

CREATING A WINNING COMBINATION WITH OPPOSING FORCES

Nancy Gray considers the technical issues when selecting the appropriate thread count for the screen mesh



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It started with a direct request from a textile ink manufacturer at the peak of the high density fashion trend, which required thick ink layers (100 to 400 microns) with a single squeegee pass for heavy deposit special effects on T-shirts.

The initial technical issues to consider were the selection of the appropriate thread count for the screen mesh (83 threads per inch/38cm – 70micron thread) and the correct system to provide the necessary stencil thickness, generally achieved with capillary film and multiple, consistent, high (minimally 25-30n/cm) tension screens.

With these parameters in place, the next challenge was to determine the right combination of squeegee hardness and edge profile to provide complete transfer of this thicker ink into the mesh and stencil.

A common misconception is that the role of the squeegee is to push the ink through the mesh. In fact, the squeegee's job is to fill the mesh openings and the stencil beneath it, allowing for a complete transfer of the contained ink to the substrate as the screen snaps away from it. Different measures were undertaken to successfully achieve these results.

THE MOST SUITABLE SQUEEGEE

One possible solution for garment decorators was to use a harder rounded edge squeegee, commonly referred to as 'bull nose'. While it's



Example of printing with 55-90-55 sh squeegees

true that the rounded edge will force more ink into the screen, it does so with an uncontrollable angle, placing excessive pressure on the screen and resulting in a loss of detail. This is less problematic when printing a thick ink paste in a uniform way with no clearly defined borders, but it is seriously limiting when printing a combination of a thick ink paste, well-defined lines, full flood stroke and higher press speeds.

Another way in which some textile printers approached this problem was to print with a very soft squeegee, as softer squeegees will produce thicker ink deposits in solid areas. However, when using a very soft, single durometer squeegee and downward pressure is applied, the squeegee blade bends excessively. This bending of the squeegee under pressure forces more surface area of



Example of printing with 75 sh squeegees



Example of printing with 75-90-75 sh squeegees

the squeegee blade closer to the surface of the mesh, reducing the optimum printing angle and preventing a clean, crisp 'snap-off'. This will result in loss of detail and incomplete clearing of the ink from the mesh and transfer to the substrate.

TRIPLE DUROMETER BLADES

At the other end of the spectrum, printing with a hard, straight edge squeegee, it is possible to achieve both fine details and high definition, but not without a resulting loss of coverage and opacity. Ultimately, it is really a combination of both soft and hard together that would be most successful in providing an acceptable result across the range of requirements. Triple durometer blades had already demonstrated successful results for many years in high-end industrial printing



Example of printing with 85 sh squeegees

operations, as well as on large-format screen-printing presses and even on high speed automatic T-shirt printers. A triple durometer squeegee resists bending during printing. Less pressure is required, providing a more controlled printing angle while minimising wear to the print edge while at the same time increasing squeegee life.

With the recent completion of successful new developments in low hardness polyurethane casting, Fimor was prepared to offer a better potential solution – a triple durometer squeegee with the powerful combination of a super soft 55sh for the external layers that would flex easily at the point of contact between the squeegee tip and the screen, in conjunction with a hard 90sh material for the inside layer, providing the necessary rigidity to resist 'roll-over' during printing. This represented a reduction of 10 shore to the outside layers of our pre-existing standard of 65/90/65sh.

SUCCESSFUL SAMPLES

Initial samples were sent to friend and textile consulting professional Charlie Taublieb. After evaluation and trial printing in both manual and automatic print shops, he became convinced that the 55/90/55sh squeegee was not limited to use with high density plastisol inks and gels, but included a variety of print applications.

These are some of the reasons he now regularly advises textile screen printers to use this blade:

- For a better ink deposit on the underlay white to improve brightness without loss of detail. This can be achieved as long as the printer does not apply excessive pressure which would cause the blade to curl.
- To get impressive results with a single pass on an automatic, and one to two passes on a manual, by slowing down the print stroke
- Recommended for use with foil adhesive by laying down the correct deposit of adhesive through an 86-110 (34-43cm) mesh screen, not requiring more than a single pass.
- Recommended for all water base printing including discharge because it allows the ink to penetrate the garment while still holding good detail. Use with 110-156 (43-60cm) mesh.
- Recommended as the front blade on a double squeegee in order to lay-down a strong deposit while holding detail, using only a single pass on T-shirts and a double pass on fleece for an exceptional underlay.

SUCCESSFUL RESULTS

After an initial launch as a special product, this hardness range has now become a standard in our line and has been tested and is successfully in use beyond its original target market of advanced textile printers. 55/90/55sh triple durometer squeegees are now being used in certain industrial printing applications that require thick and regular ink coverage with both solvent and UV inks.

When using a softer squeegee, please consider the following:

- A softer edge will deposit more ink than a harder edge. Thick ink deposits may create curing issues. Time, temperature and belt speeds will need to be adjusted accordingly.
- A lower durometer squeegee is likely to require more frequent sharpening as the edge will wear more quickly than a harder one.
- Within the same chemical formulation a softer polyurethane will be less chemically resistant than its hard equivalent and therefore may not be compatible with all ink series. ■

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