



Inkjet Printer Safety Guide

**Basic safety instructions for
VUTEk, Jetrion and EFI Wide Format Printers**

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Table of Contents

1.0	General Safety.....	5
1.1	Introduction	5
1.2	Printer Modifications.....	5
2.0	Printer Safety Components and Precautions	6
2.1	Safety Controls.....	6
2.2	Moving and Handling Materials	10
3.0	Environmental	10
3.1	Noise.....	10
3.2	Emissions.....	10
3.3	Other Environmental Considerations.....	10
3.4	Local Codes.....	10
4.0	Hazards, Warnings and Residual Risk	11
4.1	Chemical Hazards	11
4.2	Mechanical Hazards.....	12
4.3	UV Bulb Hazards	12
4.4	Fire Hazards.....	13
4.5	Laser Safety.....	14
4.5.2	Specular Reflections	14
4.6	Residual Risk Definition	15
4.7	Hazard Symbols.....	16
4.8	Protective Equipment	19
5.0	Personal Protective Equipment.....	20
6.0	CE Declaration of Conformity.....	21
7.0	Decommissioning	21
7.1	Inks	21
7.2	Disposal Instructions	21

1.0 General Safety

1.1 Introduction

This document describes important safety information and procedures to follow when operating VUTEk, Jetrion and EFI wide format printers.

Please review and follow all the safety precautions in this document *before* you begin.

Each EFI printer employs hazardous elements, including high voltage, fast moving parts, inks, solvents, maintenance fluids and material rollers. Users must understand the various safety warnings and attend a basic operations class prior to operating a printer.

Important: Please review and follow all the safety precautions in this document before you begin printing.

In addition, each printer includes a *Basic Operations Manual*. Users must read and understand this guide and become familiar with the basic operation of the printer prior to operating it. Also refer to the Basic Operations Manual for basic safety information about your particular printer model.

1.2 Printer Modifications

Operators must never:

- Modify an EFI printer from its original design without the prior written approval of EFI.
- Use unapproved accessories or consumables.

Danger! Unapproved modifications or accessories can lead to serious injury or death.

2.0 Printer Safety Components and Precautions

This section outlines the printer safety components and safety precautions which should be taken when operating the printer.

2.1 Safety Controls

This section discusses safety controls.

2.1.1 Lockout/Tagout Procedure

Always perform the lockout/tagout procedures before performing any printer maintenance.

Note: Not all EFI printers are equipped with a lockable integrated power control switch or Main Disconnect Switch.

Electrical power is normally supplied to the printer by the main disconnect switch mounted on the outside of the printer or a live AC line connected to the printer. Refer to the Basic Operator's Manual for your particular printer model for more detailed information.



Figure 1: Lockout/Tagout Symbol

Caution! Setting the main disconnect switch to OFF does not remove power to the switch. If work must be done on the main disconnect switch, the printer must be disconnected from facility power, otherwise full line voltage will be present.

1. Rotate the main disconnect switch to the **OFF** position.
2. Install a keyed or combination lock in the space provided on the main disconnect switch, as shown in [Figure 2](#). This prevents the unauthorized or inadvertent activation of the switch while performing maintenance functions.



Figure 2: Main disconnect switch-lockout/tagout in the OFF position (shown here on a TX3250r model printer)

Danger! Not all EFI printers are equipped with integrated Lockout/Tagout capabilities. For printers without this apparatus, follow the lockout/tagout procedures for your facility to tag and prevent the reconnection of the printer power.

2.1.2 Emergency Stop Button

Pressing any of the emergency stop buttons suspends print operations immediately.

Press an Emergency Stop Button, shown in [Figure 3](#) if the following situations occur:

- Ink is leaking or spilling from an ink box or bag during printing
- The carriage is striking the media
- There is visible smoke or fire
- Media is jammed in rollers/feeders
- Any other situation in which there is a safety issue or in which damage to the printer may occur.



Figure 3: Emergency Stop Button (switch)

Caution! The emergency stop buttons **do not remove power** from the printer input or electronics. The E-Stops are not an alternative to powering off the printer when instructed to do so. The emergency stop buttons help prevent personal injury and avoid damage to the printer during extraordinary circumstances.

Before operating the printer, operators must familiarize themselves with the location and operation of the emergency stop buttons. This information can be found in the Basic Operations Guide for your printer model.

2.1.3 Restarting the Printer after an Emergency Stop

Refer to the Basic Operator's Guide for your printer model for information on how to properly reset the printer after an Emergency Stop.

2.1.4 Front and Rear UV Light Shields

UV light and UV-curable ink can be hazardous to your eyes and skin. Please observe all applicable safety precautions when working on components inside the UV shield. Printers with Arc and/or LED UV lamps contain glass doors with UV shielding to protect operators from exposure to UV light. They also protect from ink overspray. Door handles display warning symbols, [Figure 4](#). If doors are opened during printing, the printer shuts off the lamps and stops carriage and printer movement, preventing the operator from being exposed to UV light.



Figure 4: UV shields symbol

Note: A trained operator must be in attendance at all times during printing. Without the immediate intervention of a trained operator, small problems and failures during printing can create safety hazards as well as the potential for significant damage to your printer.

2.2 Moving and Handling Materials

Lifting heavy media rolls may cause injury if done improperly. Printer operators must conform to the following guidelines at all times when moving heavy media:

- Wear steel-toed boots during loading and unloading of materials.
- To prevent injury or strain, use at least two qualified people or a forklift when lifting or lowering long media rolls onto the printer.
- Always check the weight of the roll and the lifting capacity of the forklift *before* loading or unloading a roll on/from a printer.

3.0 Environmental

3.1 Noise

The normal operation of EFI Inkjet Printers does not require the use of hearing protection. When the printer is running, sound levels are typically below 70dB.

Note: The 70 dB threshold may be surpassed at sites that have more than one printer type, or additional equipment that emits noise.

3.2 Emissions

Refer to each printer's Specification Sheet for emissions information. Verify that fresh replacement air is provided by passive or mechanical ventilation before starting the printer.

3.3 Other Environmental Considerations

Customers are responsible for consulting with a qualified heating, ventilation and air conditioning (HVAC) engineer to ensure that the environmental and ventilation requirements are met, based on the specification sheet for the printer model.

EFI requires that a ventilation system be installed for extracting ink particles, solvent and maintenance fluid fumes, and ozone from the printing environment.

The EFI Inkjet printer must not be operated unless a functional ventilation system is in place. Customers must maintain the correct environmental conditions in the installation environment.

Note: For specific information, please refer to the Printer Specifications document for your printer model.

3.4 Local Codes

Customers are responsible for conforming to all local codes governing emissions and work environments.

4.0 Hazards, Warnings and Residual Risk

4.1 Chemical Hazards

Printer Operators must conform to the following guidelines at all times during printer operation and while installing ink:

- Eyewash stations complying with local safety standards should be installed within 25 feet (7.6 m) of the printer and the flammable liquid storage cabinets. The location of these stations should be clearly marked and easily accessible.
- Ink, solvents and maintenance fluids should be clearly labeled and kept in labeled storage cabinets designed to hold flammable liquids. The storage cabinet and warning labels must comply with local fire and occupational safety standards.
- Safety signs must be posted in the printer work area to alert personnel to potential dangers. These signs should comply with your local occupational safety ordinances.
- Only properly trained personnel should handle inks, solvents or maintenance fluids.
- Do not wear contact lenses while using the printer or when exposed to solvent, maintenance fluid or ink vapors.
- Inks, solvents and maintenance fluids can cause allergic reactions.
- Should ink contact your skin, use only soap and cool water to remove it, and to clean the affected area.
- Read and follow the safety guidelines in the Material Safety Data Sheets (MSDSs). Post the MSDS sheets in the work area as required by your local laws and regulations.

Important: MSDS should be available for emergency service personal. MSDS are included with each ink purchase, as well as by emailing EHS@efi.com.

- Solvent and maintenance fluid vapors are flammable and potentially explosive.
- Inks, solvents and maintenance fluids vaporize easily at room temperature.
- Solvent and maintenance fluid vapors are heavier than air and can travel and collect in low spots.
- Splashing inks, solvent or maintenance fluid in eyes can damage the cornea of the eye and impair vision.
- Inks, solvents and maintenance fluids can be irritating to eyes, throat, skin, and breathing their vapors can cause dizziness or other symptoms.
- Keep ink, solvent and maintenance fluid containers tightly closed at all times. If a container becomes damaged, transfer the ink, solvent or maintenance fluid to another clean, compatible container with a sealed lid.
- Clean any ink, solvent or maintenance fluid spills as soon as they occur.
- Store inks, solvents and maintenance fluids in approved flammable liquid storage containers.
- Solvents and maintenance fluids are hazardous wastes, which must be disposed of according to local regulations.
- Dispose of waste liquids, spill-cleaning material, solvent-or maintenance fluid soaked rags and dry ink deposits in appropriate covered fireproof containers located at least 25 feet (7.6 m) from the printer. The fireproof containers must be grounded at all times.

4.1.1 Ink, Solvent or Maintenance Fluid Spills

If a spill occurs during printing which involves inks, solvents or maintenance fluids, immediately press the Emergency Stop button and follow your company's safety procedures, which may include evacuating the spill area, contacting your facilities manager, and if necessary, notifying local emergency services.

4.2 Mechanical Hazards

Printer Operators must conform to the following guidelines at all times during printer operation:

- Operate all moveable assemblies and printer accessories with care. Keep body parts and tools clear of moving printer parts.
- Keep all safeguards in place and in working order. Do not operate the equipment with covers or access panels removed.
- Do not defeat or bypass built-in equipment safety features.
- Observe all warnings and cautions, stated or implied, in the procedures.
- Follow all safety labels on the equipment.
- Do not climb onto print table or rollers for any reason: pinching or crushing is possible.
- Do not touch any heating element or drying system component when the printer is on- serious burns can result.
- If any part of the printer be missing, damaged, or fails in any way, or any electrical component fails to perform properly, shut off the printer and perform the lockout/tagout procedure. Replace missing, damaged, or failed parts before resuming operation.

4.3 UV Bulb Hazards

UV bulbs contain traces of mercury powder, which has been shown to cause adverse health effects.

Note: If you are untrained in hazardous material handling, do not attempt to clean a mercury spill; contact the appropriate facilities personnel immediately.

Follow the guidelines in this section if a UV bulb breaks.

- If the break occurs on a printer during a print job, immediately press an Emergency Stop button.
- Notify the designated safety personnel and open a window if possible. Notify people to evacuate the immediate area and leave the room for at least 15 minutes.
- Emergency personnel must isolate the area around all broken material so that the mercury powder is not tracked, or otherwise spread, to other areas. Cease all other activities and keep the spill area contained and off limits until all broken material and contaminated surfaces have been cleaned.

- Turn off all fans, heating ventilation, air conditioning systems, and anything that could spread mercury vapors or powder to other areas.
- Wear latex or nitrile gloves and a National Institute for Occupational Safety and Health (NIOSH) approved or equivalent dust mask during cleanup of the mercury powder and breakage. Do not touch uncontaminated items with gloves that have come into contact with the mercury powder or contaminated items.
- Ensure that the spill is cleaned by a trained individual.

4.4 Fire Hazards

Open flame, heat energy, or sparks around the printer can trigger a fire or an explosion when excessive fumes are present. Follow the precautions listed below, including complying with any emissions considerations:

- Install the printer on clean tiled or concrete floors, anti-static carpeting, or anti-static tiles to reduce hazardous accumulations of static electricity.
- No smoking, pilot lights, open flames, stoves, heaters, or halogen lights within 25 feet of the printer. Solvent and maintenance fluid vapors are flammable and potentially explosive.
- Inks, solvents and maintenance fluids vaporize easily at room temperature. Solvent vapors are heavier than air and can travel and collect in low spots.
- Do not operate any portable spark-producing equipment (static, electrical, or mechanical) within 25 feet of the printer.
- Local fire ordinances regarding the use and storage of flammable materials must be strictly observed. Fire extinguishers containing CO₂ should be easily accessible and visible for all approaches to the printer. The extinguishers should be within 25 feet (7.6m) of the printer and the flammable liquids storage cabinets, or located according to your local fire ordinances. **Never use water to extinguish any fire near the printer.**
- Closed containers exposed to heat and fire may melt or burn, releasing product. Use water to cool fire-exposed containers and to protect personnel. Combustion may generate irritating vapors: CO, CO₂, and hydrocarbons.
- Dispose of waste liquids, spill-cleaning material, solvent-or maintenance fluid soaked rags and dry ink deposits in appropriate covered fireproof containers located at least 25 feet (7.6 m) away from the printer. The fireproof containers must be grounded at all times.
- Always be aware of the carriage travel during printing to ensure that media does not catch or bunch up under the lamps. This can cause the media to ignite.

4.5 Laser Safety



Warning! This machine is not intended and is not safe to be used with any part of the laser system removed, including the safety system. Do not use this machine or perform any work with this machine if *any part* of the laser system is not in good working order and correctly positioned.

The Jetrion laser module system is manufactured in accordance with the European standard EN 60825-1 regarding the safety and use of laser equipment. Interfering with this device, modifying it, or operating it with any defects is a violation of the Directive to which this machine as a whole complies.

4.5.1 Class IV Laser Definition

The standard laser system fitted to the Jetrion 4900 machine is a class IV laser.

Class 4 is the highest and most dangerous class of laser. High power lasers (cw: 500 mW, pulsed: 10 J/cm² or the diffuse reflection limit) are hazardous to view under any condition (directly or diffusely scattered) and are a potential fire hazard and a skin hazard. Significant controls are required of Class IV laser facilities.

Many types of lasers are included in protective enclosures or structures and are protected from accidental access. In this case, level of risk is calculated by the real light beam that can be visible from outside of the safety enclosure.

4.5.2 Specular Reflections

Extreme care and precautions must be kept in order to avoid accidental refraction or deflection of the laser beam. A metallic object, for example, hit by laser beam will reflect most of the beam.

Important: When setting up for any new job, a risk assessment must be undertaken to determine the possibility of any reflected or refracted light from the laser beam. If it is determined that light refraction is possible, such as from shiny or reflective material surfaces, steps should be taken to minimize the light being refracted. Steps may include, but not be limited to, provision of tinted screens or solid covers around the glazed parts of the laser guarding. It may be necessary to use an alternative material.

4.5.3 Laser Head Position

The laser installed in this machine is designed to always point downwards on a fixed focal plane. Prior to using this device, it is recommended to inspect and check that the laser has not moved, and that it is still pointing directly downward, 90° from horizontal in all planes. This visual inspection should be performed as part of the daily safety inspection before machine use.

If it appears that the laser head has moved beyond 90°, do NOT use the machine. Report to a technician and repair before use.

4.5.4 Beam Position

The laser is designed to cut materials that pass within the laser cutting (marking) area.

To be effective in this process:

- The laser beam must always focus directly onto the material being processed.
- The laser must be correctly positioned inside the work area. Refer to the Basic Operator's Guide for your machine model.
- The beam must have a spread-reflection sufficient to only cut the material as desired (e.g., adequate brick dimensions) or onto materials having adequate thermal absorption properties.




4.6 Residual Risk Definition






Residual risk is defined as the portion of risk that remains after all safety measures have been taken. It is important to understand that while risk can be mitigated, it can never be completely removed. The hazard symbols in the next section are used to identify areas of the printer where there may be residual risk.




4.7 Hazard Symbols





EFI printers employ the following safety-related symbols in manuals and in labels affixed to the printers. Learn to recognize these symbols and the risks they signify.

Table 1: Hazard Symbols

	<p>Entanglement hazards are created when two rotating objects move together and at least one of the two objects moves in a circular motion. For example, the media hold-downs or media and pinch rollers create an entanglement hazard. To avoid injury from entanglement hazards, be aware of areas where they exist and avoid them. Wear clothing that fits well and is not loose. Never reach over, near, or into rotating parts.</p>
	<p>Crush hazards (crush points) are created when two moving objects move towards each other or when an object moves towards a stationary object. To avoid injury from crushing hazards, never reach in or near moving parts. Perform the lockout/tagout procedure when servicing internal components. Crush hazards exist between the:</p> <ul style="list-style-type: none">• Carriage and the right and left pulley assemblies, right-and left-pulley guards, and stop pistons.• Carriage and the printer frame.• Carriage and the holes in the carriage rail.• Carriage and the vacuum table.• Capper and the carriage.• Capper and the surrounding frame.• Vacuum table and the front media hold down, rear media hold down, and the media fence.
	<p>Impact hazards can be broken down into two categories: forceful collision and contact. Forceful collision is the result of machinery or processes where any movement of tools, machine elements, or particles could impact an operator. Contact refers to the movement of personnel that could result in collision with stationary or moving objects. For example, an operator could collide with the carriage moving across the printer while performing maintenance tasks. Impact hazards exist between any moving printer component and the operator.</p>

	<p>Cutting points are created when a single object moves forcefully or rapidly enough to cut. Cutting hazards exist between the printer carriage and the printer platen.</p>
 	<p>Lifting Hazards: Lift media rolls using mechanical assistance or get help when lifting. Media rolls are heavy objects. Lifting hazards exist during media loading.</p>
	<p>Wrap point/trapping point hazards exist where moving parts may pull objects into the equipment, such as the pinch rollers on a printer. Rotating shafts are the most common source of wrap point accidents, although any exposed machine part that rotates can be a wrap point. Entanglement with a wrap point can pull you into the printer, or clothing may become so tightly wrapped that you are crushed or suffocated. You could also be thrown off balance and fall into other machine parts. Even a perfectly round shaft can be hazardous if there is enough pressure to hold clothing against the shaft. Never attempt to hand-feed material into moving feed rollers. Always stop the equipment before attempting to remove an item that has stopped a roller or that has become wrapped around a rotating shaft. Check all equipment for potential wrap points (front and rear pinch rollers) and be alert to their potential danger.</p> <p>Wrap Point hazards exist:</p> <ul style="list-style-type: none"> • Between pulley guards and the drive belt. • Between the winder/unwinder rollers. • Between pinch rollers. • Between the vacuum table and the media hold down rollers. • At the media feed drive motor coupling when the cover is off. • At the cooling fans inside the electronics cabinet. • At the cooling fans on the lamp housings.
	<p>Shear points are created when the edges of two moving objects move close or across one another with enough speed or force to cut soft material. Shear hazards exist between the carriage and the vacuum table/platen.</p>

	<p>Burn Hazards: The potential for burns exists in and around several printer components, such as in and around the lamp assemblies and jet plate surfaces and the platen pre-heater and media dryer surfaces (if equipped). Hot areas are marked with a burn hazard/hot surface warning label. Do not touch any of these surfaces or the areas surrounding them.</p>
	<p>Voltage hazards: Printer electrical compartments contain hazardous voltages.</p> <p>Warning: Contact could result in severe electrical shock or burns, and could be lethal.</p> <p>Electrical burns can pass through the skin and damage the underlying body tissues. This can occur if you touch the ground at the same time you touch a poorly insulated live wire, tool, or printer. When that happens, the body becomes a conductor for electricity, resulting in both shock and tissue burns. Electrical burns can cause serious internal damage and may even kill you.</p>
	<p>UV Light Exposure (UV Printers):</p> <ul style="list-style-type: none"> • Eye damage can occur any time operators are in the presence of UV light. • The symptoms of over exposure to UV light are not immediately felt; operators may not realize the hazard until after damage occurs. • Effects of exposure range from mild skin irritation (equivalent to sunburn) to severe skin or eye ulcers. • The UV light levels around UV equipment can greatly exceed levels found in nature. • Acute (short term) effects include redness or ulceration of the skin. At high levels of exposure, these burns can become serious. • Chronic exposures can lead to premature aging of the skin and skin cancer, depending upon the amount of life exposure. • Additional dangers exist because UV light can enter from all angles, not just from the direction you are looking, causing corneal damage. • Acute eye pain is the first symptom felt, sometimes several hours after eye exposure. • Ensure that your eye protection is appropriate for this work. Specially made UV safety glasses are available. <p>Note: EFI will not be held responsible for damage or injury caused by personnel using or approaching UV printers without reading and understanding the considerations in this section.</p>

	<p>Laser Hazard: The potential for laser injury exists when an operator is exposed to the laser beam.</p> <p>Danger! Direct exposure to the laser beam contact could result in severe burns, and could be lethal.</p> <p>A class IV laser such as the one contained in some EFI products can burn the skin, or cause devastating and permanent eye damage as a result of direct, diffuse or indirect beam viewing.</p>
	<p>Harmful Fumes: Vapors or fumes produced by laser operation can be toxic or even carcinogenic, depending on the material being processed. As a simple rule, operators must refer to the chemical data sheet for the materials being processed, and consider that if the material emits toxic substances when on fire, then the same is true when it is being processed by the laser. If questions exist, refer to the safety department or to the material supplier for a copy of their safety data sheet.</p>
	<p>Inhalation Hazard: If toxins or carcinogens are emitted from the processed materials, it is important to ensure that the LEV system is capable of handling this emission in line with the local regulations for the handling of toxic fumes. Never allow toxic fumes to enter any confined work area. Never breathe fumes emitted from this laser equipment.</p>
	<p>Corrosive Substance Hazard: Reference the safety data sheets supplied with the materials. Some materials produce vapors or fumes, which when mixed with other airborne substances, such as gasses and water vapor, can produce corrosive chemicals. These chemicals can lead to corrosion of the machine and the laser components. Always check the safety data sheet for this type of hazard. If such substances can be produced, then special attention must be given to the LEV to ensure suitable evacuation and treatment of this substance.</p>




4.8 Protective Equipment

Whenever there is possible exposure to UV light, always follow these important safety precautions:

- Wear orange colored UV-filtering safety glasses (not commercial sunglasses) with both front and side protection.
- Wear a long-sleeved shirt or protective sleeves.
- Use nitrile gloves with the cuffs pulled up over your shirtsleeves. See [Personal Protective Equipment](#).

5.0 Personal Protective Equipment

Wear appropriate protective equipment and clothing when working with inks, solvents, maintenance fluids or waste fluids.

Eyes/Face 	<ul style="list-style-type: none">• Wear chemical glasses and a full-face shield when splash hazards exist. When working with UV light, wear UV-filtering safety glasses with both front and side protection.• The laser used in EFI machines is considered a high risk device which can lead to serious or significant injuries or permanent blindness if used incorrectly, or if poorly maintained. <p>Caution! When using the laser module, use of laser eye protection such as laser-radiation filters and goggles, compliant with EN207-208t is mandatory.</p> <p>The minimum requirement for eye protection is CE certified goggles or glasses, having the following features:</p> <p>CO2 LASER: DIR 10600 L3.</p>
Skin 	<ul style="list-style-type: none">• Avoid skin contact with inks and solvents. Wear normal work clothing (long-sleeved shirts and long pants). Use nitrile gloves and protective clothing to prevent skin contact. Cover the nitrile gloves with latex gloves if ink contains head conditioning fluid.• Wear an apron if there is any chance of clothing contact.
Respiratory 	<ul style="list-style-type: none">• Avoid breathing of vapors, mist, or spray. Use appropriate respiratory protection if ventilation is not sufficient to prevent buildup of vapors, mists, or aerosols.

6.0 CE Declaration of Conformity

EFI printers are marked with the Conformity European (CE) mark only after passing a rigorous set of design and testing criteria.



Figure 5: Conformity European Mark

This label indicates that this product meets safety and noise immunity and emissions (EMC) standards when installed as described in the installation guidelines and used within the product specifications.

7.0 Decommissioning

When decommissioning a printer, discard all materials in accordance with all federal, state, and local regulations.

7.1 Inks

Discarded UV ink is not expected to be a characteristic hazardous waste under the Resource Conservation and Recovery Act (RCRA) but is considered “Regulated Waste.” No Environmental Protection Agency (EPA) waste numbers are applicable for this product’s components. If any ink has contacted head maintenance fluid, see **Disposal Instructions**.

7.2 Disposal Instructions

Do not allow head maintenance fluid or contaminated inks to be discharged into storm drains, sewers or any public/private waterway. Recycling of this product is encouraged. Discarded product and/or wastes must be tested using methods described in 40 CFR Part 261, to determine if it meets applicable definitions of hazardous wastes. Regulations vary.

Note: Waste must be handled in accordance with all federal, state, provincial, and local regulations.

Please refer to each ink’s MSDS for more specific information, available by request at EHS@efi.com.



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