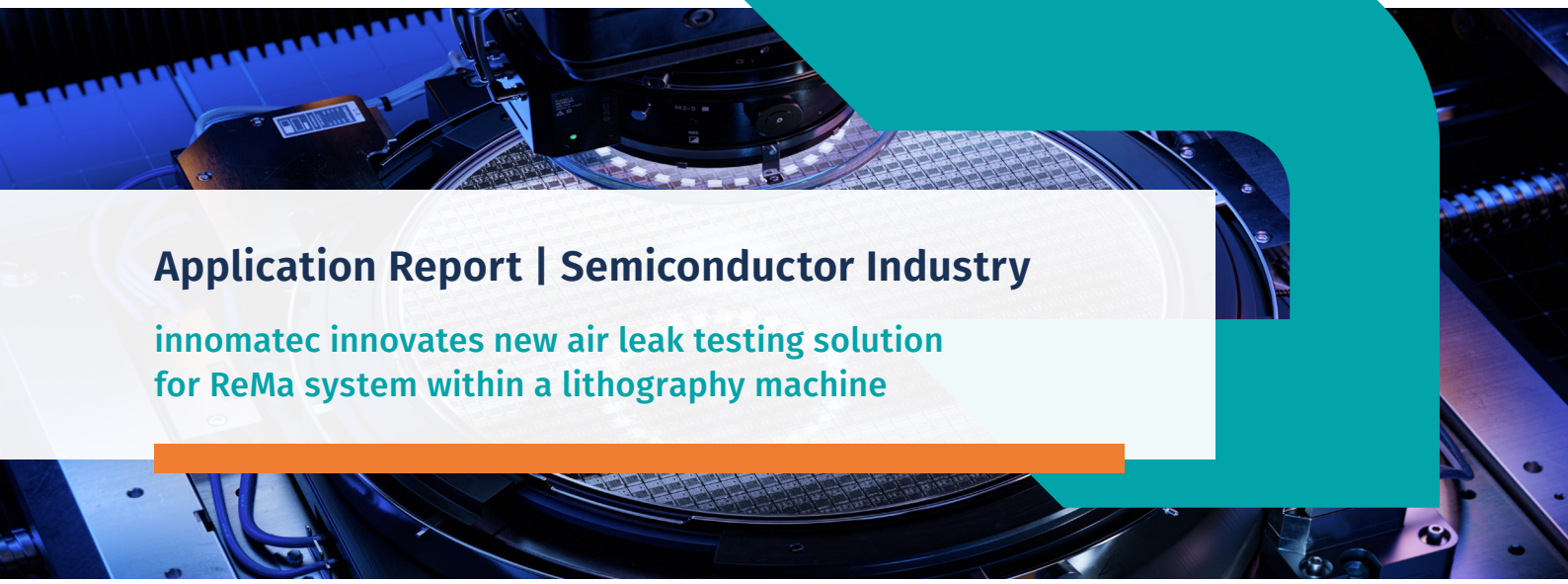
innomatec
LEAK TEST SOLUTIONS



Application Report | Semiconductor Industry

innomatec innovates new air leak testing solution for ReMa system within a lithography machine

ReMa (Reticle Masking) systems used in EUV/DUV lithography applications had typically relied on tracer gas leak testing innomatec's innovative solution offers an air leak testing alternative, resulting in a simpler, more cost-effective leak test.

The manufacturing of parts and sub-components for the semiconductor industry relies on precise, intricate processes. In this environment, there is little to no margin for error. Every component must be tested with the highest level of control and precision to ensure quality in the manufacturing process.

This is particularly true when it comes to EUV/DUV lithography systems. EUV (Extreme Ultraviolet Lithography) and DUV (Deep Ultraviolet Lithography) are cutting-edge technologies used to carve electric circuits/transistors into semiconductor wafers. ReMa (Reticle Masking) units are an important part of this lithography process.

A manufacturer of subcomponents for the semiconductor industry came to innomatec with a new project: **they needed a leak test solution that was accurate, reliable, and cost-effective to ensure the utmost precision of their ReMa units—and innomatec delivered a new, innovative solution.**

Introducing the LTC-802 SI / LTC-902 SI instrument models

Copper-free design, built for the semiconductor industry

LTC-802 SI

LTC-902 SI

The **LTC-802 SI** and **LTC-902 SI** models are fully copper-free, designed to meet the rigorous test standards of the semiconductor industry while complying with stringent instrument requirements.

The role of ReMa (Reticle Masking) units in EUV/DUV lithography systems

During the lithography process, a transistor pattern is projected onto a wafer with a light-sensitive layer. Complex chips are then made from these wafers. The ReMa unit plays an important role in the light management required for this process. The ReMa masks light by moving four metal blades in horizontal directions with extreme precision, only allowing strategic light exposure onto the wafer in order to create the desired transistor patterns.

The ReMa system demands high precision and accuracy in the movements of the masking blades, with this manufacturer's accelerations reaching up to 400 metres per second squared and image patterns smaller than mere nanometres.

Leak testing is necessary to verify the precision and accuracy of the blade movements. By ensuring no leakage of air from the control channel during the lithography process, the manufacturer can confirm precision and accuracy. In applications like this, the difference between 99.9% and 100% accuracy is important—they required 100% accuracy every time.

Using the LTC-902 SI to leak test a ReMa unit in a lithography system—with air!

Due to the very small micro connections within ReMa units, a copper-free design is required to ensure there is no interaction with the aluminum used in these systems, which could result in galvanic corrosion. This meant that these applications had typically relied on tracer gas leak testing, which allowed for no direct contact between the test machine and the ReMa unit. However, tracer gas leak testing is typically a more complex and costly test solution. **innomatec wanted to offer them a different option to meet their goals—a simpler and more cost-effective test.**

innomatec innovated this new solution using air leak testing instead of tracer gas. The new leak tester, innomatec's LTC-902 SI model, is a copper-free innovation, offering high accuracy and precision, while also eliminating the risk of corrosion within the micro connections in this type of application.

innoRC software: Seamless data measurement and integration

innoRC is a software feature that allows remote control of innomatec's leak testing devices through a Windows application. This software ensures seamless compatibility and integration between the measurement devices and your control system, regardless of complexities between different devices and systems, each with their unique data formats and communication protocols. innoRC ensures simple interaction and real time data exchange without loss or delay.

During the air leak test, the sealed enclosure was tested with the LTC-902 SI leak tester, using the **pressure differential leak testing method**. During this leak test process, the part was pressurized within the enclosure for a sustained period of 15 minutes. During this time, the system would perform a **pressure proof test**, proving it can withstand the set pressure for the required amount of time without any movement of the plate. The enclosure then stabilizes and performs **an extended leak test, measuring pressure drop over time** for a period of one hour. The maximum allowable pressure drop over this period of time was only 5–15 mbar.

The reliability of this measurement was paramount. This is where innomatec's leak test solution really exceeded expectations and surpassed any other solution on the market. innomatec's leak testers come equipped with **innoRC, a software feature that allows remote control of innomatec's leak testing devices** through a Windows application. innoRC integration seamlessly merges the data measured during your LTC leak test processes into your control systems, offering the ability to analyze every moment of your test. **innoRC was easily able to manage the transfer of large amounts of data gathered during the lengthy one-hour test cycle time to prove the quality of the entire process with the highest reliability on the market.**

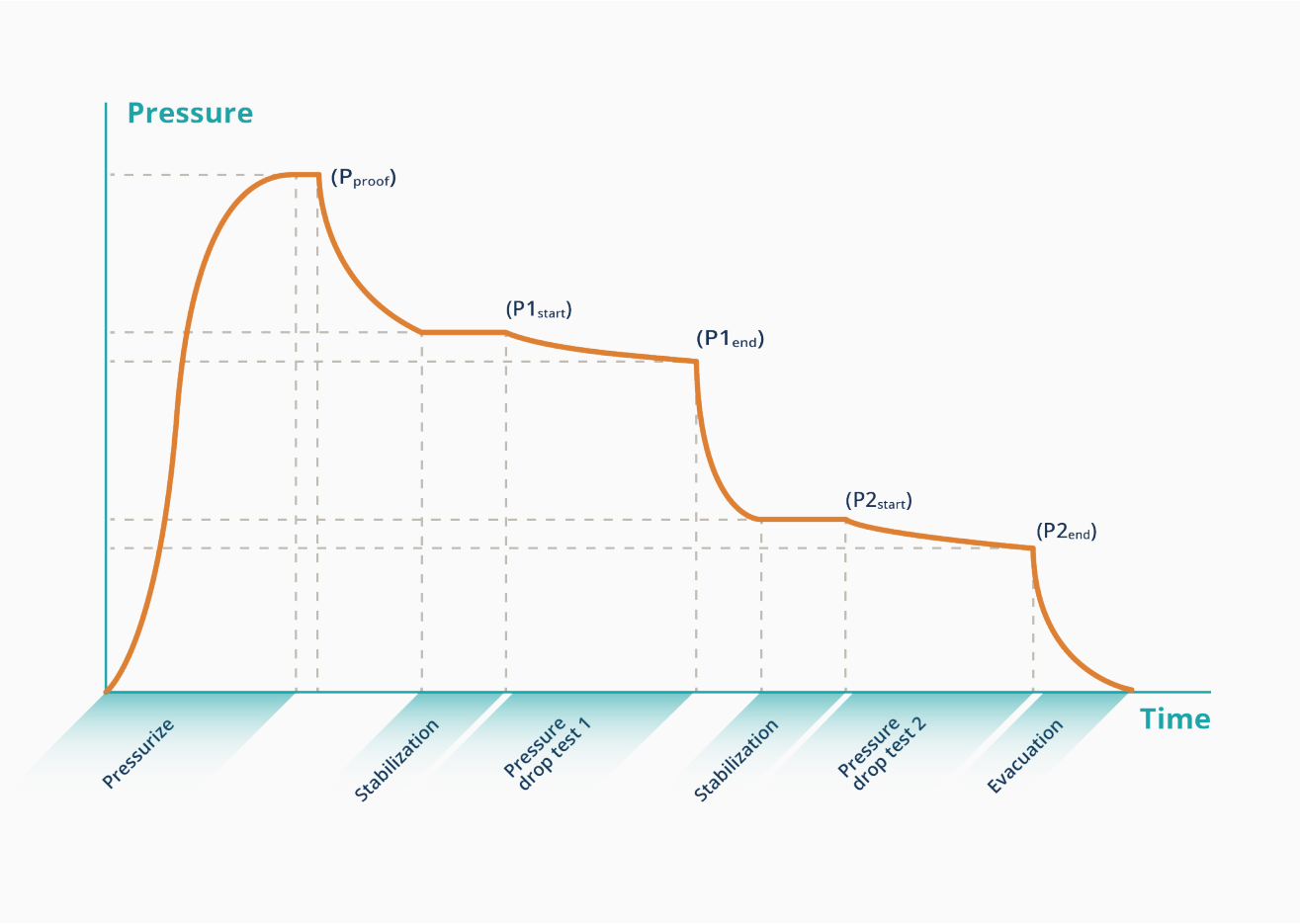


Figure 1: Pressure proof test

Mitigate corrosion risk in very small, micro connections

A copper-free design is required to mitigate the risk of corrosion in a lithography system—and other systems with small, micro connections. The interaction between copper particles and the aluminum used in these systems, in a micro-scale connection (20–200µ) significantly elevates the risk of galvanic corrosion. This risk is also heightened in the presence of inevitable moisture, which acts as an electrolyte, even at very low levels, facilitating the electrochemical reactions between these two metals that result in corrosion which leads to blockages that render the system inoperable.

Since most leak testers are designed with copper and brass components, this left manufacturers with tracer gas/helium leak testing as their only option, which is more complex and costly.

This led to the development of innomatec's LTC SI air leak tester models, built copper-free for the semiconductor industry, offering a powerful, cost-effective alternative.

Discover innomatec's innovative solutions for this rapidly evolving industry

innomatec is at the forefront of the rapidly evolving semiconductor industry. For over 40 years, innomatec has worked with the biggest manufactures in Europe and across the globe, helping them solve test problems on their manufacturing lines to ensure the highest product quality. We continue to innovate, using our decades of skill and expertise to design solutions that meet and exceed the evolving needs our customers.

Need help with your semiconductor leak testing application?

Contact the experts at innomatec!

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