



# PLT unit

Pipette Leak Testing Unit for functional testing of your air-displacement pipettes in seconds

BRAND. For lab. For life.®

- + Functional testing of your air-displacement pipettes in seconds
- + Automatic documentation of test results with the PLTconnect software
- + More security while pipetting



PIPETTE LEAK TESTING UNIT



# Get to know the PLT unit

The most frequent cause of inaccuracy in air-displacement pipettes is leakage. This arises from damage either to the seals, pistons, or tip cones. Often not detectable by the naked eye, leaks lead to significant volume errors. Well over 80% of pipettes sent in for repair have leaks and are outside their volume tolerances, even if they don't drip. The BRAND pipette leak tester (PLT unit) for air-displacement pipettes finds even the smallest leaks within seconds. If the leak test reveals that there is a leak, the cause can systematically be determined by means of various test options. The use of the PLT unit in test equipment monitoring can thus systematize troubleshooting and make it more efficient (see page 7).

According to monitoring of measuring instruments, air-displacement pipettes must be checked at regular intervals and the results must be compared with the ISO 8655-2 error limits.

However, a calibration certificate only reflects the results at the time of testing. The time between these calibrations is crucial, since leaks can occur at any time.

The PLT unit cannot replace regular gravimetric testing.

However, in a period between two calibrations, the pipette leak tester can ensure that the pipette is able to transfer liquid reliably and accurately. Regular monitoring can thus prevent an instrument from exceeding ISO volume tolerances.

The PLTconnect software gives you the additional security of knowing all your test results are documented at all times.

PLTconnect transmits test results for each pipette automatically and securely through the USB port on the PC, storing them there in a database or as a test certificate. This means you always have access to test results for your pipettes, and can print out certificates as needed.

PLT unit



Calibration certificate of PLTconnect software

- + Limit values for commercially available single- and multichannel pipettes in the volume range 1 µl to 10 ml are pre-programmed.
- + Testing with and without tips
- + Test results in seconds
- + PLTconnect Software for the documentation of the test results

# At a glance: Advantages of the PLT unit

The PLT unit detects the smallest leaks on air displacement pipettes – whether it's a BRAND pipette or a pipette from another manufacturer! This significantly improves the process reliability of pipettes. Apart from a few pipette tips, you will not

need additional accessories or any other consumables for this regular function test. Switching between the three adapters is simple, so you can perform various tests with different pipette models in quick succession.

## Single-channel adapter

Receptacle for the pipette – screw connection enables easy replacement

## Display

with straightforward menu navigation – four different languages available

## „Start/Execute“ button

## LED display

shows whether a test is taking place and the result

„Back“ button

Select knob  
for easy handling



## Adapters for testing with tips or for multi-channel pipettes

can be exchanged quickly and easily



USER  
TIP  
on page 7



Testing with tip inserted



Leak test with multi-channel pipettes



Shows the result and the deviation from the limit within seconds



PLTconnect Software for clear documentation

# Leak rates and their detection

The leak rate is a measure of the quantity of material that flows through a leak per time unit. For air-displacement pipettes the PLT unit determines the rate through a differential pressure measurement, i.e., after creating a negative pressure, the pressure rise over a given time is measured.

## Complex determinations

The leak rate is determined by considering complex physical relationships. Calculation of the limit values resident in the PLT must include factors such as the dead volume of the pipette/tip system, flow crosssection of the pipette tip, pressure rise per time unit, pipette volume and type, etc.

## The pV value

The pV value is the product of the pressure and the volume of a certain quantity of a gas at the prevailing temperature. This is a measure of the quantity of material or the mass of the gas.

## The leak rate $Q_L$

The leak rate  $Q_L$  is the ratio of the pV value and the period of time during which the gas flows through a path crosssection.

## The volume loss

For the pipette test, hPa ml/s is a suitable unit for the leak rate. A leak rate of e.g., 1 hPa ml/s at an air pressure of 1000 hPa means a volume loss of about 1  $\mu$ l/s.



# Limit values

The limit values referenced during testing represent a warning limit, from which significantly lower volume values can also be determined gravimetrically. This is one quarter of the volume tolerances, according to ISO 8655-2.

The limit value for the leak volume of a given pipette allows the leak rate to be calculated. These calculations, which are based on over 35 years of experience in the development and production of pipettes, include the dead volume and the intake characteristics, among other things.

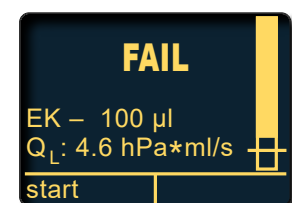
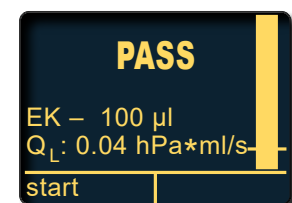
If the pipette is mechanically defect-free, clean, and the test is carried out

properly with the BRAND PLT unit, then the instrument is within the ISO 8655-2 tolerances.

The marks in the vertical progress bars in the display represent the resident limit values for the leak rate  $Q_L$ .

With the correlation table in the PLT operating manual, the missing volume can be approximately determined from the leak rate. The level of the progress bar in the display indicates whether the pipette is leaktight, and whether it lies within the tolerance limits or leaks.

If a pipette fails the test, gravimetric testing is recommended.



# Ordering information

## PLT unit (Pipette Leak Testing Unit)

Items supplied:

Including one 1-channel pipette adapter\* each for testing single-channel air-displacement pipettes with tip (mounted) and without tip, 2 plugs, 3 replacement PE filters for the pipette adapters, universal AC adapter, quality certificate and operating manual.



Pack of	Cat. No.
1	703970

\* 4-channel pipette adapter optional

# Accessories for simple and efficient work



## 1 - channel pipette adapter

for testing of single-channel air-displacement pipettes with tip mounted, including 1 plug.

Pack of	Cat. No.
1	703975



## 1 - channel pipette adapter

for testing of single-channel air-displacement pipettes without tip, including 1 plug.

Pack of	Cat. No.
1	703976



## 4 - channel pipette adapter

for testing of multichannel air-displacement pipettes with and without tips, including 4 plugs.

Pack of	Cat. No.
1	703977



## Filter and stopper

Filter, PE + stopper for pipette adapter for PLT unit (10 filters + 1 stopper).

Pack of	Cat. No.
1	703978



## Universal AC adapter

Input: AC 100 V - 240 V, 50/60 Hz  
Output: DC 6,5 V, 800 mA.

Pack of	Cat. No.
1	703979



## PLTconnect software

for the documentation of test results.

Pack of	Cat. No.
1	703980

USER TIP

# Easy identification of the cause of error in a leaky pipette

The PLT unit can generally be used in two processes:

It can be used in the laboratory as part of the regular functional testing of the pipette for process reliability between two calibrations. If the PLT unit finds a leak and the limit value has been reached or even exceeded, a gravimetric test is recommended.

The leak test can also be a part of the pipette calibration within the framework of preceding functional testing. Calibration can reveal that the pipette lies outside the defined tolerances, which is generally due to leaks.

In both cases described above, the next step can determine the cause of the pipette leak, which can then be resolved.



## Dynamic leak test with pipette tip (pressing the pipetting button)

Passed  
Pipette is leak tight

Pipette is leak tight\*

\* within the scope of a calibration: adjust pipette if necessary

Failed

## Dynamic leak test without pipette tip

Passed  
Leak in transition between shaft and pipette tip

Pipette tip unsuitable?

Cone/O-ring damaged?

Use suitable pipette tip

Replace shaft or O-ring

Failed

## Static leak test without pipette tip (without pressing the pipetting button)

Passed  
Leak on piston/piston seal

Piston or piston seal dirty/damaged?

Clean parts and grease; replace if necessary

Failed

Send in instrument for repair

## Testing with and without tip

To check the overall pipette system, the test is conducted with mounted, unused tip.

When a leak has been identified, the test can be repeated without a tip to determine whether the leak arises from the tip cone/tip coupling region.

## Dynamic or static test?

The dynamic test can rapidly determine whether a defective piston (contamination, scratches, etc.) has caused a leak. The pipette button must be pushed down numerous times during the measurement period. The associated piston movement allows a defective piston to be recognized. In the static test, the pipette button is not pressed during the test procedure, i.e. the piston doesn't move. This will only determine a leak in a general way, without attributing it to a particular component.

**BRAND GMBH + CO KG**

P.O. Box 1155 | 97861 Wertheim | Germany

T +49 9342 808 0 | F +49 9342 808 98000 | [info@brand.de](mailto:info@brand.de) | [www.brand.de](http://www.brand.de)



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BRAND (Shanghai) Trading Co., Ltd.  
Shanghai, China

T +86 400 658 3016  
[info@brand.com.cn](mailto:info@brand.com.cn)  
[china.brand.com.cn](http://china.brand.com.cn)

BRAND Scientific Equipment Pvt. Ltd.  
Mumbai, India

T +91 22 42957790  
[customersupport@brand.co.in](mailto:customersupport@brand.co.in)  
[www.brand.co.in](http://www.brand.co.in)

BrandTech® Scientific, Inc.  
Essex, CT. United States of America

T +1 860 767 2562  
[info@brandtech.com](mailto:info@brandtech.com)  
[www.brandtech.com](http://www.brandtech.com)