



SAFETY INFORMATION

Extrusion Coating & Laminating Safety

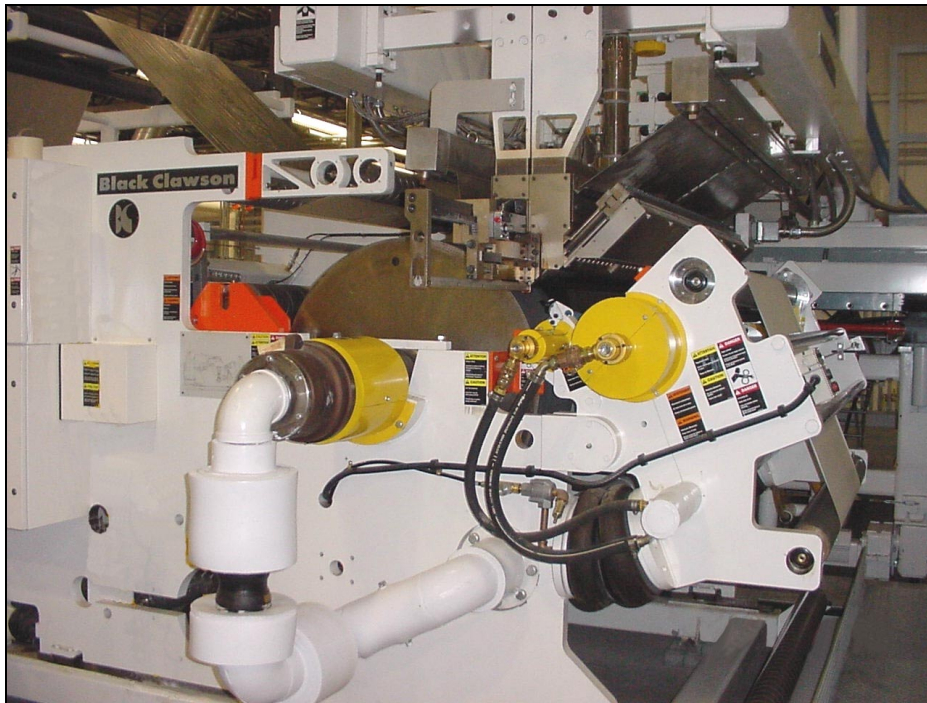


Figure (1), Extrusion Coating - Laminating Station

INTRODUCTION

The purpose of an extrusion coating - laminating station is to coat one web or laminate one web to another web with molten plastic. The webs are typically films, foils, paper, board, or other products. The molten plastic, often called a

melt curtain, is extruded from a die. The web or webs and melt curtain are brought together between a chill roll and a pressure roll. Heat is removed from the plastic by the chill roll, resulting in a bond between the plastic and web(s). See Fig. (1) for an Extrusion Coating - Laminating Station.



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WARNING IN-RUNNING NIP POINTS

Operators must be aware of and avoid in-running nip points. Where possible, in-running nip points must be adequately guarded to prevent accidental contact by personnel working around the extrusion coating – laminating station.

Figure (2) shows nip points and nip point guards currently in use.

FAILURE TO GUARD IN-RUNNING NIP POINTS CAN RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

WARNING PULL ROLL NIP POINTS

Pull rolls (not shown in figure (2) below) are used to isolate web tension sections of the extrusion coating-laminating station. The in-running nip side of pull rolls must be guarded across their full width.

FAILURE TO GUARD IN-RUNNING NIP POINTS CAN RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

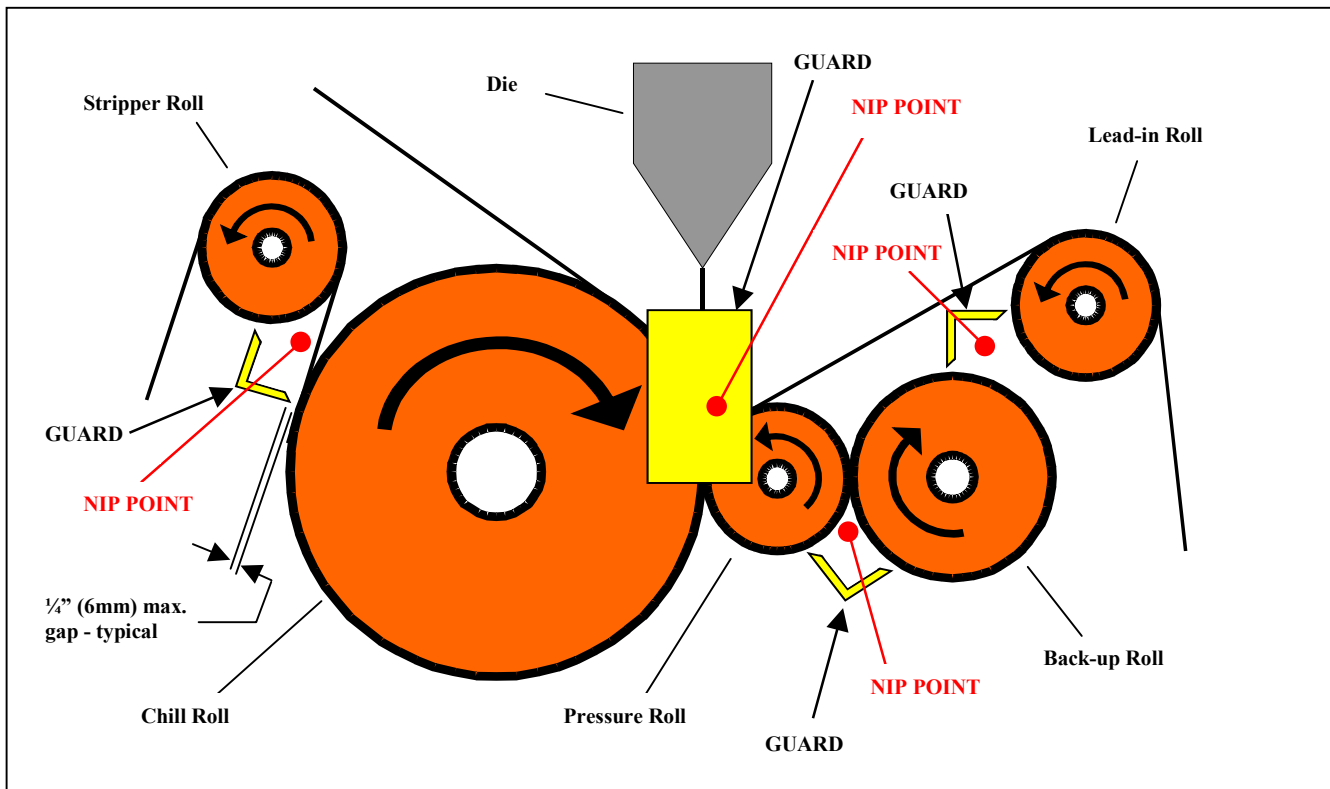


Figure (2), Extrusion Coating – Laminating Station Nip Points with Guards



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WARNING DIE AREA

Figure (3) shows the die in close proximity to the chill roll and to the moving webs. It also shows the melt curtain flowing from the die into the nip point.

Because the relationship between the die and the nip point is frequently changed for process reasons, it is not practical to fully guard the circled areas and still operate the coater-laminator. These areas present potential hazards and must be avoided at all times while the machine is in operation.

Figure (3) also shows a nip point guard with safety sign. The guard must be installed at each end of the chill roll to block direct access to the nip. Contact Black Clawson Converting Machinery, Inc. if you need assistance in providing this guard or safety sign.

FAILURE TO AVOID THESE AREAS AND INSTALL THE CHILL ROLL NIP GUARDS COULD RESULT IN SERIOUS PERSONAL INJURY.

WARNING ROTARY UNION

Cooling media is introduced into the chill roll and other rolls through rotary unions in order to remove heat from the product. Some of these rotary unions may have exposed fasteners or other surface features that may create a hazard if located within reach. Where such hazards exist within reach, they must be guarded. Figure (4) shows guarding of a chill roll rotary union.

FAILURE TO GUARD THIS AREA CAN RESULT IN SERIOUS PERSONAL INJURIES.

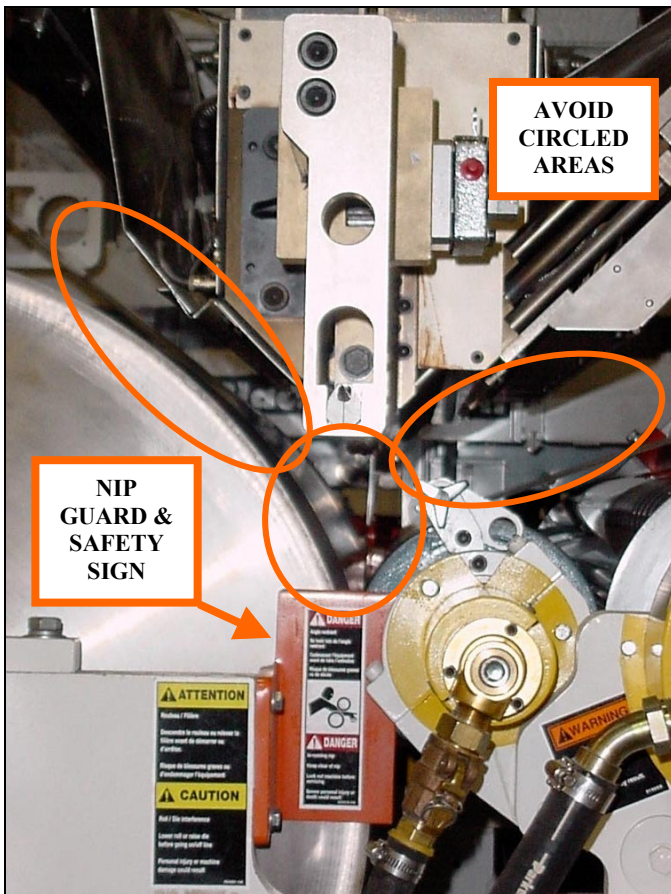


Figure (3) Die / Coater-Laminator Hazards



Figure (4) Rotary Union Guard



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WARNING DROOL REMOVAL

On occasion on older style extrusion dies, drool from the edge of the die will appear during normal operation. If the drool is allowed to drip into the nip it may damage or spoil the product. To prevent spoiling the product operators will manually remove the drool. This edge drool is hot. Operators must never remove drool by hand even with the hand protected by a glove. Always use a tool to protect the operator from the hot polymer and the in-going nip located below the extruder.

FAILURE TO USE A TOOL FOR EDGE DROOL REMOVAL COULD RESULT IN SERIOUS PERSONAL INJURY.

Figure (5) illustrates the use of a drool tool.

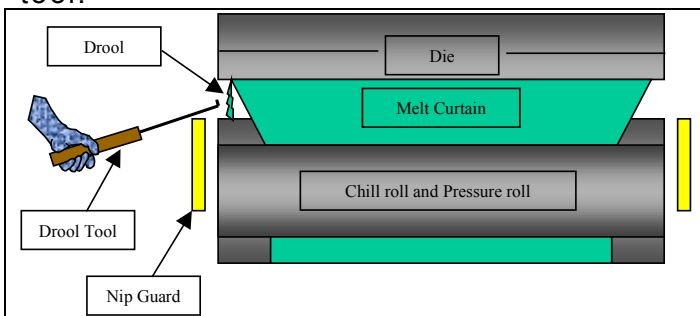


Figure (5) – Example use of a drool tool.

WARNING ROLL WRAP-UPS

In the event of a roll wrap-up, NEVER attempt to remove the wrap-up while the machine is running. When a wrap-up occurs, immediately shut the line down and back the extruders off line. On newer machines, the chill roll drive is provided with a reverse jog pushbutton to enable the operator to remove the wrap-up from outside the machine. If the operator must enter the machine to remove the wrap-up, open the nip and lock out the air supply and drive before attempting to remove the wrap-up. Use caution in removing the wrap-up so as not to damage the roll surfaces.

FAILURE TO FOLLOW THESE SAFETY RECOMMENDATIONS COULD RESULT IN SERIOUS PERSONAL INJURY OR MACHINE DAMAGE.

WARNING ROLL REPLACEMENT

Rolls may require replacement because of damage or because a product change requires a different surface feature. Before changing a roll, shut the line down, open the nips, and lock out the drive and control system. If the roll is a cooled roll, valve off the cooling supply and return. Use appropriate lifting equipment and proceed with caution. Do not remove your lockouts until all guards are securely in place and personnel in the area are clear.

FAILURE TO FOLLOW THESE SAFETY PROCEDURES COULD RESULT IN SERIOUS PERSONAL INJURY OR MACHINE DAMAGE.



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WARNING TEFLON BELT SYSTEM

Teflon belt systems are sometimes used to help prevent wrap-ups on the pressure roll from heavy edge bead. Before replacing a belt, shut the line down, open the nips, and lock out the drive and control. Do not remove your lockouts until the belt is securely in place and all personnel in the area are clear.

FAILURE TO FOLLOW THESE SAFETY PROCEDURES COULD RESULT IN SERIOUS PERSONAL INJURY.

WARNING INFRARED HEATER

Infrared heaters are used to help promote adhesion to some webs. The heating elements are very hot. Never place your hand at the point where the web passes under the heater. Do not expose yourself to the element side of the heater unless the power is locked out and the unit has cooled. Keep a fire extinguisher in the immediate area.

FAILURE TO FOLLOW THESE SAFETY PROCEDURES COULD RESULT IN SERIOUS PERSONAL INJURY OR PROPERTY DAMAGE.

DANGER HIGH TEMPERATURE

The melt curtain exiting the extruder is extremely hot and could be in the range of 600 degrees F. Keep clear of the polymer at all times even when off machine drooling. Even a slight draft is enough to blow

the melt curtain a few feet and onto any employee in the near vicinity.

FAILURE TO KEEP CLEAR OF THE EXTRUDED POLYMER WILL RESULT IN VERY SERIOUS BURNS TO THE BODY.

WARNING SLITTERS

Slitters are used to trim the edges of the product. Slitters are sharp by their very nature and must be guarded when not in use, avoided when in use, and handled with cut resistant gloves during replacement and sharpening.

FAILURE TO FOLLOW THESE SAFETY RECOMMENDATIONS COULD RESULT IN SERIOUS PERSONAL INJURY.

WARNING OZONE

Ozone generators are used to help promote adhesion to some webs by flooding the nip point with the invisible gas. Ozone in sufficient concentrations is known to cause headache, nausea, and may result in more serious breathing difficulties in cases of very high concentrations. Ozone use must be carefully monitored and any excess must be ducted out of the area. Ozone generators must be interlocked to prevent operation if the exhaust system is off or off line.

FAILURE TO PROVIDE INTERLOCKS AND TO FOLLOW THESE SAFETY RECOMMENDATIONS COULD RESULT IN PERSONAL INJURY.



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WARNING INSERTING SLIP SHEETS

To check for the extruded polymer coat weight or adhesion, operators have been known to insert a "slip sheet" by hand at the in-going nip below the extruder as illustrated in figure (6). **This is a dangerous practice and must be discontinued.**

The slip sheet must be attached to a new product roll at the unwind prior to splicing. If this is impractical operators must use a tool for inserting the "slip sheet".

FAILURE TO FOLLOW THESE SAFETY RULES COULD RESULT IN SERIOUS PERSONAL INJURY.

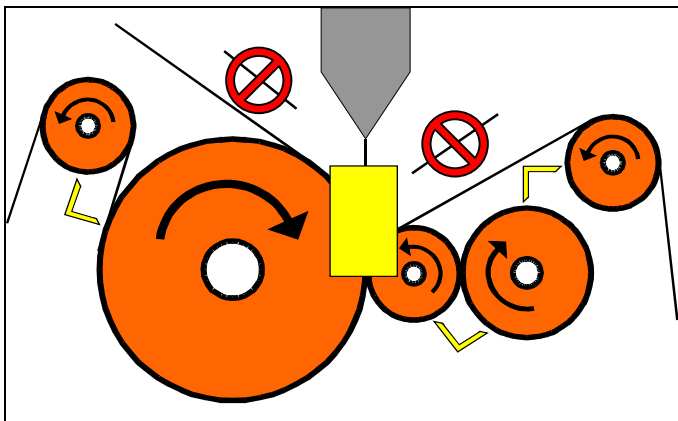


Figure (6) – Do not insert slip-sheets in the area indicated.

WARNING CARRIAGE RETRACTION

The extruder(s) and die are usually mounted on a carriage base that can be retracted to an off line position for die cleaning, threading up, or for other purposes. These carriages must be provided with pre-motion and motion alarms, audible and visual, as well as a stop cord on each end to minimize the risk of injury to unseen persons. Exposed wheel to track nip points must be guarded for both directions of travel. Personnel must stay clear of moving carriages.

FAILURE TO STAY CLEAR OF MOVING CARRIAGES AND TO PROVIDE ALARMS, STOP CORDS, AND GUARDS COULD RESULT IN SERIOUS PERSONAL INJURY.

WARNING DRAW-DOWN ADJUSTMENT

The relationship between the die and the chill roll is adjustable for optimum performance and to minimize the risk of machine damage when going on and off line. Operators must ensure that personnel are clear before making adjustments. Safety signs and orange color-coded components must be provided to warn of immediate hazards, such as crushing between the moving component and the stops, frame, floor, or other non-moving component.

FAILURE TO HEED THE WARNINGS COULD RESULT IN SERIOUS PERSONAL INJURY.



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DANGER HIGH VOLTAGE

Extrusion coating - laminating stations are powered by electric drives and controlled by electrical and electronic devices. These drives and controls must be properly grounded and all wiring checked periodically for loosening or damage and replaced if necessary. LOCK OUT POWER BEFORE servicing any electrical device, motor, or cabinet.

In some instances it may be necessary to troubleshoot inside a drive or control cabinet with the power on. Only QUALIFIED PERSONNEL trained to work with the power on should be allowed to bypass lockouts for troubleshooting purposes.

FAILURE TO FOLLOW THESE RECOMMENDATIONS WILL RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

WARNING LOCKOUT TAGOUT

All personnel must be trained in the proper procedures for lockout. Refer to OSHA Subpart J 1910.147. Lockout and tagout devices must identify the employee applying the device.

All drives must be de-energized and locked out, all controls must be locked out, and all systems de-energized before performing any work on the equipment by any personnel.

Where programmable logic controllers (PLCs) are being worked on, disable and lock out all output functions. Test all logic changes under controlled conditions. Do not make changes without first consulting

Black Clawson Converting Machinery, Inc. since even simple changes may create a hazard.

After maintenance is completed, replace all guards that were removed and ensure that no unsafe condition exists and that all personnel are clear of the equipment before removing the lockouts and activating the controls.

FAILURE TO FOLLOW THESE PROCEDURES MAY RESULT IN SERIOUS PERSONAL INJURY OR DEATH.

WARNING ROTATING SHAFTS

All power transmission equipment such as shafts, couplings, gears, pulleys, belts, etc. must be guarded in accordance with OSHA Regulation Subpart O 1910.212 & 219

Never wear loose clothing near rotating power transmission components. Long hair should be up and covered with a hat.

WARNING POLYMER FUMES

As the melt curtain flows from the die to the nip it gives off fumes. These fumes in sufficient concentrations are known to cause eye and skin irritation and, depending upon the type of polymer, may cause more serious breathing difficulties. Consult the MSDS for the polymer being used to determine the optimum processing temperature and safety measures to follow. Keep the fume removal system operating whenever the melt curtain is present.

FAILURE TO FOLLOW THESE SAFETY RECOMMENDATIONS COULD RESULT IN PERSONAL INJURY.



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WARNING THREADING

All nips must be open and the machine stopped before threading is started. With the base product threaded through to the coater – laminator, attach it to the chill roll with a magnet or tape and jog the chill roll drive until the base product is brought past the stripper roll. Remove the magnet or tape and thread the base product through to the winder. If laminating, the laminate web can then be threaded, with the nips open and the machine stopped, to the chill roll and attached to the base product with tape. When this is complete and all personnel are clear, the nips can be closed, the line started, and the extruder(s) brought on line. Once the melt curtain is fully established and the product meets specifications, a roll change at the winder can be made and the off specification material can be disposed of.

OPEN ALL NIPS AND STOP THE DRIVE BEFORE THREADING THE PRODUCT THROUGH THE MACHINE. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS COULD RESULT IN SERIOUS PERSONAL INJURY.

WARNING EMERGENCY STOPS

Extrusion Laminators must be equipped with devices that will stop the machine quickly in an emergency. These emergency stops must be located so any person working on the machine can quickly disconnect the machine section, or the entire machine from the source of power in case of an emergency.

Emergency stop devices shall be red. Stop buttons shall have a yellow background.

Emergency stop devices should be tested periodically to make certain they are operational at all times.

Emergency stops are not safety devices that can prevent an accident and must never be used as an operational tool.

All employees must be made aware of the emergency stops in their work area as part of their safety training.

WARNING MAINTENANCE

Review the following safety rules before performing maintenance on the equipment.

- Lock out all drives and controls before working on the machinery.
- All non-operating personnel are to be out of the area before activating drives and operating controls. Mirrors should be used to provide the operator with a view of the drive side area.
- Inspect slings and cables for worn or weak spots before using them. Keep all personnel out from under machine components when lifting. Do not allow chains or other lifting devices to hang in the aisles.
- Do not walk under machinery, rolls, or other items being transported by overhead crane equipment.



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WARNING MAINTENANCE - CONTINUED

- Do not depend upon hydraulic or pneumatic devices to hold equipment in a raised position while performing maintenance. Pin, chain, or block in a raised position.
- Inspect chains and clevis pins at frequent intervals for wear and damage. Block under or around units raised by chains when performing maintenance to prevent injury to personnel.
- Attach the sling securely when attempting to lift machine components. Rotation of out-of-balanced pieces could be hazardous.
- Release pressure from hydraulic and pneumatic systems and lines before disassembly. Fluids and gases under pressure can be dangerous to personnel in the area.
- Lock out all power before changing out knife blades. Use protective gloves.
- Cover roll surfaces to prevent damage before removing them from the machine and keep them covered during transport and storage.
- Be sure that all slings and cables are designed to lift the loads taking into consideration the angles of the hookup and the load to be lifted.
- Use lifting points as specified by manufacturers. Where provisions have been made for lifting eyes to be screwed into a tapped hole, make certain that eyebolt is tightened to the shoulder and that eye is parallel to the lifting plane to prevent breakage.
- Personal articles are not to be stored in electrical switch boxes, panels, or in other potentially hazardous places.

- All drain covers and barricades must be replaced over and around openings before returning function to operation.
- Safety interlocks must be checked for proper operation as part of regular maintenance schedules.

WARNING OPERATION

Review the following safety rules before operating the extrusion coater - laminator.

- Do not remove or cover warning signs. They are installed to warn personnel of possible danger. Observe all instructions given on the signs.
- Observe all color-coding. **ORANGE:** This color indicates hazards on the machine, which might cause personal injury, and to be avoided during operation. **YELLOW:** This color indicates caution and is used for marking physical hazards such as falling and tripping, etc. Examples would be fixed guards, crosswalks and steps.
- Footwalks, handrails, barriers, and guards must be in place before starting the machine.
- Do not over-reach, climb, or stand on places other than properly designed and designated ladders, steps, or walkways.
- Aisles must be clean and clear of obstructions. Wipe up spilled oil, grease and water. Good housekeeping prevents injuries.



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WARNING OPERATION - CONTINUED

- Keep clothing and all parts of the body away from in-running nips, traveling belts, gears, ropes, and rotating or pivoting loading mechanisms.
- Beware of head-high obstacles in and around the machinery area. Wear proper head protection when indicated.
- Exhaust blasts from air motors may blow dirt, scale, or other foreign materials into eyes causing eye injury. Wear proper eye protection.
- Keep all parts of the body away from rotating drive components.
- Any in-running nip point on converting machinery is a hazard. Keep clothing and all parts of the body away at all times. And especially do not wear loose clothing that could become entangled in the roll nips.
- Do not operate equipment until all personnel are accounted for and outside of safety lines.
- Guards should be provided for all exposed bolts or nuts on rotating equipment. Rotating bolts or nuts may catch clothing or loose web. Use caution in these areas while the machine is running. Never climb between guards and moving machinery.
- Keep hands away from belt and chain drives. Make certain that all guards on drive components are in place.
- When threading machinery, feet must be squarely and properly placed for adequate balance.

WARNING UNSAFE PRACTICES

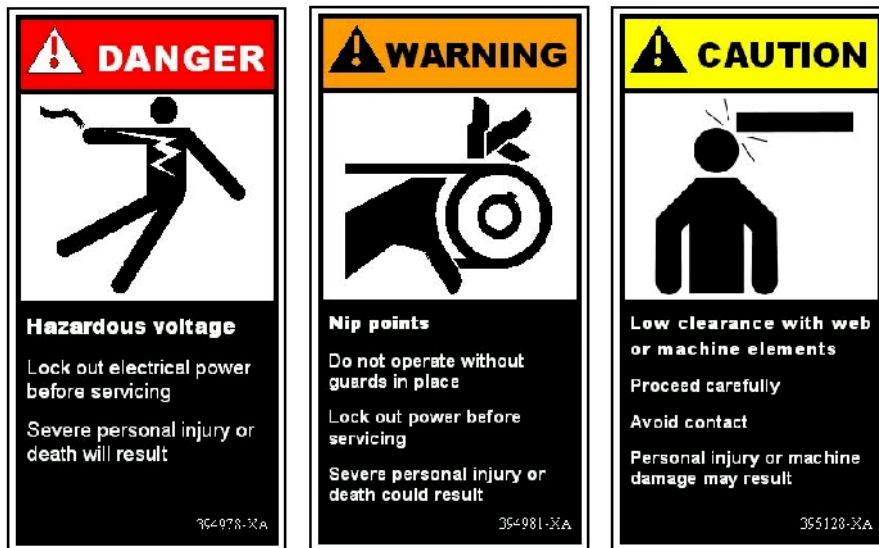
To avoid injuries, operators and other personnel should be aware of and avoid the following:

- Unguarded in-running nip points.
- Unguarded wrap points.
- Unguarded pinch or crushing points.
- Unguarded rotating machinery.
- Unguarded moving members.
- Unguarded slitters.
- Inadequate barriers.
- Moving parts and parts capable of moving.
- Improper handling of trim or web during a break.
- Improper threading of machine.
- Failure to ensure the area is clear of personnel before starting the machine.
- Failure to lock-out and de-energize when working on or repairing the equipment.
- Inadequate lighting or safety signs.
- Removal of handrails and guarding.
- Improper use of footwalks, crosswalks, access steps, ladders, etc.
- Poor maintenance of hoist equipment.
- Poor housekeeping, failure to keep working and traffic areas free of scrap and other slipping or tripping hazards.
- Improper handling of chemicals.
- Failure to read, understand, and follow the instructions.



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Safety Signs



Typical Product Safety Signs

INTRODUCTION

Operators of Black Clawson machinery, where practical and appropriate, may be protected from certain hazards by a physical barrier and may in addition, be warned of those hazards by the placement of Safety Signs. These signs alert persons to the degree or level of the hazard, the nature of the hazard, to how the hazard can be avoided, and the consequences of involvement with the hazard.

Black Clawson Converting Machinery, Inc. has developed specific Safety Signs for this purpose and should be consulted for the applicable Safety Signs and warnings for your Black Clawson machinery. The above signs are examples of Black Clawson Converting Machinery, Inc. product safety signs. Other signs are available to

alert operators to specific hazards. A list of many of the currently available safety signs appears at the end of this section.

SIGNAL WORDS

Color coding for the applicable signal word DANGER, WARNING, and CAUTION is important for the identification of the hazard level.

DANGER

White letters with red background indicate an immediate hazard that if not avoided **WILL** result in death or serious injury



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WARNING

Black letters with orange background indicate a potential hazard that if not avoided **COULD** result in death or serious injury.

CAUTION

Black Letters with yellow background indicate a potential hazard that if not avoided **MAY** result in minor or moderate injury. It is also used to alert against unsafe practices and/or property damage.

SAFETY INSTRUCTION

White letters with green background is used to convey information relative to safe work practices and procedures.

NOTICE

White letters with blue background is used to convey information that may be indirectly related to the safety of personnel or the protection of property.

The above definitions were taken from the **ANSI** Standard series Z535. These Standards must be referred to when designing Safety Signs and Labels.

DUAL LANGUAGE

The ANSI Z534.4 Product Safety Sign and Label standard provides a suggested format for multi-lingual safety signs. International and European Union standards require safety signs to be in the official language of the country in which the machine is to be used.

Black Clawson Converting Machinery, Inc. has a number of ANSI format, dual language, safety signs for use in countries where English is not the official language.



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AVAILABLE SAFETY SIGNS

The following safety signs are available for your Black Clawson machine. Other safety signs may be available, including dual language. Signs can be made for situations not covered by those listed below. Contact Black Clawson Converting Machinery,

Inc. for additional information on availability, sizes, material, and placement.

Safety signs are never to be used in lieu of guarding where guarding is feasible.

PART #	HAZARD	PART #	HAZARD
380008	Confined space.	395071	General safety instructions
391899	50 Lb. Weight limit	395073	Personal protective equipment
362051	ISO electrical symbol	395074	Airborne contamination
394978	Hazardous voltage	395085	Static electricity
394979	Roll to roll nip	395107	Gear nip
394981	Belt or chain nip	395114	Equipment above
394982	Pinch point	395115	Hot surface area
394983	Automatic movement	395126	Imminent machine movement
394985	Rotating equipment	395128	Low clearance
394987	Hazardous area	395129	Hot fluids
394990	Shear and crushing point	395132	Radiation
394993	Web edges and wrap points	395138	Electrical grounding
394994	Fixed member nip	395139	Hot water or steam
395027	Web and rolls may be hot	395143	Do not remove guard
395028	Multiple electrical sources	395149	Guard removed
395029	Unexpected machine motion		



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Reference Information

All machine operators, maintenance and supervisory personnel should read and understand not only the selected OSHA sections listed, but also all applicable OSHA codes pertaining to their job duties and functions.

OSHA and ANSI standards are updated periodically and the section numbers may change. The following references are correct at the time of printing. Owners of machines should be aware of the most recent standards applicable to their machine.

OSHA REGULATIONS

The following list of regulations from OSHA CFR 29, Section 1910 is for your reference. OSHA regulations are available on line at www.osha.gov.

Subpart G – Occupational Health
§95 – Noise exposure

Subpart I – Personal Protective Equipment
§133 – Eye and face protection
§134 – Respiratory protection

Subpart J – General Environmental Controls
§146 – Confined Space
§147 – Lockout Tagout.

Subpart N – Material Handling
§179 – Overhead cranes

Subpart O – Machinery & Machine Guarding
§212 – General requirements
§219 – Power transmission

Subpart R – Special Industries
§261 Pulp Paper and Board Mills.
(a) General Requirements
(b) Safe Practices
(k) Machine Room
(i) Finishing Room

Subpart S – Electrical
§303 – General requirements

ANSI STANDARDS

The American National Standards Institute publishes several consensus standards of interest to machinery users.

B151.2 – Film Casting Machines
B151.3 – Screen Changers
B151.5 – Film and Sheet Winding Machinery
B151.7 – Extrusion Machinery
Z534.4 – Safety Signs and Labels



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NATIONAL & INTERNATIONAL STANDARDS

The International Standards Organization (ISO) and the International Electrotechnical Commission (IEC) lists many standards of interest as does the European Union whose standards are nearly identical. In addition, many countries promulgate their own standards. A source for many of these can be found at www.global.ihs.com.

INSTRUCTION MANUALS

It is essential that operators be thoroughly trained in extrusion coating – laminating safety and the procedures applicable to the process in which they are involved.

Black Clawson Converting Machinery, Inc. provides instruction manuals with all machine orders. All operators should read and understand the information in these manuals before operating the machine.

LACK OF PROPER TRAINING AND UNDERSTANDING CAN BE A MAJOR CAUSE OF SERIOUS PERSONAL INJURY.

IMPORTANT INFORMATION

For help with guarding or on how to safely operate your Black Clawson coating – laminating machine, contact:

Black Clawson Converting Machinery, Inc.
46 North First Street
Fulton, NY 13069, USA
Telephone – (315) 593 0305

Please locate the serial number plate on the machine in question and write down the Black Clawson order number and serial number, if any. This will greatly expedite locating information on your specific machine.

BC Order No.

Serial No.
