Datum Tension

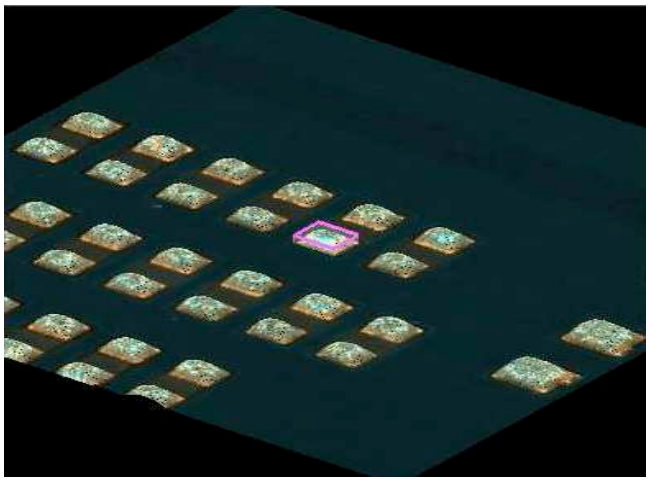
Performance update

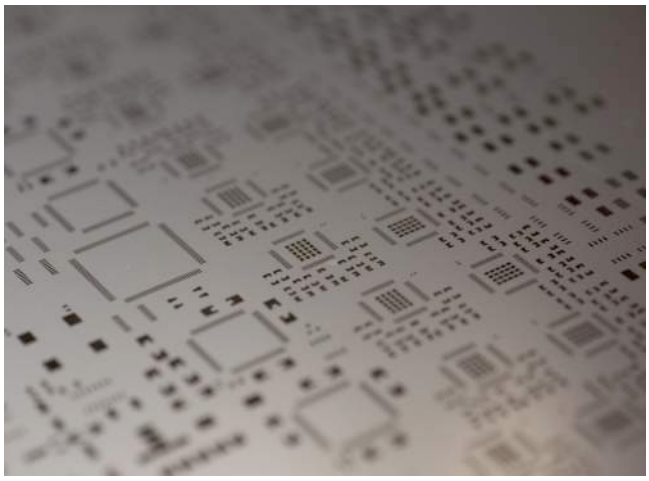
What we are observing

Datum Tension is an SMT stencil foil material (FG replacement) that consistently provides the best and most repeatable solder paste printing results when benchmarked against FG at a significantly lower cost.

Based on end user data feedback, Datum Tension:

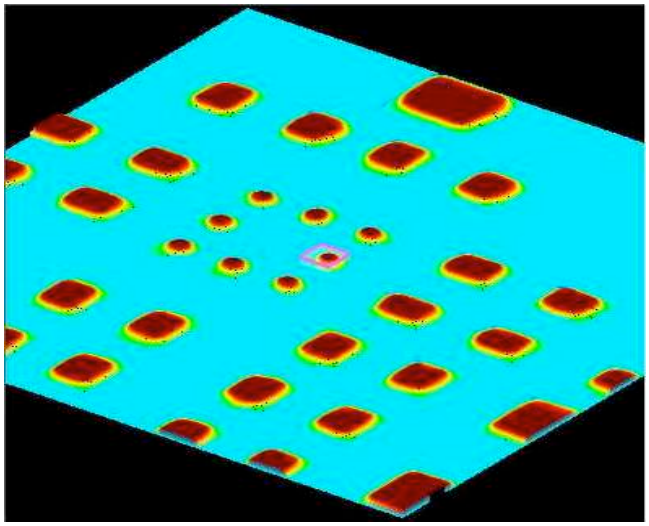
- Increased print yields by 5% over identical FG stencil
- Approached 100% transfer rates on 0201's (0603 metric)*
- Reduced overall print defects by 34% over FG
- Reduced insufficient paste defects by 41% over FG
- Boosted Transfer Efficiency on average by approximately 5% depending on aperture size





Sample data

- Manufacturer A – global CEM producing a mid-level SMT board in China
- Manufacturer B – USA-based OEM producing high reliability, highly miniaturized SMT assemblies
- Manufacturer C – European OEM overseeing CEM assembly of miniaturized, precision industrial products



The benefits are clear

Datum Tension:

- Is the newest high-performance stencil foil material available
- Produces the best and most consistent print results
- Is available in a full range of thicknesses and widths
- Costs less than alternative high-performance materials, with a price close to Datum PhD material.

*opening 9x9mil (0.23 x 0.23mm) on 4mil (100µm) foil

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The data says yes

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User results

Manufacturer A

- Reduced overall print defects by 34%
- Reduced insufficient paste defects by 41%
- Boosted Transfer Efficiency by 7% on a 1mm BGA (3% on a 0.5mm BGA for manufacturer B gives 5% average)

Note: Manufacturer A tests compared a 100um Tension with a 120um FG. That may not be fair because thinner stencils produce higher area ratios, so we did the calculations… The BGA pads have ~425um diameter, giving them ARs of 1.06 on the 100um foil and 0.88 on the 120um foil. AR of 0.88 should give full release, which it does; therefore, the foil thickness difference should not affect the comparison of the materials' release properties. The other apertures, for the SOP24 pin and the 0402 (01005 metric), are bigger than the BGA apertures, so the foil thickness should not affect those comparisons, either.

	BGA Volume	Stencil Thickness	BGA Area	BGA Radius	BGA diameter	Area Ratio
	um^3	um	um^2	um	um	
Tension	14000000	100	140000	211	422	**1.06**
FG	17000000	120	141667	212	425	**0.88**

Manufacturer B

There is a lot of historical data with a high-density PCB containing over 350 apertures per square inch, or 7500 deposits per print. The best printing stencil configuration for this board has been FG, with polymer nanocoating, mounted with metal mesh at high tension on a heavy duty tube frame. Typical print yields run in the 95-100% range. When tried on a Space Saver (SS) frame, yields dropped to ~90%.

To try Tension, 4 foils were mounted at typical tension (41N/cm2) on poly mesh on 29" SS frames, then cut on a Tannlin T8.

- Uncoated, yields were 87%. Anything under 90% is unacceptable so the stencil was removed from production
- A wipe-on nanocoating was applied to the Tension stencil - yields came up to 90%, but dropped off over a few days.
- A second Tension stencil with wipe-on coating was put into production - yields came up to the low 90's but dropped off again as the coating wore off.
- A third Tension stencil had the polymer nanocoating applied. The board design changed before the polymer coated stencil could be put into production.
- An off-line print test of 10 boards yielded 100% with the polymer nanocoated Tension stencil

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More user results and conclusion

Manufacturer C

Data gathered from mainly 0201 (0603 metric) and 0.5mmµBGA components. Manufacturer used Tension material pre-mounted by Datum on a Datum space saver poly-meshed frame.

- Transfer rates of close to 100% on 9x9mil (0.23*0.23mm) 0201 apertures and 12mil (0.30mm) µBGA apertures, using 4mil (100µ) foil
- Observations on handling:
    - Easy to set frame in the machine with SS frame and magnetic adaptor bars
    - Easier and faster handling with stretched screen compared to other frameless technologies
    - Stencil installation is fast and safe
    - Noticeable improvement in production yield and throughput stability
    - Cleaning is very easy on small openings, even manually

So what can we say about Tension?

- For larger ARs there is a clear and large reduction in print defects and insufficient paste deposits by switching from FG to Datum Tension material

- For the highly miniaturized, challenging PCBs:
    - Can't compare uncoated Tension with polymer nanocoated FG – that would not be a fair comparison.
    - Can't conclusively say Tension with polymer nanocoating was superior to FG with polymer nanocoating because our sample size with Tension was only 10 and our sample size with FG was 1000's. However, 10-print tests have proven to be highly predictive of production results.
    - Interestingly, the combination of Tension and the polymer nanocoating gave 100% yields with lower cost stencil construction – poly mesh, standard tension, space saver frame, vs metal mesh, high tension, rigid tube that optimized FG's performance.

- Other benefits include easy cleaning on small openings and when combined with Datum pre-mounting on a Datum space saver frame provided easy handling, fast launch and production stability

We'll keep you updated as we receive more information from users

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