

## Electronics assembly solutions

# Numbers that don't flatter the line

Rolled yield across every stage, a moisture clock that never runs backwards, DPMO with its definition attached and stencils checked before they print – for board assembly.

**Rolled yield**

Five stages at 98% is 90.4%

**MSL floor life**

Summed over every opening

**Area ratio 0.66**

Apertures checked before printing

# From the reel to the board – counted in the right units

Boards with their placements and joints, builds with their stages and counts, reels with their full moisture history – and a line screen that shows where the figures on the wall flatter you.



## Yield that compounds

Rolled yield multiplies every stage, and sits beside the after-rework figure the line usually quotes – with the gap in points.



## A moisture clock that adds up

Every opening of a reel's dry bag is added to its history and never overwritten – including the bag that is open right now.



## DPMO with its denominator

Each inspection stores what it counted defects against, so figures on different definitions are never averaged.



## Stencils that will print

The smallest pad decides the stencil thickness; the module names that part and the pads it leaves printed thin.

**90.4%**

five stages at 98% each

**0.66**

minimum area ratio

**168 h**

MSL 3 floor life

**1.5 $\sigma$**

shifted and unshifted

## The yield on the wall – against the yield you roll

Passes are stored as counts, not percentages, so rolled yield, DPMO and sigma can be added up, audited and compared honestly.



### Rolled yield

- Each stage stores counts in and out, so yields multiply: five stages at 98% roll **90.4%**, not 98%.
- Rolled yield shown beside the quoted after-rework figure, build by build, with the gap in points.
- No final yield is invented from first-pass percentages – it needs the scrap counts behind it.
- In a worked example the plant rolled **85.9%** while quoting **97.99%** – a 12-point gap.



### DPMO and sigma

- DPMO is refused without its kind – counted against solder joints or against boards.
- Each inspection stores its definition beside its count, and mixed definitions are never averaged.
- Sigma is reported shifted and unshifted, because both are called sigma and they differ by 1.5.
- 3.4 DPMO equals  $6.0\sigma$  shifted – pinned as a test in the engine.



### The same defects, two thousand times apart

Five defects across a hundred boards is **25 DPMO** counted by solder joint and **50,000 DPMO** counted by board. Identical defects – only the denominator changed.

#### Builds by customer

Planned, good, rolled and quoted yield for every build, with the gap and its state.

#### Line balance

What another placer really buys before the capital request, with the next bottleneck.

#### Real placement rate

Nozzle changes added to the data-sheet rate: 21,000/h quoted, 17,321/h actual in testing.

## A clock that never runs back – and paste that will print

Moisture-sensitive reels keep every exposure they have had, and every board is checked for apertures too small to release paste.



### Reel floor life

- Each dry-bag opening is appended to the reel's history, never replaced, and the total is judged against its MSL floor life.
- The bag open right now is counted too, so a reel that looks fine on the record is flagged while it is still open.
- Bake from the reel: 9 h at 125 °C, or 264 h (11 days) at 40 °C for a part whose tape cannot take the heat.



### Stencil and area ratio

- Area ratio =  $(L \times W) / (2(L+W)t)$ ; below **0.66** an aperture will not release its paste.
- One stencil prints the whole board, so the smallest pad sets the maximum thickness for every pad.
- The module names the deciding part and the pads now printed thin – the case for a step stencil.

## Worked examples from testing

| Case            | What happened                                              | Figure                      |
|-----------------|------------------------------------------------------------|-----------------------------|
| Reel R-00412    | Four openings of 44, 41, 47 and 46 h – none alarming alone | <b>178 h of 168 h</b>       |
| Reel R-00455    | 96 h on the record, and its bag open another 84 h          | <b>Flagged while open</b>   |
| Board PCA-3300  | 0.28 × 0.22 mm QFN pad on a 0.127 mm stencil               | <b>AR 0.485</b>             |
| PCA-3300 builds | Rolled yield against the quoted after-rework yield         | <b>67-70% vs 94-95%</b>     |
| Placement       | 412-part board, nozzle changes included                    | <b>17,321/h vs 21,000/h</b> |
| Whole plant     | Rolled yield against the yield on the wall                 | <b>85.9% vs 97.99%</b>      |

On PCA-3300 the thin paste shows up at reflow and inspection, while placement looks fine – which is why the stencil check sits on the board, not the stage.

## Every screen in the module – and what is on it

Read off the running application – the panels, columns and figures that are actually there.

**4** screens  
**36** functions

### 01 Line

Reels out of floor life   Rolled vs quoted yield   Apertures that won't print   Bags open now  
Boards that cannot print   Inspections   Openings   Used / allowed   Why it was missed

### 02 Boards

Add a board   Rev   Placements   Joints   Nozzles   Moisture parts   Stencil  
Max for the smallest pad   Material

### 03 Builds

Plan a build   Started   Board   Customer   Planned   Good   Rolled   Quoted  
Gap

### 04 Reels

Receive a reel   Part   Level   Remaining   Openings   Used   Allowed  
Open / close bag   Bake

## Not a separate program – a complete business system

The trade module sits on top of a complete ERP: everything it does lands directly in the accounts, the stores and the reports – no double entry.



### Accounting

Editable chart of accounts, automatic entries from every transaction, VAT and financial statements.



### Financial dimensions

Cost centres, departments, business lines and sites – with statements per factory.



### Inventory

Warehouses and bins, batches and serials, moving average, FIFO or standard cost.



### Purchasing & sales

RFQs, purchase orders and receipts, quotations, invoices and ageing.



### Maintenance & assets

Equipment register, preventive maintenance, work orders and depreciation.



### Access & language

Roles and rights per module, audit trail, full Arabic and English interface.

## Rules built into the engine

### RTY

Rolled yield multiplies every stage

### MSL

Floor life summed over every opening

### DPMO

Defects stored with their denominator

### $AR \geq 0.66$

Aperture area ratio for paste release

### $\sigma \pm 1.5$

Sigma shifted and unshifted

These are the rules the engine calculates with, covered by 95 automated tests. Stages, stencils and moisture levels come from your own boards and reels.

# Bring us a board **and a reel**

Book a session and we'll set the module up with one of your own boards, a build and its reels, then walk through the real numbers with you.

## Request a demo

Website

[www.vluerp.com](http://www.vluerp.com)

Demo request

[www.vluerp.com/#demo](http://www.vluerp.com/#demo)

Email

[hello@vluerp.com](mailto:hello@vluerp.com)

- 1 Line:** reels past floor life, including one whose bag is open right now.
- 2 Builds:** rolled yield against the yield the line quotes, build by build.
- 3 Boards:** the smallest pad, the stencil it forces and the pads left thin.
- 4 Reels:** open a bag, close it, and watch the clock carry on from where it was.

Switched on from Add-ons with a free seven-day trial, and it runs on the same general ledger.