

LED Assembly

Dispensing Solution for Tight CIE LEDs

LED manufacturers specify Nordson ASYMTEK's in-line dispensing equipment to increase the speed, accuracy and yield of their high-brightness white LED production. The largest market driver for high-brightness LEDs is display backlighting for television, notebook and desktop monitors. Other LED applications include general lighting, automotive (e.g., head lamps and indicators), street lighting, sign and display lighting.

In the white LED market, tightness of CIE or bins is the most important differentiator regardless of end-application. Bin coding is a method of describing the LED specifications in terms of flux rating, tint, Vf (forward voltage), and color. Many variables contribute to CIE (bins) tightness making it difficult to control.

Silicone phosphor dispensing is critical to LED color quality and for ensuring tight CIE. Cavity encapsulation is the most common method used for depositing the phosphor. After LED chips are placed in the cavity bottom, silicone phosphor is dispensed to encapsulate the cavity.

The LED assembly market requires advanced technologies and equipment for tighter CIE LEDs and lower cost production. Nordson ASYMTEK's automated jet dispensing system, equipped with active nozzle technology, agitation system, calibrated process jetting, and single valve jet dispensing, is a cost effective and easy-to-use solution for LED encapsulation.

Manufacturing challenges solved

Minimal CIE inspection and adjustments required

In LED manufacturing, frequent CIE inspection and dispenser adjustments have commonly been required to control CIE tightness. For example, if CIE data shifts to the yellow side, reducing fluid pressure will deposit less silicone phosphor for improved CIE. Manual process control and inspection is expensive, time-consuming, and lowers UPH.

Nordson ASYMTEK's dispenser provides software-managed dispensing parameters for closed-loop control that eliminates the need for time-consuming operator adjustment. LEDs will maintain a tighter CIE with less inspection required due to a higher degree of fluid weight accuracy and consistency.

Nordson ASYMTEK's jet dispensing technology offers many advantages over needle dispensing

Silicone is tough to dispense due to its sticky nature. With needle dispensing, time-consuming retract moves are required to snap off the silicone tail (see Figure 1). Long silicone tails contribute to an inaccurate measurement reading, which translates to lower yields.

Nordson ASYMTEK's jetting and active nozzle technologies eliminate long retract moves (see Figure 2). Quick, multiple shots of silicone ensure fluid weight accuracy, consistency and tighter tolerance. Tighter tolerance contributes to tighter CIE LEDs.

Higher units-per-hour (UPH) lowers production cost. Greater than 20,000 UPH for 5630 cavity lead frames is achievable with Nordson ASYMTEK's dual lane dispenser configured with one DispenseJet® valve.

Phosphor settling can be minimized

Phosphor settling is a key concern in the LED industry. Nordson ASYMTEK offers several types of agitation systems to keep the phosphor in suspension.

A single dispense head simplifies set up without sacrificing UPH

Multiple-head dispensers make LED production extremely complex. The benefits in speed by using a multi-head dispenser, such as an 8-needle system capable of 10,000 UPH, are lost in lengthy set-ups and diminished product consistency, reliability and quality. All dispense heads must operate in unison, which means they have to be adjusted to ensure that all dispense the same amount of material at the same viscosity. If one head stops dispensing, the others must be shut down. If CIE data shifts unfavorably, each needle has to be manually readjusted. Nordson ASYMTEK's single-jet dispenser can achieve double the UPH of an 8-needle system with a much higher degree of accuracy (see Figure 3).



Figure 1 Needle Dispensing

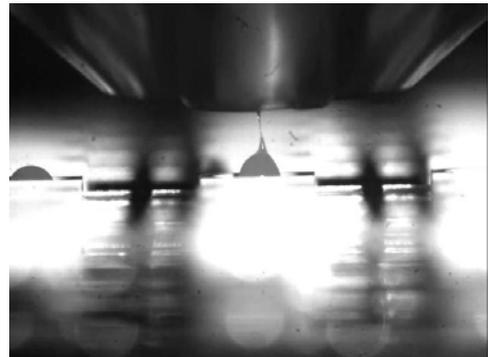


Figure 2 Jet Dispensing with Active Nozzle Technology

Manufacturing challenges solved



Figure 3 Single-Jet Operation

Advanced Calibrated Process Jetting (CPJ+) significantly reduces process variability

Silicone phosphor fluid changes viscosity over time, which seriously affects dispense weight accuracy and consistency if adjustments are not made. Nordson ASYMTEK's advanced CPJ+ software and support tools, which include an integrated scale, automatically adjust dispensing conditions to meet the targeted weight tolerance.

Without CPJ+, LED companies must frequently check CIE or dispensed weight and manually adjust dispensing

conditions. This manual operation interrupts the production process and is prone to human error. Human errors, lost time due to frequent interruptions and inspections, and poor dispense accuracy present huge quality and cost issues.

With CPJ+, calibration ranges for dispensing parameters, dispense weight and tolerance targets are added to the recipe (program). After initial set-up, the system performs the patented jetting operation autonomously. At programmed intervals, dispensing parameters are adjusted automatically to maintain a constant mass per part. Settings are recorded for traceability. Tight tolerances are maintained over tens of thousands of LEDs (see Figure 4).

Consider the total cost of ownership when purchasing a dispenser

When comparing equipment, system price per UPH (\$/UPH) is just one consideration. It's also important to compare the cost of poor yield, down-time, floor space, labor, consumables, and equipment lifetime.

Nordson ASYMTEK's automated jet dispensing system, equipped with active nozzle technology, calibrated process jetting, agitation system, and single valve jet dispensing reduces process variation, increases yield, and reduces cost.

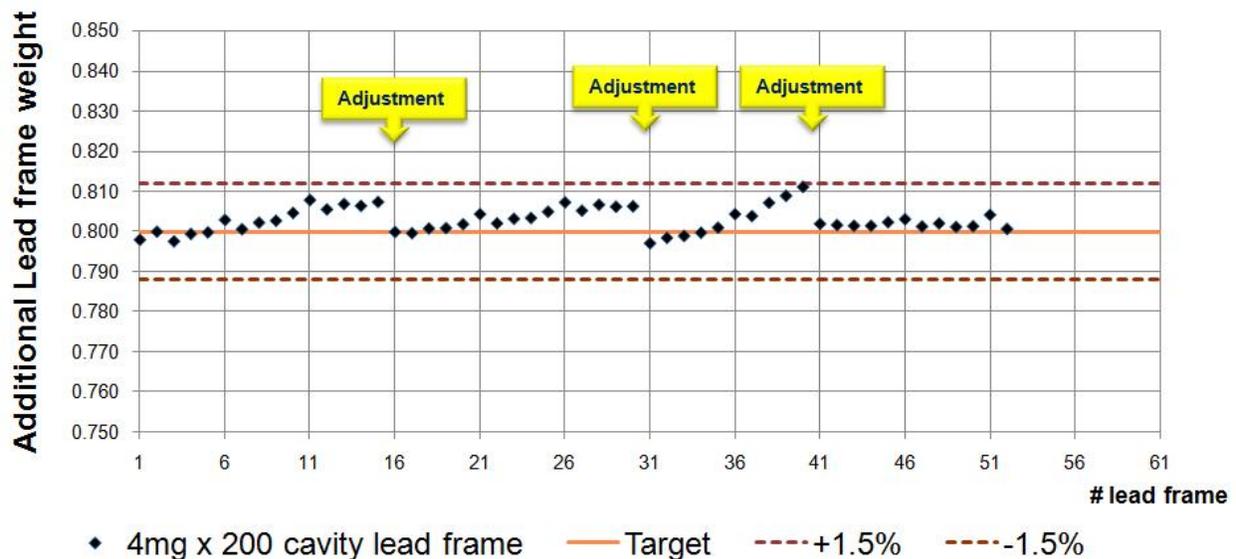


Figure 4 Dispensing weight adjustment with CPJ+

**For more information,
speak with your local
representative or
contact your regional
office.**

Nordsonasymtek.com

North America

Headquarters
Carlsbad, CA, USA
+1.760.431.1919
info@nordsonasymtek.com

China

Shanghai
+8621.3866.9166
info@asymtek.cn

Beijing
+8610. 8453.6388
info@asymtek.cn

Guangzhou
+8620.8554.0092
info@asymtek.cn

Europe

Maastricht, Netherlands
+31. 43.352.4466
cs.europe@asymtek.com

Japan

Tokyo
+81.3.5762.2801
Info-jp@nordsonasymtek.com

Korea

Seoul
+82.31.765.8337
info@nordsonasymtek.com

India

Chennai
+91. 44.4353.9024
info@nordsonasymtek.com

S.E. Asia/Australia

Singapore
+65.6796.9514
info@nordsonasymtek.com

Taiwan

+886.229.02.1860
info@nordsonasymtek.com

Nordson ASYMTEK
+1.760.431.1919 Phone
info@nordsonasymtek.com Email
2747 Loker Avenue West
Carlsbad, CA USA 92010-6603
www.nordsonasymtek.com

Published 2010-12-17

