

The Dangers of In-Press Laser Anilox Cleaning

Introduction

We work in a world where every advantage to gain a competitive edge is seized, sometimes resulting in unknown risks. Laser products improve the quality, precision, accuracy, security, and reliability of many products. While laser anilox cleaning is the most effective way to remove difficult ink chemistries from aniloxes, there is a right way to do it, and a wrong way to do it.

For nearly 30 years, corrugated converters relied on using baking soda cleaning systems to properly maintain aniloxes to assure print quality, color matching and reduced waste. As laser anilox cleaning gained popularity in other market segments of flexography, it quickly picked up speed in corrugated.

LASER CLASSIFICATIONS

The biggest difference between corrugated and other market segments is the type of laser environment. **Class I** is common for many household devices (CD players, laser printers) and has a light-tight safety enclosure. Anilox cleaning requires a **Class IV** configuration so it is imperative that the laser be operated by a highly-trained person who adheres to all safety protocols to prevent injury or fire.

	Class I	Class IV
Uses	Common uses	Corrugated anilox cleaning
Type of Environment	Closed (light-tight with safety interlocks)	Open (laser beam is exposed)
Risks	No laser hazards are present when operating the certified laser product.	Immediate skin and eye hazard from exposure to either the direct or reflected beam; may also present a fire hazard.
Training	No special safety training required.	Specialized training for laser operation and safety protocols required.

Why is Laser Safety Critical?

This document is intended to shed light on all the safety regulations in place to assure safe usage of lasers in a Class IV production environment. Regulatory bodies include:

- **CDRH** (Center for Devices and Radiological Health of the FDA U.S. Food & Drug Administration) assures that all laser product manufacturers comply with federal standards and do not have any radiation safety defects
- **ANSI** (American National Standards Institute) set forth guidelines for implementing a safe laser program in industrial, medical, military, and educational applications of lasers
- **OSHA** enforces these policies
- **State and local governments** may also have their own regulations regarding safe use of lasers in manufacturing

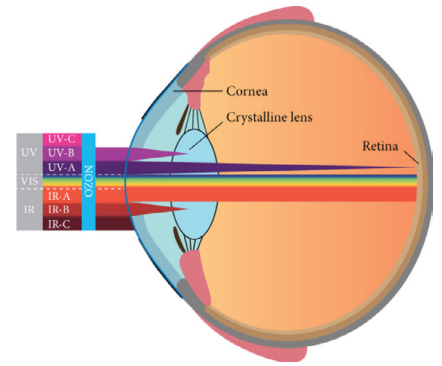
Eaglewood Technologies is considered the experts in laser anilox cleaning due to the fact that we have been cleaning aniloxes with lasers longer than our competition. We have received awards and recognition from industry organizations such as the FTA (Flexographic Technical Association) and the Global Label Awards. Our vast knowledge of safely operating lasers has allowed us to place laser anilox cleaning systems at many of the industry leading flexo printing operations in the world. We discovered how some companies were operating lasers in their facility and were compelled to share the dangers of these practices.

RISKS OF OPERATING CLASS IV LASERS

Loss of vision. The largest risk is the potential for loss of vision when the retina is burned by direct or diffused laser radiation. A laser beam of sufficient power can theoretically produce retinal intensities at magnitudes that are greater than conventional light sources, and even larger than those produced when directly viewing the sun. Permanent blindness can be the result.

Skin damage. Laser-induced tissue damage is possible when tissue proteins are denatured due to the temperature rise following absorption of laser energy.

Fire. Fire can result from direct or diffused reflection, especially in a corrugated environment where paper and paper fiber particulate are present.



PRODUCTION AREA SAFETY MEASURES

Nominal Ocular Hazard Distance (NOHD). The NOHD specifies the distance from the laser source at which the intensity of a single laser beam becomes safe. This area must have protective barriers and compliant signage. Anyone entering the temporary laser control area must wear appropriate laser safety glasses.

Status Lights. System control master switches (or eStops) must be present both inside and outside of the temporary control area. If the technician from your service provider does not adhere to the SOP's provided, their Laser Safety Officer must be notified.



WHAT TO ASK FOR FROM AN ANILOX CLEANING SERVICE PROVIDER

When a service company comes to your facility to clean aniloxes with a laser there are many items that you need to ask for in advance to assure safe operation of lasers and dramatically reduce risk of injury to your team.

- ✓ **Has your service provider conducted a Workplace Laser Safety Audit per OSHA referenced ANSI Z136.1-2014 Standard?** This audit will illustrate the correct Engineering Control Measures, Administrative Control Measures, Personal PPE Protective Measures and appropriate Warning Signs/Labels have been conducted and are being adhered to. This document must be signed by an Laser Safety Officer.
- ✓ **Laser Hazard Analysis.** This analysis is conducted by a 3rd Party Laser Safety Officer and highlights the NOHD (Nominal Ocular Hazard Distance) of the specific laser being used along with the data needed to create a Workplace Laser Safety Audit and SOP's around safe operation of the laser.
- ✓ **Standard Operating Procedures.** A document should be shared with you prior to the service provider's arrival so that you can see who their Laser Safety Officer is, that they've completed all the necessary audits, proper SOP's have been created to assure safe operation of the laser in your facility, where signage and where the Temporary Laser Control Area (Nominal Hazard Zone is determined by Laser Hazard Analysis) will be during operation. This document should also outline what will happen in case of an injury.
- ✓ **Some states and municipalities require their own regulations or audits be conducted by a Laser Safety Officer.** Check with your local government to determine what additional steps need to be taken.
- ✓ **Documents showing that the laser ablated ink particulates are being vacuumed or captured correctly and effectively.** These ablated particulates get airborne easily and can be breathed in by production staff. Long term affects can be very detrimental to respiratory systems.

Summary

In a perfect world, lasers being used to clean aniloxes in a pressroom environment should be done so inside of a Class 1 enclosure. This assures that the laser is being used safely and mitigates any potential mishaps during operation. To operate a Class 4 laser open, many steps need to be taken to protect others in the production area. This does NOT include all the audits, certifications and administrative work that should be done ahead of time.

The NOHD (Nominal Ocular Hazard Distance) will have been determined ahead of time and the service provider will know that the NOHD of their laser is X meters. In many cases, the NOHD will be at least 202 meters. This means that anyone within 202 meters of the laser while in operation risks, "immediate skin hazard and eye hazard from exposure to either the direct or reflected beam; may also present a fire hazard." To mitigate this hazard the service provider must establish a temporary laser control area using barriers that prevent any laser radiation from getting past the barriers. These barriers must encapsulate 180 degrees from the line of site. These barriers must be accompanied by signage per ANSI standard 4.4.3.5. Signage must be on the laser equipment itself, on the protective barriers and as a warning prior to entering the NOHD. This signage must abide by ANSI standard Z535.2. The signage must provide information regarding the laser type being used and a warning for the laser radiation emissions. Anyone entering the temporary laser control area must wear the appropriate laser safety glasses per the Laser Hazard Analysis.

Laser System status lights must also be used to warn your employees when a laser is in use and when it is not in use. System control master switches or eStops must be present both inside of the temporary laser control area and outside of the temporary control area. If the technician from your service provider does not adhere to the SOP's given to you, their Laser Safety Officer must be notified. This LSO (Laser Safety Officer) must then report any accidents or injuries.

In conclusion, lasers are a great technology, but shortcuts cannot be taken when using them within a manufacturing environment. Serious injuries can happen if the correct safety programs are not followed and if your service provider has not taken all the necessary steps to truly understand their laser technology. It is imperative for the safety of your employees, equipment, and contractors that lasers are operated in a safe and consistent manner.

Eaglewood Technologies is considered the leading expert in laser anilox cleaning. Award-winning products and unparalleled experience has allowed Eaglewood Technologies to integrate laser anilox cleaning systems at many prestigious flexo printing operations around the world.

Contact us for more information | salesinfo@eaglewoodtech.com | 800-347-1959