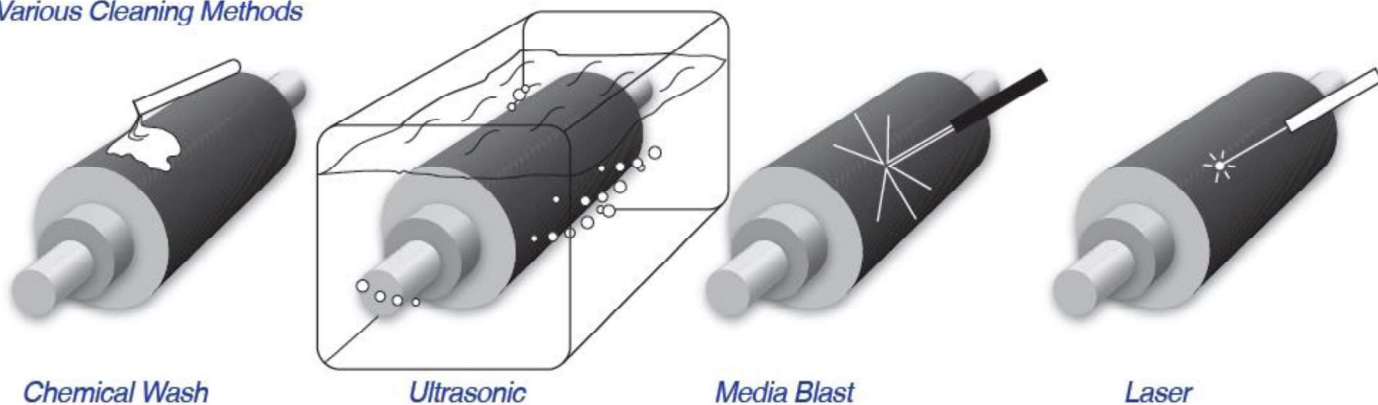


Anilox roll cleaning systems

Various Cleaning Methods



If the cells of Praxair Surface Technologies' laser engraved ceramic anilox rolls become clogged with dirt, dried ink, or coatings, print quality is affected. In normal use, laser engraved anilox rolls must be cleaned as soon as possible after the completion of a press run to remove residual ink/coatings. All too often, a delay or interruption in the cleaning process may cause an anilox roll to become ineffective due to build-up of dried deposits in the cells. The build-up reduces the roll's ability to carry the proper amount of ink/coating. When this occurs, a method of effectively removing unwanted deposits and restoring cell volume is needed.

Cleaning Methods

Any method used to clean the engraved coating must penetrate the depth of the microscopic cells in the hard-ceramic coating that gives the roll its long life. Solids from ink pigments, varnish, etc. deposited in the bottom of each cell must be dislodged and carried away. A satisfactory cleaning method must do this without damaging the cell walls and the ceramic surface, so a balance between cleaning aggressively to remove deposits quickly and protecting the integrity of the roll's surface must be achieved.

Chemical Wash

Chemical wash anilox roll cleaning systems dissolve ink build-up in anilox cells using a caustic cleaning fluid wash followed by high pressure water spray. These processes clean by softening the ink/varnish deposits chemically, then by dislodging them with the force of the rinse. They do not use abrasives and they are advertised as preserving the integrity of the roll's surface. Because these systems use fluids, they are not size limited in the ability to penetrate high screencount anilox rolls up to 400Lpcm (1000Lpi). The roll is placed in a closed tank where it is rotated and flooded with a heated cleaning fluid that is applied, recirculated, and filtered. When this wash cycle is completed, a high-pressure water spray travels the length of the rotating roll and removes the residue from the cleaning solution and the dissolved inks. The cleaning process is completed by drying with compressed air.

Because there is a potential disposal problem with the effluent from this process, it is important that these systems include provisions for separating the effluent from the removed deposits and cleaning solution into flushable wastewater, and solid sludge for appropriate disposal.

Media Blast

The method includes directing at a high-speed spherical blasting media, through compressed air, against the anilox surface to clean.

The media to be used must be softer than the ceramic coating so as to not damage the engraved cells.

The media itself must consist of particles small enough to fit into anilox cells. Usually the dimensions of the media used are small enough to work up to 260Lpcm (660Lpi).

Blasting results can be manipulated by length of exposure to blasting, or adjustment of pressure, nozzle size and nozzle distance so, the keys elements for successful operation of any media blast system include:

- Nozzle standoff distance. Must remain constant for even cleaning effect over the entire engraved surface.
- Nozzle angle must be 90 degrees to the roll surface. This will direct its media into the cells and not against the sides of the cells where it can damage the cell walls.
- Dwell time must be rigidly controlled by nozzle travel and roll rotation speeds. Careful control of nozzle movement is necessary to ensure the process does not linger in one area long enough to cause engraving damage.
- Air pressure must be only as intense as required for successful cleaning. Excessive pressure may cause the media stream to be too aggressive and attack the engraved surface.

Over time, repeated exposure to the media blasting action may cause cell walls to show signs of deterioration.

Ultrasonic Cleaning

Available as a service or as equipment for inhouse use, ultrasonic cleaning systems are effective for cleaning Laser Engraved Ceramic Anilox Rolls – even those with high screen counts – but operating procedures vary greatly with the size of the roll, the characteristics of the engraving, and the design characteristics of the cleaning equipment. For example, as the screen count increases, cell wall thickness decreases, and the engraving is more susceptible to cell damage from prolonged exposure to some elements of this process. Ultrasonic cleaning procedures tailored to the specific equipment being used and the roll being cleaned must be carefully defined and followed to prevent damage to the engraved cell structure on the roll surface.

The ultrasonic cleaning cycle uses sound waves to produce cavitation - the formation of microscopic gas or vapor filled bubbles by mechanical means. These bubbles are under pressure and implode when they contact the surface of the roll. The energy released at the implosion point will result in an agitation, or scrubbing action, of great intensity that dislodges material from the roll surface. This agitation by many small and intense imploding bubbles scrubs both exposed and hidden surfaces of parts immersed in the solution carrying the ultrasonic waves. Only cleaning solutions designated for specific equipment cycles, and for cleaning laser engraved ceramic anilox rolls should be used. Operating temperatures must be limited to those recommended by the ultrasonic cleaning equipment manufacturer. Cleaning time is critical, the longer an engraved coating is exposed to ultrasonic cavitation the more it is likely to be damaged.



Laser Cleaning - The contact free cleaning

Anilox laser cleaning is a more modern way of cleaning anilox rolls and is rapidly replacing the traditional methods such as media blast, ultrasonic, and chemical wash. The contact-free laser provides a cleaning without any mechanical, chemical, or unhealthy thermal load on the anilox.

The laser beam is directed to the anilox surface and the pulse's output power are controlled in a way that protects the ceramic layer and the engraved cells. The pulses are tuned to evaporate the material trapped in the anilox cells and can act against dried inks, adhesives, waxes, silicones, Teflon, and others.

This non-contact and non-abrasive method only expose the elements that are clogged over the substrate that are vaporized and come off as dust particles easily to be collected.

There are no screen count limitations as this system can work up to 800Lpcm (2000Lpi). The PST Novara facility offers a complete evaluation service for your anilox pool. The rollers are inspected, laser cleaned, and certified as per a new anilox. Only anilox suppliers can assure a quality result, so please contact our sales team for a cleaning service quotation.



PRAXAIR ADVICE

Due to the actual technology based on high screencount with high volumes and consequently deep cell with finer walls, PST advises the laser cleaning as the preferred method to avoid any broken walls on the engraved pattern.

