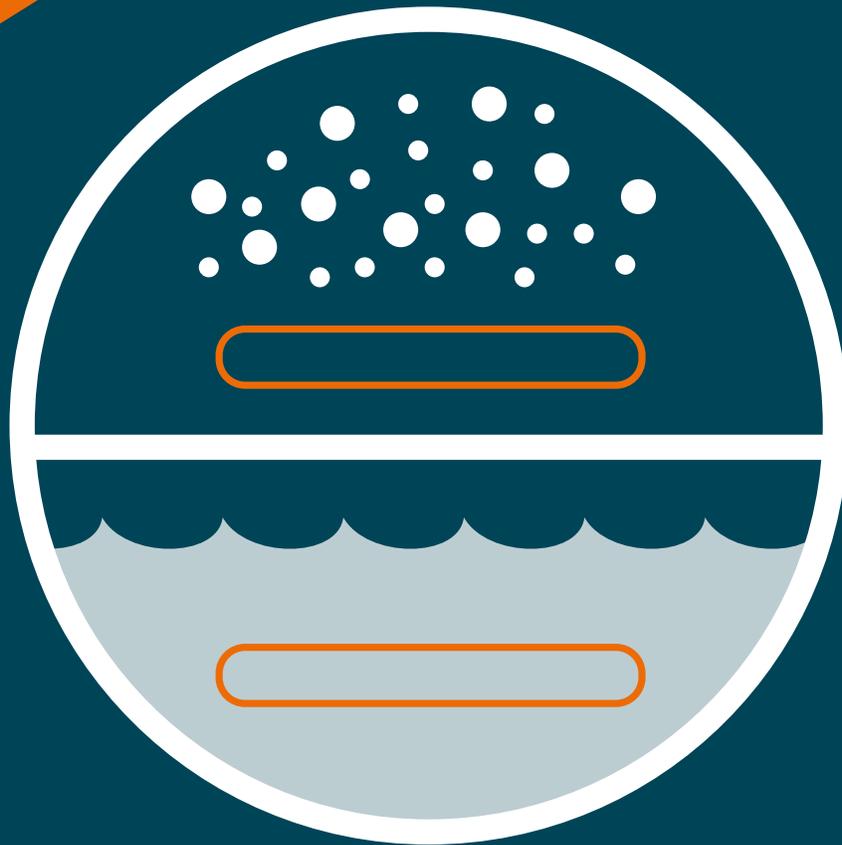


TME



# IP 67 Equivalency testing for Sealed Electronic Devices

### **IP 67 equivalency and sealed devices**

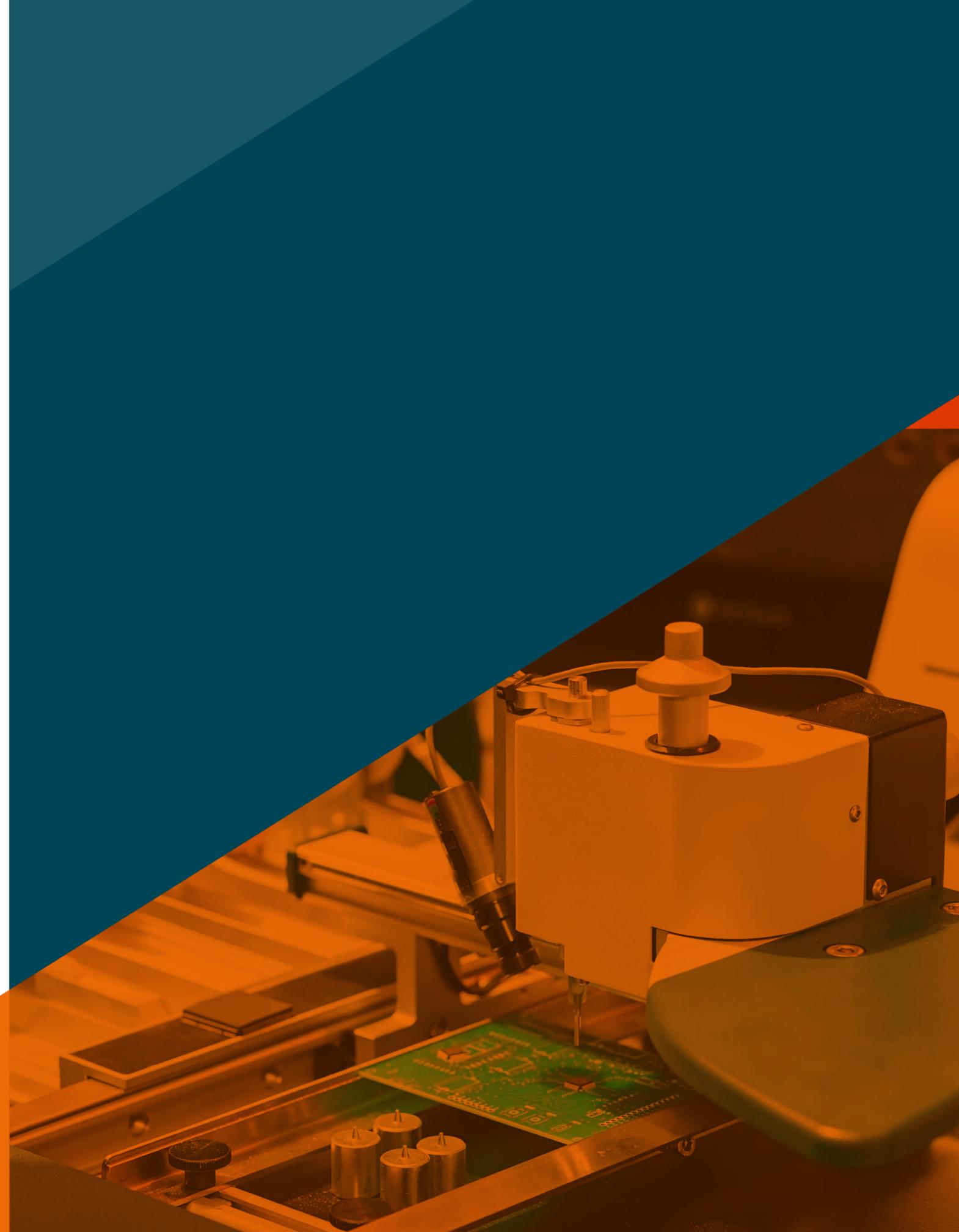
These days mobile device electronics come in many shapes and sizes. People take them everywhere. So they must withstand the environmental trials of everyday life. Effective testing to strict standards makes sure they are fit for purpose. And IP 67 is a classification and standard that products should aspire to ensure such integrity.

Electronic devices such as cell phones, cameras, and speakers are known as 'totally sealed devices.' As they're totally sealed, manufacturers must undertake destructive tests to check against IP standards. For example, the product must be submerged under one meter of water and left for 30 minutes. It's then removed and disassembled for inspection so that water damage to the electronics can be noted. Unfortunately, this destructive method is both time-consuming and costly. So we decided to do things differently!

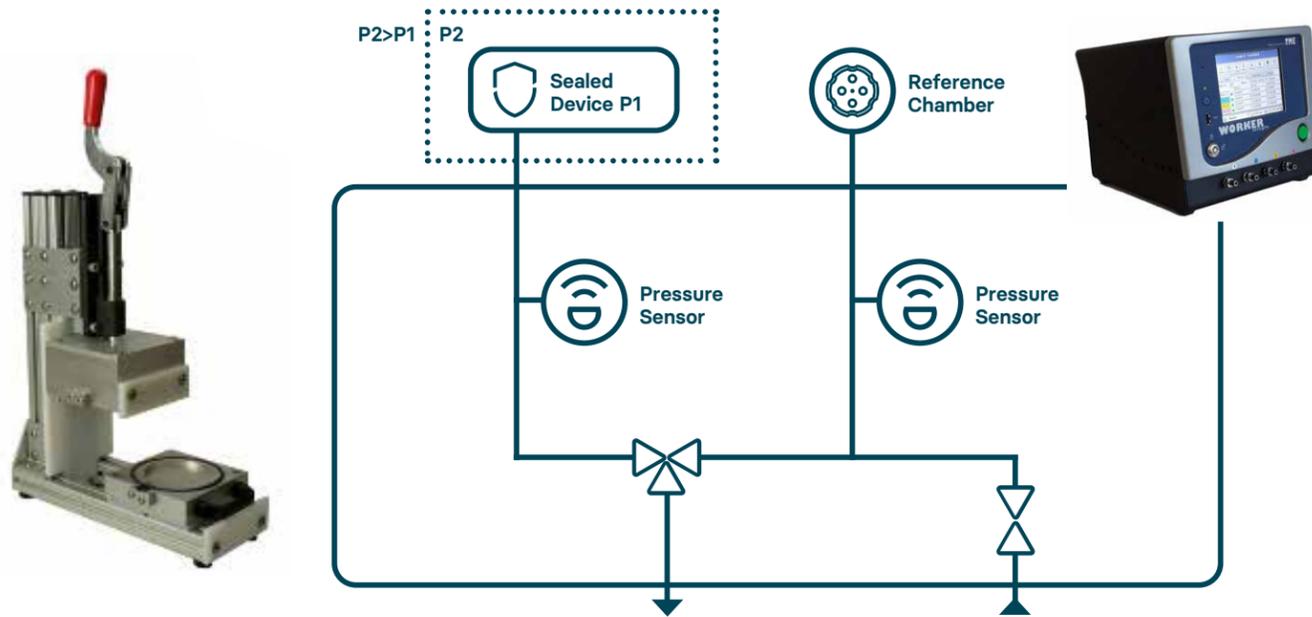
### **The IP solution**

The IP 67 equivalency test method involves creating a closed space (the "chamber") around the device before pressure is applied. This creates a pressure differential across the non-porous product walls and seals. Once stabilized, air movement from the higher pressure (inside the chamber space) to the lower pressure (in the test part) is measured. This indicates the presence of a leak path, providing a quantitative measure of leak integrity in a non-destructive manner.

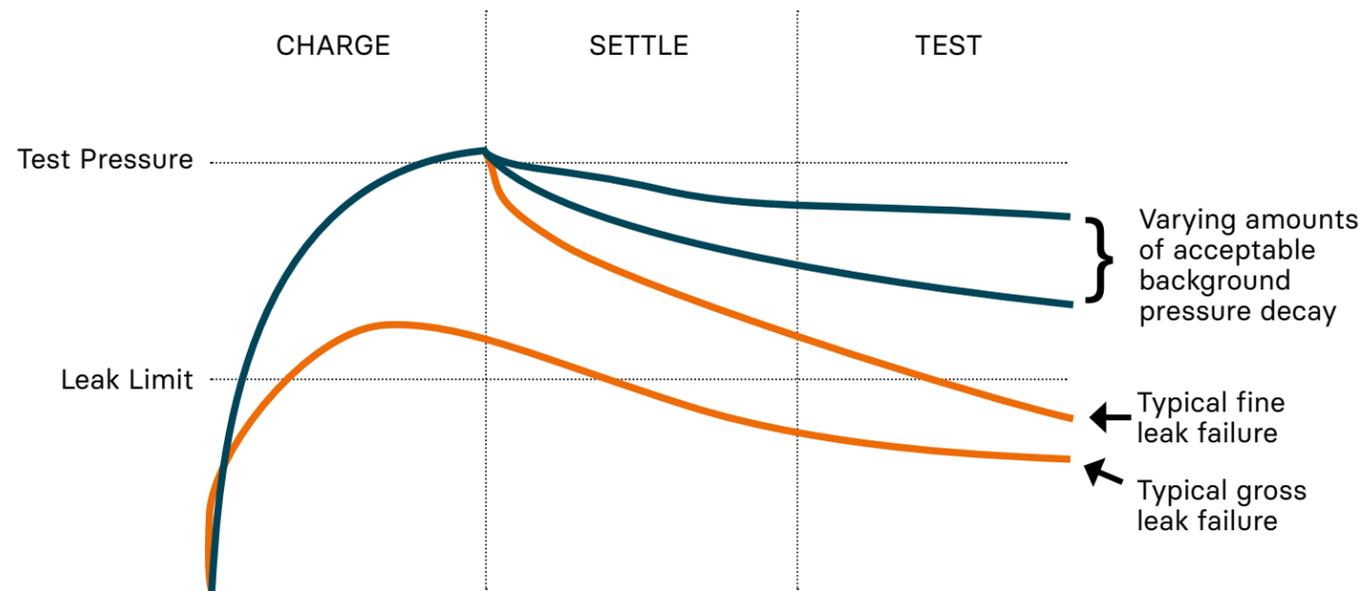
An influential factor impacting the test sensitivity is control of the void volume (the volume inside the test chamber surrounding the test item). The smaller the void volume, the more sensitive the leak test. The need for sensitivity is driven by the user's leak rate specification. Test chambers should be configured to closely approximate the size and shape of the item being tested. This minimizes the void volume while maximizing the test's sensitivity and accuracy. So you get repeatable test results and an ability to detect micro leaks.



# IP Equivalency testing or Sealed device test



## IP 67 equivalency test method:



## The technical bit

1. The test item is placed into the test chamber and the fixture is closed and secured.
2. A valve separates a reference chamber (inside the test instrument) from the external test chamber surrounding the test item. The valve is closed during the pressurization phase of the test cycle. This reference chamber contains a pressure level greater than the desired test pressure level.
3. CHARGE TIME: When the test cycle is actuated, the chamber valve opens to join the reference chamber with the test chamber for a pre-determined length of time ("charge time"). Because the system volume is now greater, the pressure level approaches the desired "test" pressure. At the end of the charge cycle the chamber valve closes, leaving the desired pressure level.
4. SETTLE TIME: A "settle" time is allowed after the pressurization of the test chamber and before the test actually begins. During "settle", the test item is allowed to equilibrate in the chamber. This accommodates for any flexing or adiabatic heating changes resulting from the chamber pressure change.
5. TEST TIME: During the "test" time, observed changes in interstitial pressure indicate that gas is moving from the higher pressure (inside the chamber space) to the lower pressure (the test item). This decay of the pressure in the chamber indicates the presence of leakage paths in the test item. The accept or reject decision is made based on predetermined criteria.
6. GROSS LEAK DETECTION: If the item being tested has a gross leak, for example broken material or a bad seal, the chamber's pressure

level after settling will not reach the desired test pressure level. Which results in a gross leak failure.

7. FINE LEAK DETECTION: If the chamber's pressure level does reach the test level, but the decay of the internal chamber pressure is greater than the expected background decay for that test part, it may indicate an unacceptable level of leakage. This is a fine leak. The selection of an appropriate leak limit for the test product will differentiate between "normal" background pressure decay and an unacceptable fine leak in the test item.

You can then set limits to determine a valid or invalid seal based on the volume of the tested part. Additionally, a special test sequence prevents badly leaking parts, that can cause no change in pressure, from passing the decay test.[1] [JM2]

## The clever bit

As well as satisfying IP67 standards, air testing offers several benefits as an alternative for water testing:

- Air has a much lower density and viscosity. It can penetrate leak paths 25 times faster than water.
- Air is non-destructive allowing for rework or repair of the device.
- Testing time is reduced to seconds per unit using high resolution instruments
- Test systems can be arranged to allow multiple part testing configurations.

# TME solution™ & TME Worker Integra™

## TME solution™

Our high-resolution leak or leak/flow test system has been popular for many years. That's because it's reliable, durable and gives you accurate, repeatable test results in your workplace...fast!

Control the test parameters using the operator friendly touchscreen and menu-driven technology. Examine statistical analysis of your results in real time and download your files easily.

The touchscreen menu is so easy to use. Use it to store up to 100 linkable programs, with enough data storage for up to 5000 test results.

## TME Worker Integra™

A bench-top, high-resolution leak or leak/flow test system that is easy to operate and maintain.

It makes programming, testing, downloading, printing, storing, accessing and reviewing test results really simple!

Check out the icon-based touchscreen display. It provides easy, clear navigation through the many data handling and review screen options. While the small internal volume contributes to high sensitivity, repeatability, and reliability of tests.



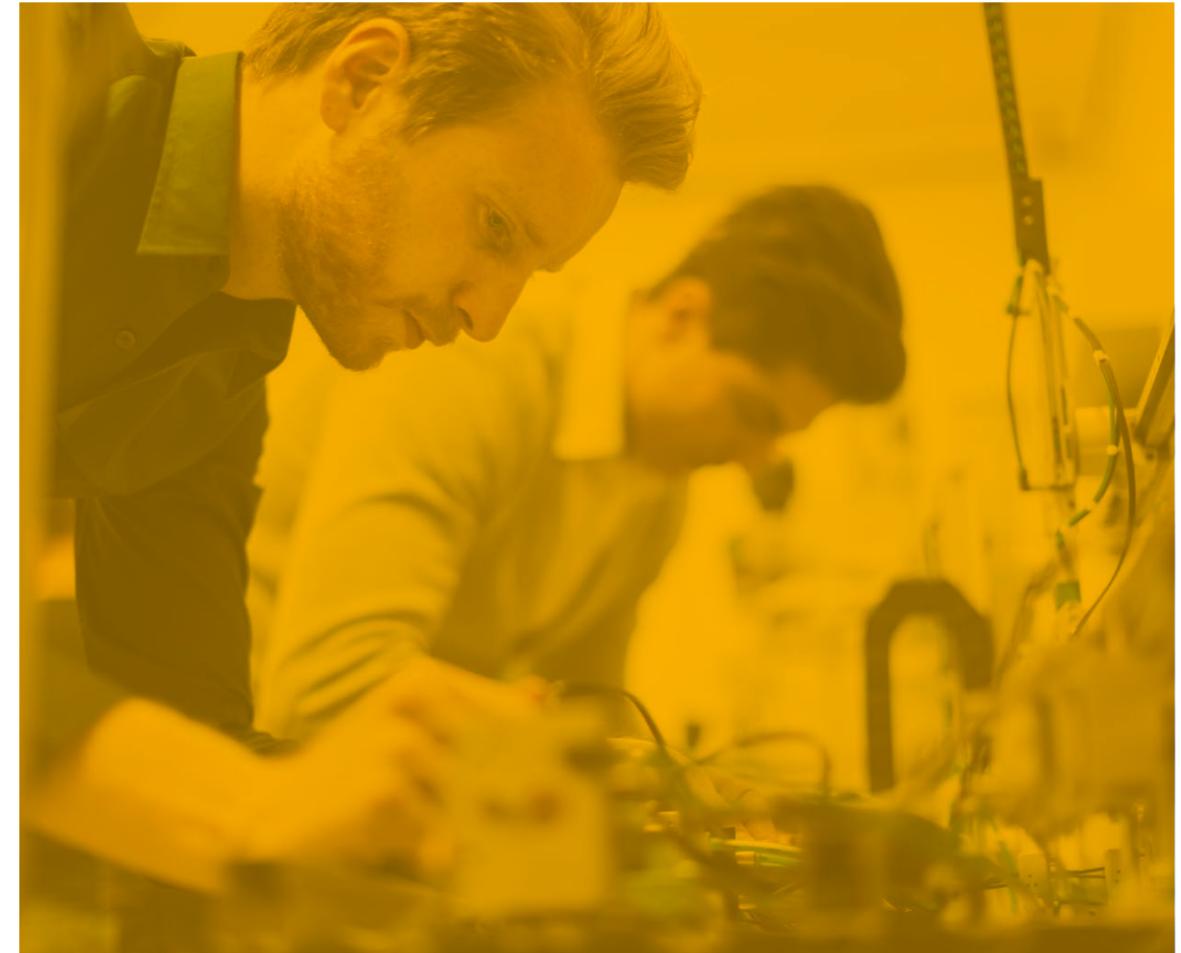
## Why choose us?

TME has designed and manufactured more than 1200 unique test fixtures to solve leak and leak/flow test problems in the medical device, pharmaceutical, automotive, electronic and packaging industries.

**As part of Industrial Physics, we are ready to explore new markets and make more great testing machines.**

Our TME Worker integra™ and TME Solution™ devices offer subtle differences

and benefits for your business that we will happily talk you through. Get in touch today and a dedicated account manager will explain to you how we can improve your quality procedures and save you some money in the process.



# Get in touch

To find out more about how we can support your unique needs, get in touch today.

Email: [info@industrialphysics.com](mailto:info@industrialphysics.com)