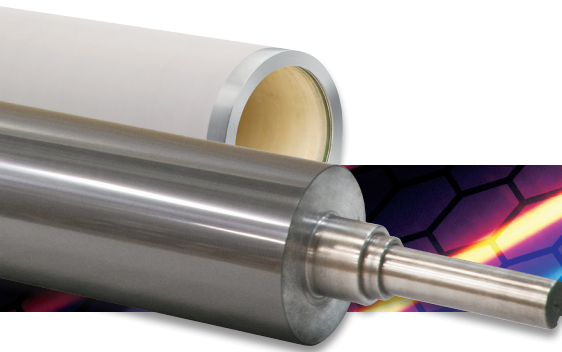


A Linde company



# Score Lines on Ceramic Anilox Rolls

Shiny lines around the circumference of an anilox roll are an indication of localized wear (scoring), or deposits of foreign material in the engraved cells. The lines are usually very narrow and appear as one or more reflective bands across a roll surface. Sometimes, but not always, the bands will show up in print - particularly during heavy ink laydown.

If a doctor blade fragment, or another piece of hard foreign material, becomes trapped under the doctor blade and held against the engraved ceramic surface of the roll, it can polish that point completely around the roll until it disintegrates.

The polished band that is created will release ink differently than the cells adjacent to it. The hard material may be a small fragment of the ceramic coating material itself chipped from the roll surface during handling, or it may have originated from agglomerated ink particles native to the ink in use - hard constituents such as titanium dioxide (TiO<sub>2</sub>) may be found in ink formulations. A more common cause of shiny line formation is the deposition of softer material in the cells and lands of the engraved anilox surface. If a material softer than the chromium oxide coating on the roll is held against the roll surface, it may deposit fragments of itself in the ink-holding cells, or the surface lands between the cells, until nothing remains. The band of cells around the roll that is affected may again have different ink release characteristics than the remainder of the roll.

Material from the doctor blade itself is the most common villain in this scenario, and doctor blade chambers that utilize containment blades exhibit a greater tendency toward trapping particles - probably because there are more surfaces available to do so. Metal or plastic doctor blade material may be trapped between a blade and the engraving, become heated from friction, and imbed itself in the roll surface. Some plastic blades seem to be more susceptible to trapping foreign material due to softer characteristics. Since it is not usually possible to notice the formation of this kind of anilox roll damage immediately, prevention is the best remedy.

## Prevention Techniques

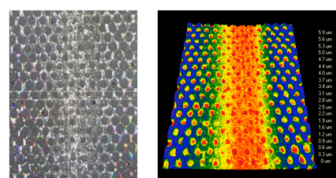
The steps necessary to prevent shiny lines from forming start with the inking system itself and involve good doctoring and maintenance practices.

**Magnets** - Be certain the ink fountain or pot contains magnets to capture metal fragments in the inking system. The placement of these magnets depends upon the type of system: in circulating systems, position them in, or near, the return loop to capture particles before they can be sent back to the roll; in an open fountain, place the magnets strategically in the fountain to cover the greatest area.

**Filters** - The addition of filters to closed-loop inking systems with pump circulation can trap foreign materials of any type. The size of particles removed is limited only by the mesh of the filter itself. Filters can remove fragments of doctor blades made of any material, agglomerated ink particles, and any other foreign material that may find its way into the ink system. As with any filtered system, regular maintenance of the ink system filters is required to remove accumulated particles and ensure full system flow.

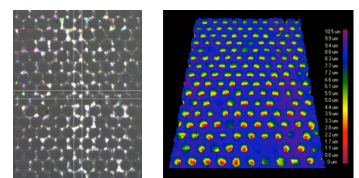
**Blades** - Doctor blades are intended to wipe the surface of an anilox roll, not force more ink into it. Once a blade is in contact with the surface, additional blade pressure simply bends the blade, increasing wear and creating heat from increased friction. A good rule of thumb for doctor blade pressure is 1/2 oz. per inch of blade length. The edge of the blade does the doctoring, so ensure the edge is clean and sharp, not worn or damaged. Above all, keep any blade maintenance operation clean, to prevent the inadvertent introduction of foreign material to the inking system that may damage the anilox roll engraving.

### Scoring Line



Ceramic removed from the engraving

### Polish Line

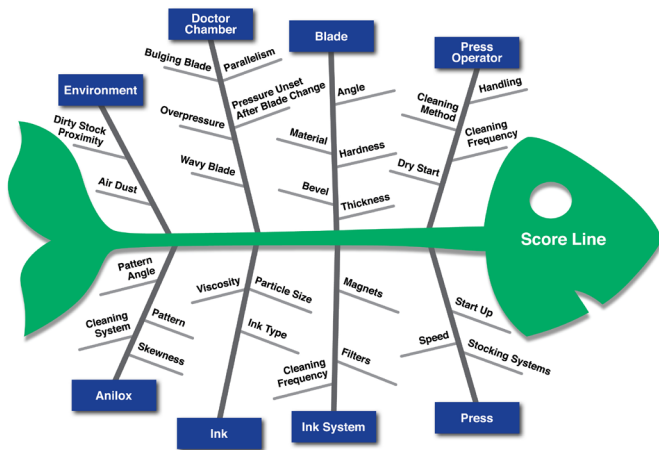


Material inclusion spread OVER the cell

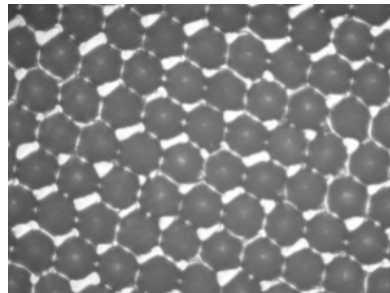
**Surface Finish** - Enhancing the smoothness of the surface of an anilox roll reduces friction. This, in turn, reduces doctor blade wear and prevents the formation of shiny lines. Additional superfinishing is recommended, in some cases, when specifying anilox rolls, and Praxair Surface Technologies can help determine when this may be appropriate. A normal laser engraving process results in small peaks of material around engraved cells that are removed by this process, making the surface smoother for mating blades. A new breakthrough technology, the Novaline™ Engravings, developed by and only available from Praxair Surface Technologies, provides a smooth, level, roll surface with minimal superfinishing. This process improves the density and lowers the recast surrounding each engraved cell, provides more effective doctoring, and promises more consistent ink delivery.

## SLR - One more weapon against scoring lines

The very fine lines on the anilox defined by the flexographic community as a score line are a nightmare for all printers. They immediately appear on the printed product and are difficult to remove. Extensive studies have shown that the causes are various and of different origins, as shown in the fishbone diagram below.



Praxair Surface Technology has developed a highly resistant and high-performance product against this phenomenon called SLR (Score Line Resistant).



**SLR**  
Score Line Resistant

Test were conducted in the most critical working conditions validated in production by printers who confirmed the excellent performance of the new SLR product.

The union of a compact and resistant ceramic coating, with a special set of the latest laser engraving technology process, has allowed the creation of a highly resistant product to the score lines phenomenon.

The new technology is part of the standard 60° engraving, so it does not require any transfer tests and does not require changes in the printing machine setting.

Migration to SLR is simple and immediate.

Praxair is present worldwide and the SLR product is available in each of our printing facility. Praxair technicians are available to provide all the additional information over this new product.

## External Factors to be Checked:

### Inking System:

- Magnets
- Filters

### Press Set-up:

- Never run the press dry

### Doctor Chamber:

- Paralleism
- Overpressure
- End blade hang outside the roll

### Blade:

- Pressure
- Overrear of the blade
- Maintenance
- Blade material (Steel, Plastic, Ceramic)

### Anilox:

- Cleaning
- Maintenance
- Storage
- Anilox Surface
- Handling

## How to Get Started. Contact Us Today.

Ask a Praxair printing specialist to schedule a complimentary anilox roll audit.

Call the nearest location or email [psti-info@praxair.com](mailto:psti-info@praxair.com).

Or visit [www.praxair.com/printing](http://www.praxair.com/printing) to learn more.

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Printed in the United States of America  
12-2020

Printed on recycled paper  
P4-9122  
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