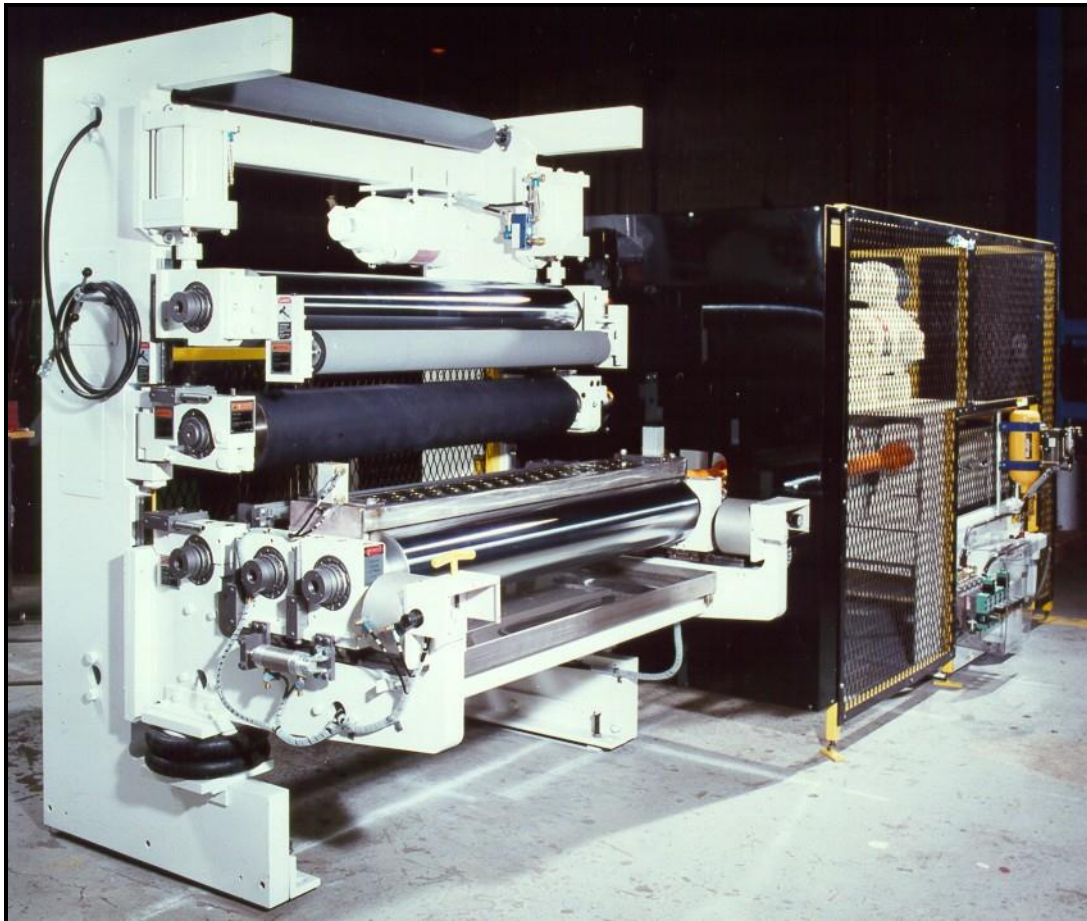




**SAFETY**

**INFORMATION**

# **Solution Coater Safety**



*Figure (1) – Five Roll Coater*



# SAFETY INFORMATION

## INTRODUCTION

The purpose of a coater is to apply a uniform coat weight of slippery or sticky liquid to paper, paperboard and to non-paper products such as film or other plastic type material.

The method of applying the coating is dependent on the product being coated. In roll coaters, the coater can be comprised of only one roll that picks up coating from the coating pan and transfers it to the product, or it can be comprised of multiple rolls that pick up, meter, and control the coat weight to the product. Some coaters use coating heads or blade applications to apply and control the coat weight to the product. See Figure (1) for a Five Roll Coater.

It is not the intention of this bulletin to describe every conceivable type of solution coater that is available, but to give general guidelines for safe operation and warn of potential hazards.

## WARNING HAZARDOUS FOOTING

The presence of coating creates hazardous footing for operators and other personnel working around the coating station. Cleanliness and care in handling the coating is paramount. Continuous training must be given to coating personnel to instill positive safety conscious work habits around the coater. Operating procedures must be continually assessed to ensure operator safety and to eliminate potentially unsafe conditions.

## WARNING NIP POINTS

Nip barrier guards must be installed where practical. Operators must never touch the coater rolls or attempt to remove anything from the rolls, or clean the rolls while in operation.

**KEEP CLEAR OF COATER IN-RUNNING NIPS. NEVER TOUCH ROTATING COATER ROLLS WHILE IN OPERATION. FAILURE TO HEED THIS WARNING COULD RESULT IN SERIOUS HAND OR BODY INJURIES.**

## WARNING THREADING

Turn the drive off and open all nips before threading the tail or leader through the coater. Current accepted practice is to open nips a minimum of 4 inches.

**FAILURE TO FOLLOW THESE INSTRUCTIONS MAY RESULT IN SEVERE PERSONAL INJURY.**

## WARNING LIGHTING

Proper lighting of the web before and after the coating station is extremely important to the observation of the coated product. Operators approaching the web path for inspection must be warned of the potential hazards and must work cautiously.



# SAFETY

# INFORMATION

## WARNING CLEANING ROLLS

There are many configurations of roll coaters that range from single roll to five or more rolls. For this reason the instructions for cleaning are generic.

Operators must be thoroughly trained and be aware of the hazards of cleaning coater rolls. Stop the drive and open all nips before cleaning. It is recommended that rolls be cleaned one at a time. Engage only the drive for the roll to be cleaned and use a soft pad to clean the roll as it is slowly rotated using jog or thread speed. It is recommended that control of the rotating roll be done by the person cleaning the roll using a hand held hold to run switch. If your particular operation does not allow this, it is recommended that a second operator stand by the control panel to engage the E-stop in an emergency. Do not clean with all rolls rotating. Do not use loose rags to clean rolls. Always clean on outgoing side of the nip. Special care must be taken on coaters with more than two rolls, as either the roll above or below the out-going nip will create an in-running nip.

Due to the nature of some coatings it may be impractical to install nip guards as the coating will hang up on the guard and damage the product. **If any nip guards are removed during the cleaning process, they must be replaced before restarting the coater.**

**CLEANING ROLLS IN A CONTINUOUSLY ROTATING MODE CAN BE HAZARDOUS. FAILURE TO FOLLOW THESE INSTRUCTIONS OR THE INSTRUCTIONS FOR YOUR PARTICULAR COATER CAN RESULT IN SERIOUS HAND OR BODY INJURIES.**

## WARNING RISK OF EXPLOSION

Coatings containing solvents other than water must be stored and handled in accordance with the manufacturer's recommendations. Further, equipment utilized within the NFPA designated danger zone must meet explosion proof standards. See Figure (2) for a coater enclosure used to control the solvent area.

**FAILURE TO FOLLOW THESE RECOMMENDATIONS CAN LEAD TO SEVERE PERSONAL INJURY, DEATH, AND/OR PROPERTY DAMAGE.**

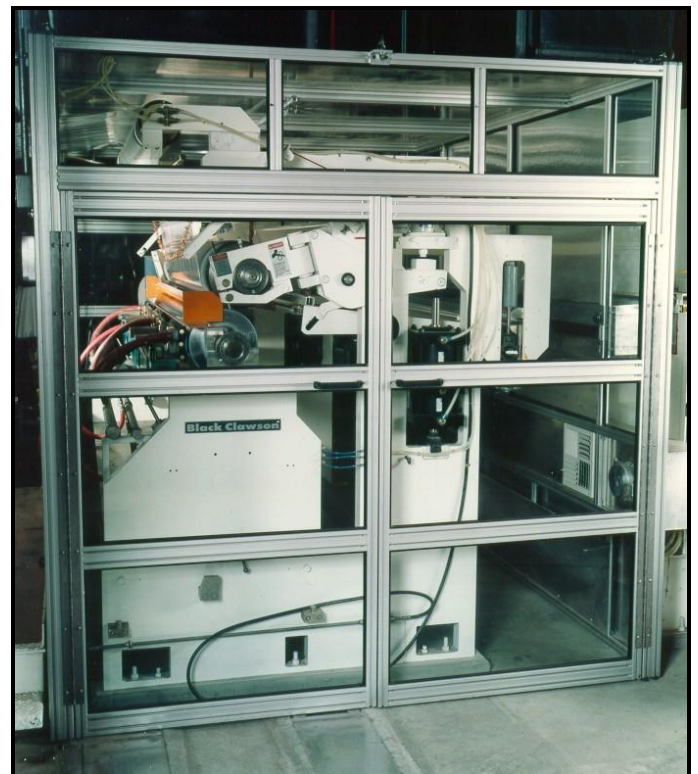


Figure (2) – Coater Enclosure



# SAFETY INFORMATION

## WARNING ROTATING ROLLS

It may not be practical to completely guard the roll nips using a typical nip guard for process reasons. In these cases, install adequate barriers to prevent accidental contact with the rotating rolls. Add safety signs that warn and remind personnel of potential coater hazards. Refer to Figure (3).



Figure (3) – Gravure Coater

## WARNING COATING HEADS & BLADES

Caution should be exercised at all times when working in the area of the coater head. Coater blades are extremely sharp. A blade guard should be placed on the blade to prevent accidental contact during clean up. Controls must be locked out to prevent movement of the blade head while servicing.

## WARNING HIGH TEMPERATURE DIE HEADS

Some solution coaters use a die to apply the coating directly to the product or on to a back-up roll. These coatings can be very hot. If the back-up roll is used, the back-up roll will also be heated and the die will create a nip between it and the back-up roll. Operators must be warned of these potential hazards with appropriate warning signs and be given adequate instruction on how to avoid the hazards.

**FAILURE TO HEED THESE WARNINGS AND FOLLOW INSTRUCTIONS CAN RESULT IN SERIOUS BURNS TO THE BODY OR OTHER PERSONAL INJURY.**

## WARNING ROTATING UNIVERSAL 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.

Coater rolls are commonly driven with universal shafts in order to provide the range of motion needed for various operating conditions of the rolls. See Figure (4).

**Never wear loose clothing near rotating power transmission components. Cover up long hair with proper head covering.**

**FAILURE TO GUARD THESE DRIVE COMPONENTS AND FOLLOW THESE RECOMMENDATIONS MAY RESULT IN SEVERE PERSONAL INJURY.**



# SAFETY INFORMATION



Figure (4) – Universal Shaft Guarding

## DANGER HIGH VOLTAGE

The solution coater is 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 MAY 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 Davis-Standard, LLC 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.**



# SAFETY

# INFORMATION

## WARNING EMERGENCY STOPS

The solution coater 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 and emergency stop pushbuttons 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 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.
- Failure to keep working area clear of waste and other tripping hazards.
- Failure to properly lock out controls and drives during maintenance operations.
- Static electricity build-up.
- Improper use of handrails and footwalks.
- Inadequate barriers and/or guardrails.
- Standing on barriers and/or guardrails.
- Improper threading.
- Inadequate lighting or safety signs.
- Failure to read, understand, or follow the machine instructions.
- Improper handling of solvents and/or chemicals.
- Failure to keep hands clear of in-running nip points.
- Touching coater rolls while running.
- Never use loose rags to clean rolls.



# SAFETY

# INFORMATION

## WARNING OPERATION

Review the following safety rules before operating the solution coater.

- Do not remove or cover warning signs. They are installed to warn personnel of possible hazards. Observe all instructions on the signs.
- Observe all color coding.

ORANGE: This color indicates hazards on the machine which might cause personal injury and are 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, cross walks 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, coatings, and unnecessary water. Good housekeeping prevents injuries.
- Keep clothing and all parts of the body away from in-going nips, traveling belts, ropes, and rotating or pivoting loading mechanisms.
- Beware of head-high obstacles in and around the machine area. Wear proper head protection where indicated.
- Exhaust blasts from air motors may blow dirt, scale, or other foreign materials into eyes causing eye injury. Wear proper eye protection when indicated.

- Keep all parts of the body away from drives and rotating equipment.
- Do not walk or crawl under operating equipment.
- Any nip point on machinery is a hazard area. Keep clothing and all parts of the body away at all times. And especially do not wear loose clothing that could become entangled in roll nips.
- Do not operate equipment until all personnel are accounted for and outside of machine safety lines.
- Guards should be provided for all exposed head bolts on rolls. Rotating nuts or cap-screws on roll heads may catch clothing. Use caution in these areas while the machine is running.
- Never climb between guards and moving machinery.
- When threading machinery, feet must be squarely and properly placed for adequate balance.
- Keep hands away from belt and chain drives. Make certain that all guards on drive components are in place.
- Never thread to an in-running nip by hand.



# SAFETY

# INFORMATION

## WARNING MAINTENANCE

Review the following safety rules before performing maintenance on the solution coater.

- Lock out all drives and controls before working on machinery.
- All non-operating personnel are to be out of the machine 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 from under machine components when lifting. Use lifting points specified by manufacturer. 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.
- Do not depend on 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 and around units raised by chains when performing maintenance to prevent injury to personnel.
- Tie sling securely when attempting to lift machine components. Rotation of out of balanced pieces could be hazardous.
- Release pressure from oil and air lines before disassembly. Oil and air under pressure can be dangerous to personnel in the area.
- 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 the 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 the 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 must be replaced over and around openings before returning to operating function.
- Safety interlocks must be checked for proper operation as part of regular maintenance schedules.





# SAFETY INFORMATION

## Safety Signs

### INTRODUCTION

Operators of Davis-Standard, LLC 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.

The following examples illustrate the ANSI Z535 standard series format for product safety signs and labels. These standards must be referred to when designing safety signs and labels. Not all safety signs will have a pictorial panel.

Color-coding for the words DANGER, WARNING, CAUTION, and SAFETY INSTRUCTION is important for the identification of the hazard level.



**DANGER** – (white letters with a red background) indicates an immediate hazard that if not avoided **WILL** result in death or serious injury. This should be limited to the most extreme situations.



**WARNING** – (black letters with an orange background) indicates a potential hazard that if not avoided **COULD** result in death or serious injury.



**CAUTION** – (black letters with a yellow background) indicates a potential hazard that if not avoided **MAY** result in minor or moderate injury.



**SAFETY INSTRUCTION** – (white letters with a green background) is used to convey multiple messages stating procedures or actions that must be followed for the safe operation of the product.



# SAFETY INFORMATION

## AVAILABLE SAFETY SIGNS

The following safety signs are available for your Davis-Standard, LLC machine. Other safety signs may be available, including dual language. Signs can be provided for situations not covered by those listed below.

<b><u>PART #</u></b>	<b><u>HAZARD</u></b>
424656	Confined space
424650	Hazardous voltage
424632	Roll to roll nip
424645	Belt or chain nip
424661	Pinch point
424653	Automatic movement
424647	Rotating equipment
424692	Hazardous area
424663	Shear and crushing point
424670	Web edges and wrap points
424638	Fixed member nip
424651	Multiple electrical sources
424672	Unexpected machine motion

Contact Davis-Standard, LLC for additional information on availability, sizes, material, and placement.

**SAFETY SIGNS ARE NEVER TO BE USED IN LIEU OF GUARDING WHERE GUARDING IS FEASIBLE.**

<b><u>PART #</u></b>	<b><u>HAZARD</u></b>
424743	General safety instructions
424655	Airborne contamination
424699	Static electricity
424646	Gear nip
424668	Equipment above
424687	Hot surface area
424667	Low clearance
424708	Hot fluids
424700	Radiation
424652	Electrical grounding
424686	Hot water or steam
424649	Do not remove guard/Guard removed



# SAFETY INFORMATION

## 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.

### **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

### **Subpart S** — Electrical

- §303 - General requirements

### 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](http://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

### ANSI STANDARDS

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

### **Z535.4** – Safety Signs and Labels

### NATIONAL & INTERNATIONAL STANDARDS

The International Standards Organization (ISO) and the International Electrotechnical Commission (IEC) list 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](http://www.global.ihs.com).



# SAFETY

# INFORMATION

## INSTRUCTION MANUALS

It is essential that operators be thoroughly trained in solution coater safety and the procedures applicable to the process in which they are involved.

Davis-Standard, LLC 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 on how to safely operate your Davis-Standard, LLC Solution Coaters or for such assistance or help with guarding solution coaters manufactured prior to March 15, 2003 by The Black Clawson Company or Black Clawson Converting Machinery LLC or any solution coaters manufactured by Black Clawson Converting Machinery, Inc. or Egan Machinery, contact:**

Davis-Standard, LLC  
46 North First Street  
Fulton, NY 13069, USA  
Telephone – (315) 598 7121

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

Solution Coating Safety Bulletin  
No. DSLLC BUL. 2-05/07  
Davis-Standard, LLC  
46 North First Street  
Fulton, NY 13069  
Ph. (315) 598 7121

This and other safety bulletins may also be found on-line at:

<http://www.davis-standard.com/safety-bulletins>