2 mm (¼ - 3”) in steps of 6.35 mm (¼”)
	Max. package size (W x D):	230 x 400 mm (9 x 15.7”)
PPC 300 II **w. Package fixture**	Dimensions (H x W x D):	200 x 470 x 495 mm (7.9 x 18.5 x 19.5”)
	Weight:	20.0 kg (44.1 lbs)
	Restraining height:	31 - 80 mm (1.2 - 3.1”)
	Max. package size (W x D):	310 x 360 mm (12.2 x 14.2”)
Valve Test Unit (VTU)	Dimensions (H x W x D):	115 x 176 x 189 mm (4.5 x 6.9 x 7.4”)
	Weight:	2.6 kg (5.7 lbs)
	Max. sample size	Ø 24.1 mm (0.95”)

Basic specifications

Ambient operation pressure	900 - 1050 mbar (13 - 15.2 psi)	
Measuring ranges	1:	10 - 1000 mbar (0.5 - 14.5 psi)
	2:	200 - 3000 mbar (2.9 - 43.5 psi)
Resolution per **Measuring range**	1:	0.1 mbar (0.0015 psi)
	2:	1.0 mbar (0.015 psi)
Accuracy per **Measuring range**	1:	± 0.5 mbar (0.007 psi) or 1% *
	2:	± 2.0 mbar (0.030 psi) or 1% *
		* whichever is greater and within specified range. Can be used below with reduced specifications.
Reproducibility per **Measuring range**	1:	± 0.5 mbar (0.007 psi) or 1% *
	2:	± 2.0 mbar (0.030 psi) or 1% *
		* whichever is greater and within specified range. Can be used below with reduced specifications.
Ambient temperature	Operational:	+15 to +45 °C, less than 90% RH, non-condensing
	Storage:	-10°C to +60°C, less than 95% RH, non-condensing
Pressure units	mbar, mmHG or psi	
Test time	1 - 9.999 sec.	
Interface languages	English, German, French, Spanish	

Connectivity

RS232	D-SUB 9 DTE interface (male connector)
Machine I/O	D-SUB 15 male

Conformity

- CE (RoHS)

10. Consumables and accessories

Ordering items

When ordering any of the below listed items please state carefully the item number, the item specification and the number of items wanted and send the order to your spare parts dealer.

Consumables

- Septa, ø21/ø3x3mm (1000 pcs) black, Ser. Cpl. . . . . P/N 340313
- Septa, ø21/ø3x1mm (1000 pcs) grey, Ser. Cpl. . . . . P/N 340314
- Filter, foam Ø20/ø8 x 15mm (25 pcs) Ser. Cpl. . . . . P/N 340321
- Printer paper, reel, 112mm x 28m Thermal (1 pcs), Ser. Cpl.. . . . . P/N 340412

Accessories

- Barcode Scanner w. USB cable, Ser. Cpl. . . . . P/N 301189
- PPC 300 II, Ser. Cpl. . . . . P/N 330237
- Needle, sharp, Ø4mm, Ser. Cpl. . . . . P/N 340303
- Needle, flat, Ø4mm, Ser. Cpl. . . . . P/N 340304
- Needle, double, Ø4mm/Ø2mm, Ser. Cpl.. . . . . P/N 340306
- Needle, twin, handheld, w. cover, Ser. Cpl. . . . . P/N 340317
- Filter, housing f. test head, Ser. Cpl. . . . . P/N 340319
- Stand, basic, Ser. Cpl.. . . . . P/N 340323
- Fixture f. ASTM restraining, Ser. Cpl.. . . . . P/N 340325
- Test Head, Ser. Cpl.. . . . . P/N 340327
- Needle, handheld, mono, Ser. Cpl. . . . . P/N 340336
- IV-Bag adapter, Ser. Cpl. . . . . P/N 340338
- Package Fixture f. PPC 300 II, Ser. Cpl. . . . . P/N 340347
- PPC 300 II w. Package fixture, Ser. Cpl.. . . . . P/N 340348
- Printer, thermal, SEIKO DPU414, Ser. Cpl. . . . . P/N 340349
- Valve Test Unit (VTU), Ser. Cpl. . . . . P/N 340350
- Tube-adapter incl. gasket f. test head (custom made), Ser. Cpl. . . . . P/N 340400
- Cable, RS232 9/9 pole f. PC connection, Ser. Cpl. . . . . P/N 340440
- Cable, USB to RS232A adapter, Ser. Cpl.. . . . . P/N 340441
- Tool, needle head, blind, f. test head, Ser. Cpl. . . . . P/N 340462