



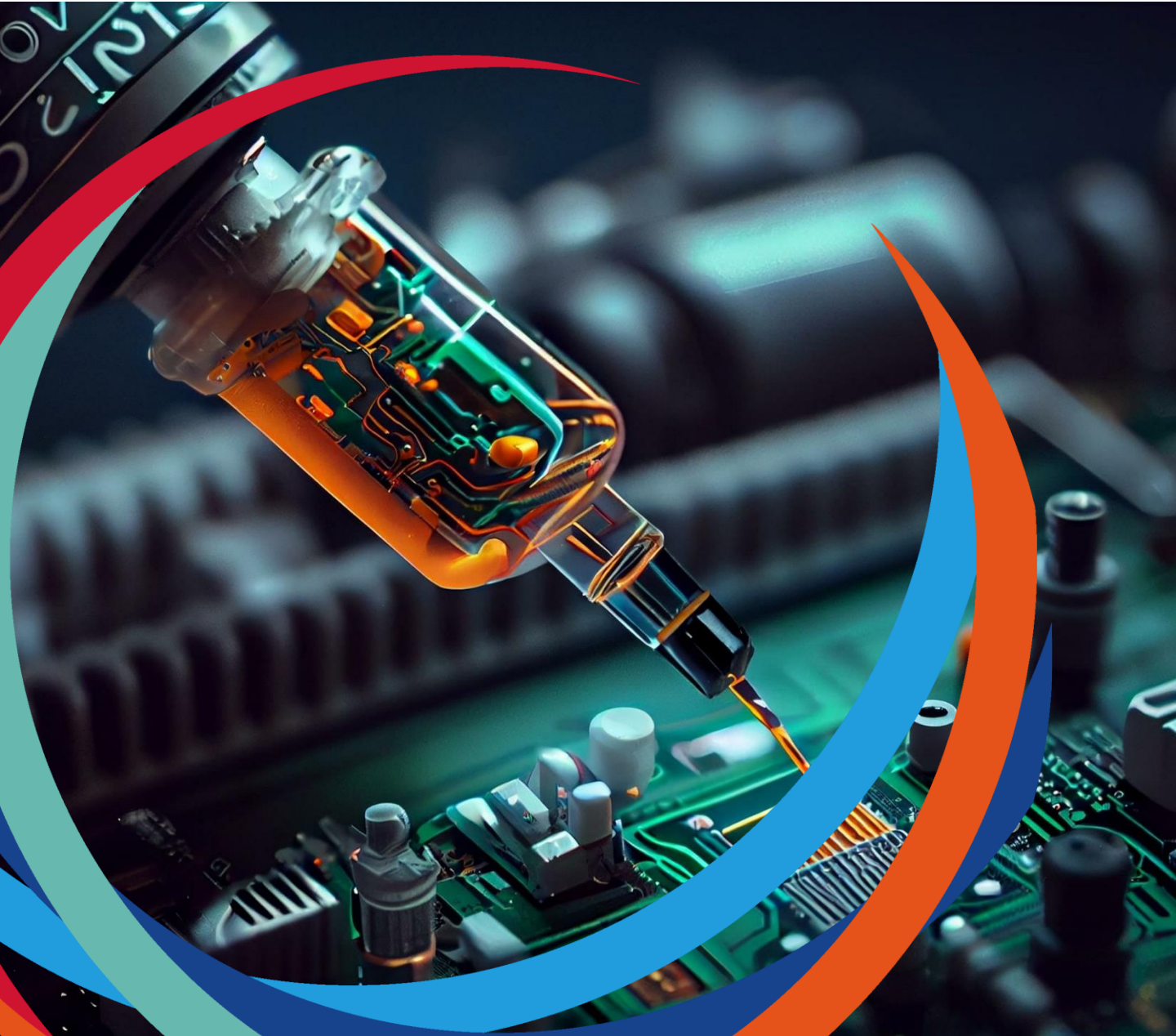
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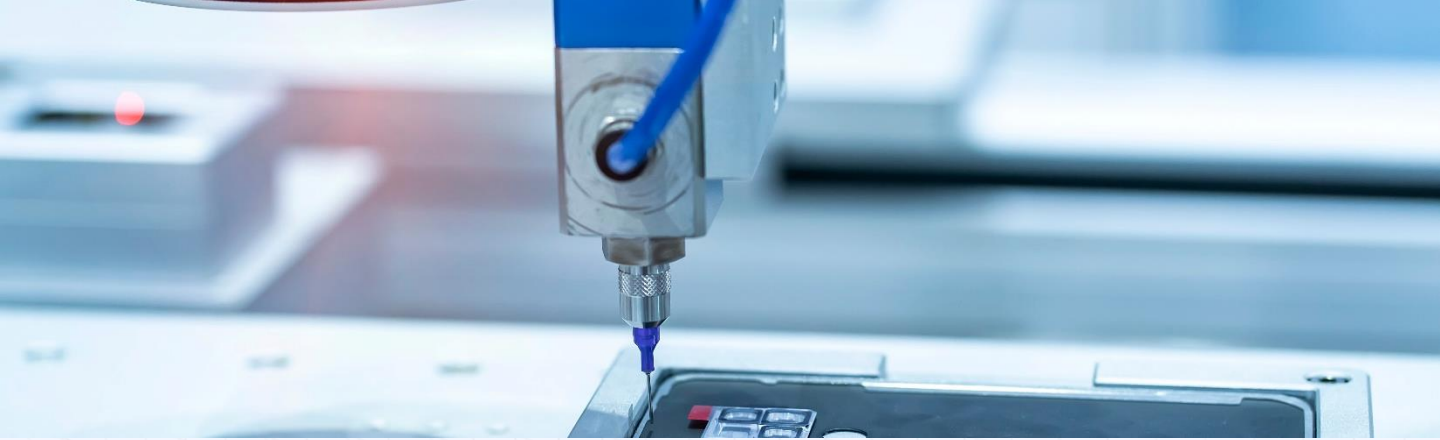
**BEYOND**  
the boundaries of possible



# SEMICONDUCTOR CASE STUDY

## HOT MELT ADHESIVE DISPENSING MACHINE & RECIPROCATING NEEDLE





OMNISEAL® SPRING-ENERGIZED SEALS

## PFAS-FREE\* Hot Melt Adhesive Dispensing Machine & Reciprocating Needle

Dimitra Papagianni & Beatrice Borde, March 2024

WEAR RESISTANCE SEAL RELIABILITY LONGEVITY

### Environment

A hot melt adhesive dispensing machine applies hot melt adhesives in controlled patterns and is commonly used in industries such as packaging, electronics, or woodworking. Adhesive is stored in a heated reservoir where it remains in molten state. When the machine is activated, the adhesive is pumped through a nozzle or dispensing gun. Depending on the settings (speed, needle geometry and more), the glue is dispensed as small dots or a continuous line.

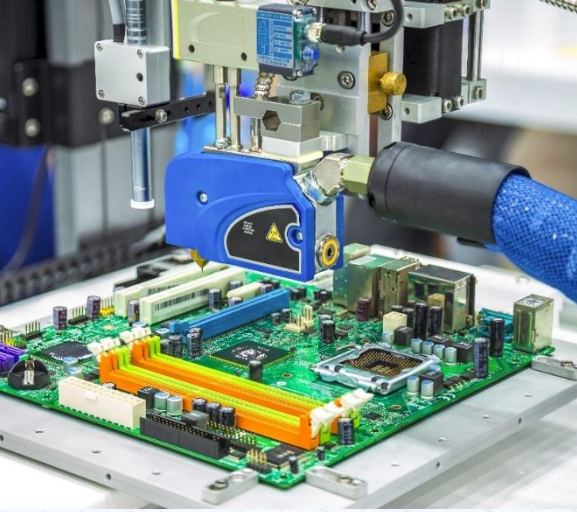
### Challenge

A typically small (2.5 mm) seal serves a critical function in maintaining a controlled and precise dispensing process. The needle makes reciprocating movements (0.2 to 0.8 m/s) to apply an adhesive flow with different solvent chemistries and viscosities. The system operates at a wide temperature (40°C to 200°C) and pressure range (0 to 100 bar). The seal ensures that no unintended flow will occur and internal components remain protected, keeping the adhesive contained within the dispensing path. Applications conditions require the seal to have a very low deformation or compression set while remaining flexible, exhibiting excellent wear resistance, and being chemically compatible with the various glues and solvents specified by the customer.

To comply with customer demand for a PFAS-FREE\* sealing solution, this case study application does not use fluoropolymer (usually suitable material for this kind of demanding application).



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## Solution

Due to our many years of experience in hot melt adhesive dispensing applications, we were able to design a custom, Omniseal® spring-energized seal that combined a precision fit. Having a wide material portfolio, we were also able to formulate a specifically adapted PFAS-Free\* material blend that withstands temperature variation and demanding lifetime requirement.

## Our seals do not get stuck in material challenges!

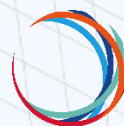
### Simulation & Testing Capabilities

At our research and development center in Kontich, Belgium, we have the capability to complete our proprietary material simulations with testing in application conditions. Testing ensures the reliability of our solutions, decreasing the development cost and the number of development cycles. This process saves customers valuable time in their challenge of replacing fluoropolymer materials.

### Benefits

- PFAS-Free\* sealing solution, avoiding supply chain potential issues with growing regulation
- Low friction and wear for long life
- Thermal stability
- Chemical resistance and compatibility with different types of adhesives
- Continuous performance under all pressure conditions
- Cost-effective

*PFAS-Free\* here means we do not intentionally add PFAS material in the solution, but does not exclude the possibility of traces, as these materials are common in the environment.*



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## Design Expertise & Customized Solutions for Your Extreme Applications

Omniseal Solutions is a global engineering leader with over 65 years of historical legacy, relentlessly dedicated to the design and manufacture of precision sealing and wear control solutions that protect critical applications in the most demanding environments and passionately driven to push "*Beyond the Boundaries of Possible.*"



### Contact Our Expert

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