

Small-dot Solder Paste Dispensing Solutions

Solder paste is dispensed for a variety of applications and on many types of surfaces: printed circuit boards, IC packages, MEMs devices, and electrical components. It is an alternative when screen printing is not possible. For years, Nordson ASYMTEK has worked with customers to develop good processes for solder paste dispensing.

Automated dispensing can be trouble free if the paste is formulated correctly, the proper dispensing technology is used, and the equipment is set up properly. Most of the techniques and best practices for dispensing solder paste apply equally to lead-free pastes and pastes containing lead.

Solder paste dispensing offers several advantages over screen printing. It overcomes the limitations of screen printing especially when the PCB is too warped or contains big and small components. Dispensing replaces micro stencils for rework. Dispensing is also good for solder paste patterns that require large volumes, like RF shield attach as well as lesser volumes for small-geometry passives.

Dispensing solutions are available for a wide range of operations including high-mix, low-volume production, labs and research and development (R&D). Nordson ASYMTEK offers systems that successfully dispense solder paste for these applications.

Understanding important facts helps ensure a robust solder paste dispensing process

Solder paste consists of solder powder and liquid flux. The powder is specified by the metal alloy and the size of the powder particles. Typical alloys contain a combination of lead, tin, silver, bismuth, indium, and other alloys. The alloys are chosen for their physical and chemical properties for a specific application, but the alloy can also affect the dispensability.

Dispensable-grade solder pastes require specific metal loading. Most printable pastes have much higher metal loading and will not work for needle dispensing. Keep these facts in mind:

- Ideal loading: 84 to 86% metal by weight
- Dots smaller than 300 microns typically require paste type 5 or 6 and 28 to 30 gauge needle.
- Controlling the dispense gap is very important. If PCBs are warped, additional process control, like a height sensor, will probably be required.

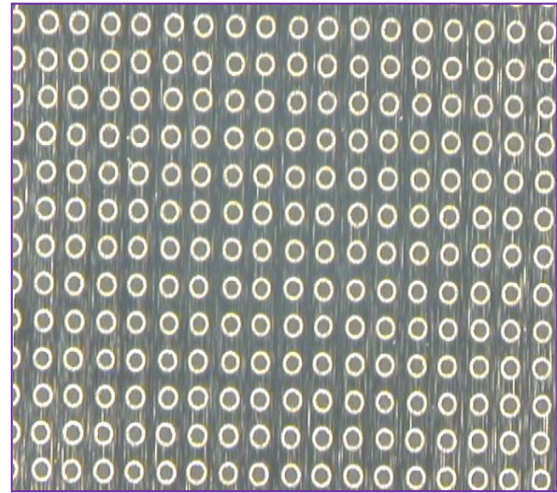


Figure 1. These dots are 250 microns (0.010 in.), 3 Sigma <10% in diameter. They were dispensed using the settings shown in Table 1.

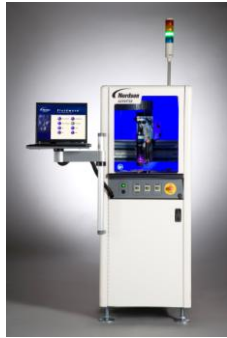
Table 1. Example Settings Summary for Small Solder Paste Dots

| | |
|--------------------------|---|
| Platform | Axiom™ X-1020, with options including Precision Z-Head and Laser Height Sensor |
| Jet/Pump/Valve | Heli-Flow® DV-7000 with feedscrew/cartridge: 32 pitch tight clearance. |
| Fluid Type | Solder paste |
| Fluid Details | Flux Series: F36; Alloy: Sn63Pb3; Metal Content 86%; Viscosity: D (300-400 Kcps), Powder Mesh Size: 5 |
| Needle Size | 30 gauge standard precision needle, non-footed |
| Fluid Pressure | 69 kPa (689 bar, 10 psi) |
| Valve Temperature | Ambient, with no temperature control |
| Dispense Height | 75 microns, ±12 microns, with Precision Z-head option |
| Substrate Temp | Ambient, with no temperature control |
| Substrate | Steel plate, polished flat to 13 microns (0.005 in.) |

Choose the system that meets your production requirement

Spectrum™ S-910N

- In line, 1 or 2 lane
- Vision
- Height Sense
- Scale
- Dispense Area:
339 x 410 mm
(13.3 x 16.1 in.)



Spectrum™ S-820

- Batch
- Vision
- Height Sense
- Dispense Area:
350 x 350 mm
(14 x 14 in.)



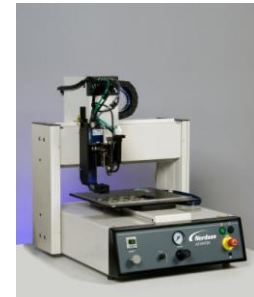
Axiom™ X-1010

- In line, 1 or 2 lane
- Vision
- Height Sense
- Scale
- With Precision Z option
- Dispense Area:
458.2 x 459.0 mm
(18.0 x 18.1 in.)



DispenseMate® D-585

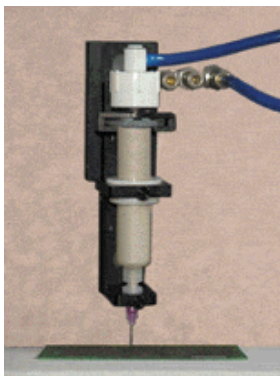
- Bench top
- Vision*
- Height Sense: Optional
- Dispense Area 585:
325 x 270 mm
(12.8 x 10.6 in.)
- Dispense Area 583:
525 x 470 mm
(20.7 x 18.5 in.)



A variety of solder paste valves to meet your specific requirements

DV-01 Dispense Valve

- Accuracy is “good enough”
- Slow



DV-7000/8000 Heli-flow®

- Small & Large dots
- Capable of dots <200 µm
- Medium speed
- Footed needle capable
- Tool-free disassembly of wetted parts for quick and easy cleaning



SV-100 Slider Valve

- Small dots
- High speed
- Limited to dot sizes of 300 µm or larger



Correct needle size selection helps ensure dispensing success

| Type (Joint Industry Standard) | Mesh (per ASTM- B214) | Maximum Particle Size (micron) | Less than 1% Larger (micron) | 80% Minimum between (micron) | Suggested Needle Size (gauge) |
|---|-----------------------------|---|------------------------------------|---------------------------------------|-------------------------------------|
| II | -200/+325 | 80 | 75 | 75-45 | 21 or larger |
| III | -325/+500 | 50 | 45 | 45-25 | 23 or larger |
| IV | -400/+500 | 40 | 38 | 38-20 | 25 or larger |
| V | -500/+635 | 30 | 25 | 25-15 | 27 or larger |
| VI | -635 | 20 | 15 | 15-5 | 28 to 30 |

**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 2011-10-20

