



Wafer and Panel-Level Packaging

Advanced Precision Fluid Dispensing Solutions



With Nordson, you have a fully automated solution for getting wafers and panels to and from the dispensing process.

We've integrated process at the wafer level with the Vantage® Series Wafer-Level Packaging solution, and now we're innovating at the panel level with the Vantage Series Panel-Level Packaging solution.

Panel-Level Packaging

First discussed within the industry in 2016, large panels offer new possibilities for processing larger package sizes that integrate complex semiconductor components. They support the advance of heterogeneous integration, chiplets, and 3D packaging for better Power, Performance, Area, and Cost (PPAC).

We have solved several common panel-related challenges, from handling and transport to warpage, cycle time, and ensuring heat uniformity across the panel.

Our panel-level solution is achieved by integrating the Vantage Series dispensing system with Canvas® fluid dispensing software operations, controls, and traceability to support panel-level applications.

Nordson Panel-Level Solution Highlights

- **Solved:** Handle and transport large panels, even when warped, between the factory and dispensing system, ensuring contact with the panels and keeping them flat during handling. When warped panels arrive at the dispensing system, warpage is efficiently managed to ensure precise dispense results.
- **Solved:** Apply heat uniformly to eliminate warpage and facilitate fluid flow during dispensing. Pre-heat panels with a method that minimizes cycle time, eliminates warpage, and keeps them within a set temperature range to optimize fluid flow.
- **Solved:** The robust Vantage Series frame, combined with dual IntelliJet® valves mounted on independent heads for maximum maneuverability and real-time correction, automatically adjusts for skewed parts and component height variation in the x and y-axis, making it possible to maintain high-speed and precise dispense accuracy over a large area panel.

Panel-Level Automation: Success Is in the Details!

Why is managing warpage and heat uniformity so critical in panel-level applications?

Warpage is common with large panels, and non-flat surfaces hinder uniform underfill dispensing, impacting reliability.

Heat helps address warpage and ensures optimal fluid flow.

Uniform heat is applied across the panel, ensuring:

- A consistently flat surface.
- Consistent fluid flow around solder bumps into narrow gaps, preventing void formation that compromises mechanical strength, thermal conductivity, and reliability.
- Consistent process control and repeatability, reducing defects that impact yield.

Process capabilities:

- Support 510 mm x 515 mm panels, a popular size under consideration for industry standardization, while exploring support for other panel dimensions.
- Consistently maintain panel temperature within a specified application range.
- Support for Front Opening Unified Pods (FOUP) transport specifically optimized to handle and transport panels.
- The ability to deliver panels to the Vantage Series system efficiently.

Wafer-Level Packaging

In addition to our panel-level solution, we offer complete Vantage Series dispensing system integration, including Canvas fluid dispensing software operations, controls, and traceability to support wafer-level applications.



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Nordson Wafer-Level Solution Highlights

- **Solved:** Remotely control the entire wafer cell, Equipment Front End Module (EFEM), FOUPs, and each Vantage Series dispensing system from a single control point via your factory network.
- **Solved:** Real-time tracking of all wafers between FOUPs, alignment station, buffer station, and each Vantage Series dispensing system.
- **Solved:** The robust Vantage Series frame, combined with dual IntelliJet valves mounted on independent heads for maximum maneuverability and real-time correction, automatically adjusts for skewed parts and component height variation in the x and y-axis, making it possible to maintain high-speed and precise dispense results.

Wafer-Level Automation: Nordson Continues to Lead the Industry

Process capabilities:

- Manage system activities via a single point of communication with an integrated station controller compatible with GEM300 protocols and SEMI E84 standards.
- Access and monitor each Vantage Series and EFEM through the dual system displays.
- Optimize UPH with two IntelliJet Jetting Systems.
- ISO 6 Class Compatible with integrated Fan Filter Unit (FFU) on the EFEM.
- Dual FOUPs accommodate 300 mm size wafers.
- The FOUP ports are compatible with Overhead Hoist Transport (OHT), Automated Guided Vehicle (AGV), and manual drop off.
- The Vantage Series and EFEMs feature integrated Emergency Off (EMO) circuits