

Printing on Baby Rib Knits

Follow these easy steps to perfect printing on these fashion garments.

By Rick Davis, Contributing Writer

Rib-knit garments have been fixtures in American sportswear for many years. The tiny ribs make these garments stylish, giving them a fashion feel and fitted form. While it is a little challenging to print on rib-knit garments, the process is not that difficult if you pay a little attention to the printing details.

Follow the advice in this *Impressions* Tech Tips Newsletter, sponsored by American Apparel, and rib knits will be coming off your presses in no time.

For this lesson, we will review two different fabrics from American Apparel — the 2x1 rib knit (style 3308) and the 1x1 baby rib knit (style 4305).

Rib-knit garments are known for their high fabric elongation and form-fitting characteristics. The fabric's knit surface is exactly what it is described as — ribs.

The 1x1 rib knits are constructed by a knitting machine with two sets of needles knitting at right angles to each other. The rib knit's high degree of elasticity demands that you use ink that has good elongation, as well as soft-hand characteristics.

In the knitting process, when every other wale alternates between plain and purl stitches on the right and back sides, it is called a 1x1, or plain, rib. By alternating every two wales of plain stitches to the front side with every two wales of purl stitches to the back side, a 2x1 rib is created.*



A classic tank made of 100% ring-spun combed cotton, the Rib Boy Beater tank (style 3308) features a resilient, wide-rib surface with reinforced binding at the neckline and arm openings, and a double-needle bottom hem.

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Printing on 2x1 Rib Knits

The key to success for textile screen printers working with 2x1 rib-knit fabrics is printing an even image across the surface and still achieving good elongation and a cured image that will not crack. Many printers make the big mistake of simply filling the fabric's rib valleys with ink. When printing with plastisols, you are challenged with the ability to properly cure the ink deposited into those valleys. This often results in cracking.

When printing with a water-based product, you must ensure that you have properly driven the water from the fabric. Here again, you must create a uniform ink-film surface on an uneven printing surface.

Let's first address printing on 2x1 baby rib-knit fabric with plastisol ink. Once again, the objective here is to achieve a soft-hand print while minimizing the ink-film thickness on the ribbed fabric.

First, ensure that you are printing with high-tension screens. The numerous benefits that these screens offer will be key to achieving your goals when printing on a 2x1 rib.

Next, minimize your off-contact. Printing a 2x1 rib is like printing on fleece from the standpoint of fabric compressibility. This needs to be taken into consideration when printing on ribbed fabric. Although you want to minimize the over-squeegee pressure, you still must compress the fabric to a uniform height.

It's important to use a higher durometer squeegee blade to ensure you uniformly compress the fabric, allowing for a consistent height, while also transferring a uniform ink-film thickness across the fabric surface. In a standard squeegee blade, I would recommend an 80-durometer or 80/90/80 blade.

Also, use high-elongation plastisol ink. A 2x1 rib can have elongation rivaling that of Lycra spandex. For this reason, you need ink that can withstand the fabric's stretch characteristics. High-elongation inks are available from most ink manufacturers as either independent ink lines or additives to finished ink for improving elongation. Also, check the manufacturer's printing recommendations, as some high-elongation plastisols cure at lower-than-normal temperatures.

Cautiously use sufficient squeegee pressure to compress the fabric to a uniform height. This step will require some



minor trial and error. Remember, you want a uniform ink film in the knit's valleys and ribs. Excessive squeegee pressure will result in overshearing of the ink, thus driving the ink film down into the fabric. Insufficient squeegee pressure will result in the valleys of the rib knit filling with ink. This is the mistake most commonly made on rib knits and will result in an excessive hand, and poor curing and elongation.

Regarding mesh selection, lean toward finer mesh counts (in conjunction with the high tension) to allow you to control and minimize the finished ink-film thickness. If an underbase is required for darks, use a 156-180 mesh count. For overprinting or wet-on-wet printing, you can use 230-305 mesh counts.

Next, test for proper cure and elongation. Although I typically do not subscribe to the "stretch test" to determine cure, this is the exception to that rule, and is necessary to ensure the correct printing conditions have been met.

A 1x1 rib knit possesses the same stretch characteristics as the 2x1 rib knit, but is constructed with a finer format that allows for a smoother printing surface than the 2x1 rib. This is somewhat more forgiving from the printing standpoint.

The 1x1 rib knit allows for more traditional printing parameters, although you still need to allow for the fabric's lateral elongation characteristics. As for the step-by-step applications, you can use the same parameters that were applied to the 2x1 rib. Keep in mind that you still need a thin ink film (in order to maintain the soft hand) and the high-elongation characteristics of that ink film.

Printing with Water-Based or Discharge Ink

The next alternative to printing plastisols on rib-knit fabrics is to use either water-based or discharge inks.

There are advantages here, including the fact that water-based inks have an inherently soft hand. The ink will penetrate the fabric, producing a dyeing effect that covers the issue of elongation. The following steps are suggested for printing water-based or discharge inks onto rib-knit fabrics.

First, ensure you are using a water-resistant photo emulsion. Water-based inks are notorious for eating up screens, so check with your supplier to ensure the emulsion you are using is compatible.

As with the plastisol applications, use a high-tension screen; again, your goal is to control the flow and penetration of the ink into the fabric. Next, set the screens to a low off-contact — $\frac{1}{16}$ th is the maximum. This will allow you to minimize the squeegee pressure and control detail.

For squeegees, I recommend only a 70/90/70 triple-durometer blade. In this scenario, you need the

70-durometer edge to conform to the mesh surface, while having the rigid 90-durometer center to keep the blade on its edge instead of rolling over onto its face.

When printing with water-based ink, it is generally advisable to use a high-velocity, hot-air gas dryer. It is essential that all of the water be driven from the ink film to achieve a proper cure.

The same parameters also apply to water-based discharge printing. Since the American Apparel rib-knit line is dyed with reactive cotton dyes, they are completely compatible with water-based discharge agents. Pre-production testing always is recommended to determine the performance of discharge ink on a given color, as not all colors discharge uniformly.

Add these unique garments from American Apparel to your inventory lineup and expand your product offerings. Printing on these garments is simple enough if you follow the parameters detailed here.

**Reference from Fabric University*

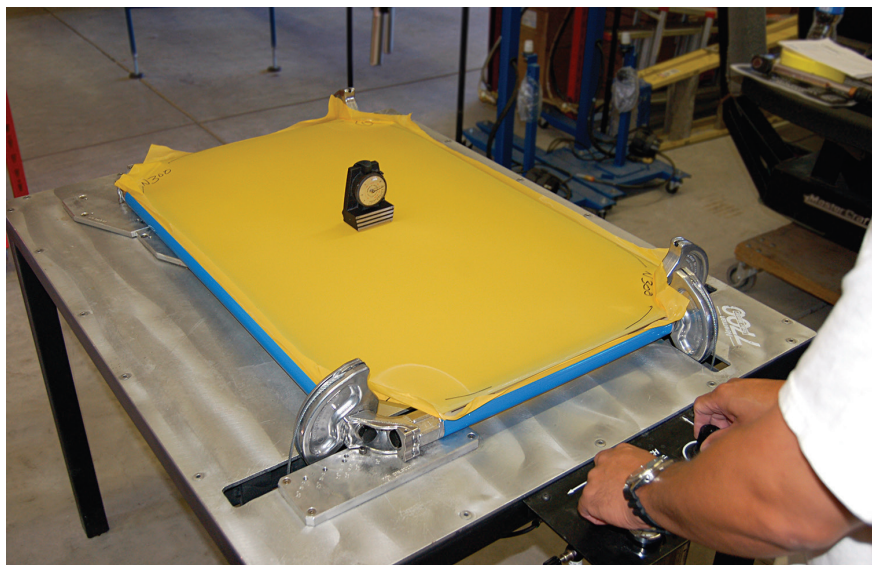
STEP-BY-STEP

STEP
1

Here, you can see where the uneven nature of the fabric creates a minor obstacle for printers. The trick to successfully printing these is to deposit a uniform ink film onto the tips of the knit, as well as in the valleys.

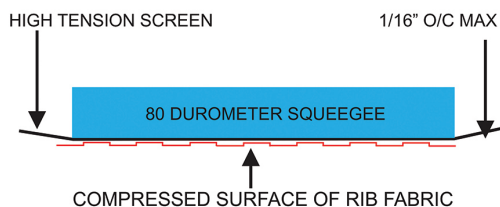


SIDE VIEW OF THE RIB KNIT SURFACE.



STEP
2

High-tension screens are key to controlling the ink-film thickness on a rib-knit fabric. *Photo courtesy of Stretch Devices Inc., Philadelphia*



STEP 3 Here, the rib knit's surface is being compressed into a more uniform height. This allows for the uniform deposit on the fabric surface, as well as in its valleys.

STEP 4 The uniform ink deposit is achieved on the surface, as well as in the valleys of the fabric. Note that the valleys are not flooded with an excessive ink film. *Print courtesy of Reliable Custom Imprints, Longwood, Fla.*

STEP 5 This is the 1x1 rib knit with the thin ink film and soft hand. The same mesh counts were used for both the 1x1 and 2x1 rib knits. *Print courtesy of Reliable Custom Imprints Inc., Longwood Fla.*



STEP 6 This is an up-close view of the printed 1x1 rib.

STEP 7 Shown here is a water-based print on a 2x1 rib knit.

STEP 8 Here, you can see the inside of the garment where ink penetration into the fabric was minimized through the use of high tension.



STEP 9 This shows a finished discharge print on a 1x1 rib. *Print courtesy of Real Thread, Winter Park, Fla.*