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Cleaning anilox rolls: procedures and options

Scope

Various anilox roll cleaning procedures will be detailed. It is a good maintenance practice to examine anilox rolls on a regular basis and clean them if necessary.

Safety precautions

All chemical manufacturers' safety instructions should be practiced and appropriate safety equipment worn as required.

Cleaning

To keep anilox rolls operating at their optimum ink carrying ability it is critical to clean them to maintain optimum cell volume. The polymer technology used today in water based inks that allows them to stay open long enough to print with very thin ink films has also made clean up of the anilox rolls a "Do it today" kind of job. If it has to wait till Saturday, clean up might as well have not been done at all. This is due to the amine or pH systems used in water based ink to keep the polymers liquid. Most water based inks are designed so they stay fluid at a pH of 8.0 and above, keeping in mind that usually water is in the 7.0 range and is pH neutral. In conventional amine ink systems, as the amine flashes off and the ink pH falls below 8.0 the polymers start to cross link and form a protective barrier around and over the ink pigment particles. This is what bonds the colorant to the board. When the amine has flashed off and the ink has cured for a 24 hour period the polymers become water resistant. Maintaining correct ink pH during normal running conditions and washing up promptly on a color change or press shut down will minimize the need for major anilox cleaning.

The anilox rollers should be cleaned on a daily basis. The detergent used should be an anilox specific cleaner with a rust inhibitor. Consult the anilox supplier for recommendations. Typically cleaners have a pH of 2 pH points higher than the ink's pH. Per OSHA pH's above 12 are a corrosive and personal protection equipment must be used.

For brush cleaning methods, chrome rollers should be cleaned with a brass bristle brush with bristles no larger than .003" in diameter (the anilox roll supplier usually has cleaning brushes). Ceramic anilox rolls, both mechanically engraved and laser engraved can be cleaned using a stainless steel brush. When using an anilox flexo detergent to clean the complete inking system the concentration should be diluted more than when the cleaner is used only on the anilox. This is because most inking systems contain aluminum parts and they are easily corroded with pH above 12.

Once the manual cleaning is done, warm water should be pumped thru the printing unit to remove all of the high pH flexo soap. If the roll is allowed to remain in the high pH solution over a long period of time or if the solution is not fully flushed from the system, corrosion of the anilox roll base material may occur.

Caution: Be sure to know what material the anilox roll base is made of. Carbon fiber bases require different cleaning procedures than standard steel bases. Aluminum sleeved bases are easily corroded by harsh "caustic" cleaners that were not specifically designed for anilox rollers. Always consult the anilox supplier for their specific recommendation.

Ultrasonic cleaning

Ultrasonic cleaning requires the removal of the roll from the press and usually shipping it to a cleaning facility. The roll is submerged in a tank of warm, high pH cleaning solution. The tank is lined with ultra sonic transducers that emit high frequency sound waves. These sound waves create tiny bubbles in the solution that implode in the engraved cells and dislodge the dried ink resins and pigment particles. The roll is rotated in the tank to keep the cleaning even and to reduce damage that can occur from cleaning in one area too long. The roll should not be cleaned longer than one cleaning cycle before being removed from the tank and allowed to cool. The anilox roll's mild steel core and the surface finish, either chrome or ceramic material expand and contract at different rates. This may cause micro cracks to develop in the surface and allow the ultra sonic vibrations to dislodge the ceramic or chrome plate along with the dried ink.

Sodium bicarbonate cleaning

The sodium bicarbonate is suspended in air and under low pressure (15 to 35 psi), impacted against this surface of the roll by a system similar to sand blasting. With some systems water is used as a dust controller and also cools the roll. The more common method of controlling/collecting dust is a dry vacuum system. Some systems have a transverse bar that attaches to the print station and allows the soda spray gun to move across the roll at a constant speed. This reduces the opportunity for damage by keeping the spray gun from cleaning the same area for an extended period of time. Sodium bicarbonate media is available in different particle sizes. For cleaning anilox rolls it is recommended to use a media with particles at or less than 70 microns. Larger particles can harm the roll.

The sodium bicarbonate cleaning system can be used without removing the roll from the press; however, some special clean up procedures may need to be observed to keep the soda and water out of vital mechanical press parts. Some systems have a soda reclamation unit that pulls the dust off of the roll like a vacuum cleaner to be discarded.

Sodium bicarbonate cleaning can be done either while the anilox roll remains in the press or after it has been removed from the press. Individual plants can purchase the appropriate cleaning equipment and perform the cleaning within their plant (on or off press) or they can contract with a supplier to clean rolls in the customer's plant (on or off press) or at the supplier's facility.

For those plants whose employees use this method to clean anilox rolls, it is very important to closely follow the equipment manufacturer's instructions to avoid damaging anilox rolls. Of particular concern are items such as the distance of the spray nozzle from the anilox roll, the traverse speed of the spray nozzle, the rotation (RPM) of the anilox roll, and the amount of pressure used to spray the sodium bicarbonate. Care should be taken with the final wipe down of the rolls to ensure that the sodium bicarbonate does not dry in the anilox cells. For more specific details of the cleaning process and the specific materials to be used, converters should consult with the equipment manufacturer/supplier for their directions.

Plastic media cleaners

These cleaners use low pressure, blasting equipment much like soda cleaners, however their media is different. This system uses a small resilient plastic bead that impacts the anilox roll and dislodges the dried ink. The plastic bead is reclaimed, cleaned and ready for use again at another time. This system still requires the removal of the roll from the press and it being placed in a cleaning booth on site or shipped to a cleaning facility.

As with sodium bicarbonate cleaning, these systems are available for purchase from the cleaning equipment supplier. The equipment supplier/manufacturer should be contacted to discuss the details of cleaning options and availability of the equipment.

Dry ice cleaning

In the same manner as plastic media and soda cleaners these cleaners use low pressure, blasting equipment, however their media is different. This system relies on a frozen particle impacting the anilox roll and dislodging the dried ink. This system does not require the removal of the roll from the press. The equipment supplier/manufacturer should be contacted to discuss the details of cleaning options and availability of the equipment.

With all the impact cleaning methods above it is important to keep the cleaning head moving and the anilox roll rotating to avoid excessive abrasion at any one point on the anilox roll.