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SAFETY REGULATION

no. 8



*Relating to the
Safeguarding of*

MACHINERY

with

ROLLS

used in the

Plastic & Rubber Industries.

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N.J. DEPARTMENT OF LABOR & INDUSTRY
Trenton, N.J.

Division of Labor

This Safety Regulation No. 8 supersedes the following:

*“Rules and Regulations Governing Machinery
with Rolls of the Type Used in the Plastic and
Rubber Industries” which was filed with the
Secretary of State on October 29, 1953.*

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FOREWORD

This Regulation establishes reasonable standards for the safeguarding of machinery with rolls of type used in the plastic and rubber industries. This Regulation is a revision of rules and regulations on the same subject prepared by a special committee appointed by the Commissioner of Labor and Industry in 1952. In the preparation of the original rules and regulations this special committee was guided by the publications of the Association of Mutual Casualty Companies and the American Standards Association.

It is recognized that exposure to workers may occur in the use of machinery with rolls other than the types used in the rubber and plastic industries. Standards for safeguarding machinery with rolls other than the types covered by this Regulation are being prepared. Upon completion they will be incorporated in a revised Safety Regulation No. 8 which will relate to machinery using rolls of any type.

This Regulation is promulgated by the Commissioner of Labor and Industry of the State of New Jersey under authority vested in him by law:

R. S. 34:1-20. The Commissioner may make and publish rules and regulations not inconsistent with law as he shall deem necessary to enforce the provisions of this title.

Whenever any condition is found to exist in contravention of any provision of this title, the commissioner may by written order signed by him specifying the things to be done and the time for compliance require such conditions to be corrected.

The provisions of Title 34 which refer to the subject matter regulated are:

34:6-62. MACHINE GUARDS. The owner or person in charge of any factory, workshop, mill or place where the manufacture of goods is carried on where machinery is used, shall provide in the discretion of the commissioner, friction clutches for stopping shafting, and belt shifters or other mechanical contrivances for the purpose of throwing on or off belts or pulleys. Whenever practicable, all machinery shall be provided with loose pulleys. All vats, pans, saws, planers, power presses, cogs, gearing, belting, shafting, set screws, drums and machinery of every description shall be properly guarded. No person shall remove or make ineffective any safeguard around or attached to such machinery, vats, or pans while the same are in use, unless for the purpose of immediately making repairs thereto, and all such safeguards so removed shall be promptly replaced. If the machinery, or any part thereof, or any vat, pan or vessel containing molten metal

or hot liquid is in a dangerous condition or is not properly guarded, the use thereof may be prohibited by the commissioner, and a notice to that effect shall be attached thereto. Such notice shall not be removed until the machinery is made safe and the required safeguards are provided. In the meantime such unsafe or dangerous machinery, vats, pans, or vessels containing molten metal or liquid shall not be used...

Prior to its promulgation, this Regulation was revised and approved by the New Jersey State Industrial Safety Committee.

SECTION 1 - PURPOSE AND SCOPE

- 1.1 **PURPOSE.** The purpose of this Regulation is to establish reasonable safeguards against injury to workers who use or may come in proximity to machinery coming within the scope of this Regulation.
- 1.2 **SCOPE.** This Regulation applies to machinery with rolls of the types used in the plastic and rubber industries when such machinery is used in any factory, workshop, mill or place where the manufacture of goods is carried on.
- 1.3 **EXCEPTIONS.** In cases of practical difficulty or unnecessary hardship, the Commissioner may grant exceptions from this Regulation provided that a request for such exception has been made in writing. Exceptions can only be granted when it is clearly evident that a satisfactory, safe and sanitary condition is attained, but cannot be granted in any case where conflict would be created with mandatory requirements of the law.

SECTION 2 - DEFINITIONS

2.1 General Definitions

- 2.1.1 **Approved** - approved by the Commissioner.
- 2.1.2 **Commissioner** - the Commissioner of Labor and Industry or his authorized representative.

2.2 Special Definitions

- 2.2.1 **Inrunning Rolls** - shall mean a set of two or more adjacent rolls which revolve in opposite directions and that have a nip or pinch zone.
- 2.2.2 **Horizontal Inrunning Rolls** - rolls with horizontal axes at approximately the same height.
- 2.2.3 **Vertical Inrunning Rolls** - rolls with horizontal axes one above the other.
- 2.2.4 **Mills** - shall mean a machine with two horizontal inrunning rolls.
- 2.2.5 **Calender** - shall mean a machine with two horizontal inrunning rolls.
- 2.2.6 **Safety Tripping Devices** - shall mean a device located so as to be easily accessible to the operator and connected to the controls of the machine for stopping purposes.

- 2.2.7 **Nip or Pinch Zone** - shall be that zone in which there is danger of any part of the operator's body being drawn into the rolls or between the stock and roll, or between a roll and an adjacent object.
- 2.2.8 **Emergency Stopping Device** - a device to bring the machine to a quick stop in order to avoid or minimize injury.
- 2.2.9 **Barrier Guard** - a device that will protect an operator from exposure to a nip or pinch zone.
- 2.2.10 **Slow Speed** - shall mean a roll speed such that the roll can be stopped within a distance of 24 inches or less, as measured on the surface of the roll.
- 2.2.11 **High Speed** - shall mean a roll speed such that the roll cannot be stopped within 24 inches or less, as measured on the surface of the roll.
- 2.2.12 **Exposure** - as used herein means the physical possibility of a man getting one or more fingers or other parts of the body into the nip or pinch zone.
- 2.2.13 **Cold Rolls** - any one or more rolls where the highest surface temperature of the roll does not exceed 150° F.
- 2.2.14 **Hot Rolls** - roll or rolls having a surface operating temperature in excess of 150° F. Where a hot and cold roll run together, it is necessary to consider the pair as "hot rolls", since the hot roll determines the extent of the potential hazard.
- 2.2.15 **Continuous Automatic Reversing** - is that arrangement whereby the rolls start turning in the opposite direction after coming to zero speed upon application of the braking device; and such reverse rotation continues indefinitely until stopped by actuation of the "stop" button control.
- 2.2.16 **Automatic Limited Reversing** - is that arrangement whereby the braking action on a roll is followed by opposite rotation for a predetermined and preset distance only, which setting is made through a timer.

SECTION 3 - GENERAL REQUIREMENTS

- 3.1 **Compliance.** All machinery subject to this Regulation shall be made reasonably safe and shall conform to all applicable requirements contained herein.
- 3.2 **Power Guarding.** All gears, belts, shafts and couplings shall have safeguards in accordance with the requirements of Safety Regulation No. 4 relating to the Safeguarding of Mechanical Power Transmission Apparatus.

3.3 **Working Areas.** All working areas must be easily accessible and have level flooring free from slipping and tripping hazards.

3.4 **Clearance.** Clearance must be maintained between units to permit movement of transportation equipment and freedom of movement of operators.

3.5 **Roll Guard.** All rolls where nip or pinch zone exists shall be protected by isolation or by barrier guarding as provided in Section 3.6, except in those cases where workers must have access to work on the rolls and where guards are impracticable; in such cases mills and calenders shall be equipped with emergency stopping devices in accordance with Section 4.3, and other machinery employing rolls shall be suitably protected as the conditions may require.

3.6 Barrier Guarding

3.6.1 All rolls provided with barrier guards as herein specified to eliminate exposure do not require emergency stopping devices.

3.6.2 Solid and unpierced guards or guards with openings or clearance not more than one quarter (1/4) inches may be used as close to the nip or pinch zone as desired.

3.6.3 Guards with openings or clearance for visibility, stock feed or other uses shall be installed in accordance with the following distances from the nip or pinch zone as defined in Section 2.

MAXIMUM BARRIER OPENING
IN INCHES

MINIMUM DISTANCE FROM
PINCH ZONE IN INCHES

3/8

1 1/2

1/2

2 1/2

5/8

3 1/2

3/4

5 1/2

7/8

6 1/2

1 1/4

7 1/2

1 1/2

12 1/2

1 7/8

15 1/2

2 1/8

17 1/2

More than 2 1/8

30

Maximum opening 6

More than 30

3.7 **Protection by Location.** When the nip or pinch zone is so located that persons cannot normally reach through, over, under, or around and come in contact with the pinch zone, neither barrier guarding nor emergency stopping devices will be required.

3.8 **Alarm.** Where an exposure is created by the operation of a roll, an operator shall be isolated but shall be within sight or hearing of other employees or other employees or a suitable alarm device so that assistance will be available in case of an accident.

SECTION 4 - SPECIAL REQUIREMENTS FOR MILLS AND CALENDERS

4.1 **Horizontal Inrunning Roll Height.** Where an operator handles material on the rolls, all horizontal inrunning rolls shall be installed so that the top of the operating roll is not less than 46" above the level on which the operator stands.

4.2 **Inching or Jogging.** Where rolls are moved for short distances by use of an inch or jog button, the button shall be so arranged that the rolls will move only while the button is held down.

4.3 **Emergency Stopping Devices.** Except as permitted in Section 3 all mills and calenders shall be equipped with emergency stopping devices activated by a safety tripping device. The emergency stopping device shall be capable of bringing the machine to a stop within the distance indicated in the applicable table in Section 4.5.

4.4 Safety Tripping Devices.

4.4.1 **Horizontal Inrunning Rolls -** Wire cable, chains, and other nonstretching devices, that will operate by a Push or Pull, shall be provided at front and back of each set of rolls and shall be carried the full length of the roll. The normal location of the safety trip over the operating roll shall be within 2 inches of a vertical plant tangent to the front of the roll and not more than 72 inches above the level on which the operator stands. The normal location of the safety trip over the rear roll shall be within 2 inches of a vertical plant tangent to the rear of the rear roll and not more than 72 inches above the level on which the operator stands.

4.4.2 **Vertical Inrunning Rolls -** Safety tripping devices shall be provided in front and back of all vertical inrunning rolls to operate readily by a Push or Pull and shall be carried the full length of the roll. Safety tripping devices on vertical rolls shall be not more than 72" above the working floor level on which the operator stands. Each safety tripping device on vertical rolls shall have one chain or cable at each end of the roll. These chains or cables shall be carried to within 6 inches of the floor level and be effectively secured to the frame of the machine. Safety trip chains or cables shall be connected with the tripping devices and positioned at a distance not more than 12 inches from the face of the roll and at a distance not less than 2 inches from the machine frame.

- 4.5 *Stopping Distances.* Unless acceptable alternate safeguards are provided, "slow" inrunning rolls shall stop when empty within the distances indicated in the following table of stopping distances, as measured on their surfaces in inches.

TABLE OF STOPPING DISTANCES

Speed F/M	Surface Travel in Inches
20	3.0
25	3.7
30	4.5
35	5.2
40	6.0
45	6.7
50	7.5
55	8.2
60	9.0
65	9.7
70	10.5
75	11.2
80	12.0
85	12.7
90	13.5
95	14.2
100	15.0
105	15.7
110	16.5
115	17.2
120	18.0
125	18.7
130	19.5
135	20.2
140	21.0
145	21.7
150	22.5
155	23.2
160	24.0

- 4.6 *High Speed Rolls.* All high speed rolls shall comply with the following requirements where the described conditions are present.

4.6.1 High speed rolls requiring threading operations where the operator is exposed to the nip or pinch zone during the threading operation shall be equipped with emergency stopping devices that will stop the rolls in accordance with the distances specified in Section 4.5 for the threading speed used.

4.6.2 Such high speed rolls shall be provided with a barrier guard, mechanically or electrically interlocked to prevent operation of the rolls at high speed except when the guard is in place, and to prevent lifting or removing of the guard until the speed of the rolls has been reduced to a value that will allow stopping within the allowed distance.

4.7 *Electrical Equipment*

4.7.1 *Sequence Relays* – Sequence relays shall be provided and arranged in a manner that, when the safety device is tripped, a complete starting cycle, will be necessary in order to place the equipment back in service.

4.7.2 On all machines that use rolls, the starting control shall be located so that the normal operating area is clearly visible to the operator at all times.

4.7.3 All electrical equipment shall be installed in accordance with the National Electric Code.

4.8 *Hot Rolls.* Installations involving hot rolls may be equipped with the following roll reversing features.

4.8.1 Automatic limited reversing mechanisms shall be designed with electrical devices to eliminate reverse motion of the roll except during the emergency stopping interval. Such reversing mechanisms shall limit the reverse motion of the rolls to no more than one (1) revolution.

4.8.2 Manual inch reversing mechanisms may be used to reverse hot rolls provided the reverse motion can be effected only after the emergency brake system has been actuated and provided further that the inch reversing button is located in view of the rolls.

4.8.3 Automatic continuous reversing mechanisms as defined in Sub-Paragraph 2.2.12 shall not be used.

4.9 *Inspection and Testing*

4.9.1 All roll installations equipped with emergency stopping devices should be tested daily for operability. All such equipment shall be tested and inspected for conformance to these rules at least once per month.

EXCEPTION: Roll installations equipped with wholly electrical braking devices need be tested by measurement of stopping distances only once every three months.

4.9.2 Stopping distances shall be determined in terms of inches of peripheral travel of the roll from the instant of actuation of the emergency stopping device.

4.9.3 A written record of the stopping distances shown by these tests during the previous twelve (12) months shall be maintained at all times by the employer for inspection by the Commissioner.