

February 25, 1949  
Labor.

House File 518

By MUNGER, SCHWENGEL and ARMSTRONG.

Passed House, Date .....

Vote: Ayes..... Nays.....

Passed Senate, Date.....

Vote: Ayes..... Nays.....

Approved .....

# A BILL FOR

An Act relating to the health and safety of persons employed, vesting in the industrial commission power to make reasonable rules relating thereto; providing for the enforcement thereof.

*Be It Enacted by the General Assembly of the State of Iowa:*

1 Section 1. The industrial commission is hereby  
2 vested with the power and authority to administer the  
3 provisions of this act.

1 Sec. 2. This act shall apply to all employers  
2 engaged in any occupation, business or enterprise in  
3 this state, and their employees, except as follows:

4 (a) Nothing contained in this act shall be construed  
5 to apply to any work, employment or operations done, had  
6 or conducted by farmers and others engaged in farming,  
7 tillage of the soil or stock-raising, or to those who  
8 rent, demise or lease land for any such purposes, or to  
9 anyone in their employ, or to any work done on a farm or  
10 country place, no matter what kind of work or service is  
11 being done or rendered.

12 (b) Nothing contained in this act shall be construed

13 to apply to employers and employees in the coal mining  
14 industry.

1 Sec. 3. It shall be the duty of every employer under  
2 this act to provide reasonable protection to the lives,  
3 health and safety of all persons employed by such employer.  
4 The industrial commission shall, from time to time,  
5 make, promulgate and publish such reasonable rules as  
6 will effectuate such purposes.

7 Such rules shall be clear, plain and intelligible as  
8 to those affected thereby and that which is required of  
9 them, and each such rule shall be, by its terms, uniform  
10 and general in its application whenever the subject  
11 matter of such rule shall exist in any business, occupation  
12 or enterprise having employees.

13 Nothing in this act shall be construed to grant to  
14 the industrial commission the power to make any rule  
15 which will require the submission of any plan,  
16 specification or other information concerning any proposed  
17 installation, alteration, construction, apparatus or  
18 equipment, or in any manner regulate the hours of labor  
19 of any employee in this state.

1 Sec. 4. To effectuate the purposes stated in section  
2 three (3), the industrial commission shall make such rules  
3 only for:

4 (a) The proper sanitation and ventilation of all  
5 places of employment to guard against personal injuries

6 and diseases.

7 (b) The arrangement and guarding of machinery and the  
8 storing and placing of personal property to guard against  
9 personal injuries and diseases.

10 (c) The prevention of personal injuries and diseases  
11 by contact with any poisonous or deleterious materials,  
12 dusts, vapors, gases or fumes.

13 (d) The prevention of personal injuries and diseases  
14 caused by exposure to artificial atmospheric pressure.

15 (e) The construction, setting, placing, erecting  
16 and maintenance of scaffolds, platforms or other similar  
17 frameworks.

1 Sec. 5. Such rules of the industrial commission  
2 shall have the force and effect of law.

1 Sec. 6. The industrial commission may appoint  
2 advisory committees to suggest rules or changes therein.  
3 Representation on such committees of employer and  
4 employee shall be equal.

1 Sec. 7. The industrial commission may, on its own  
2 initiative, or upon written petition, make, modify or  
3 repeal any rule or rules as provided in this act,  
4 conforming with the following procedure:

5 (a) If the industrial commission shall resolve to  
6 institute such proceedings on its own initiative, it  
7 shall pass a resolution stating in simple terms the  
8 subject matter and purpose of such hearing, and shall

9 place such resolution on file, and the matter shall  
10 proceed to hearing and disposition upon such resolution  
11 as hereinafter provided.

12 Every petition for hearing upon rules filed with the  
13 industrial commission shall state, in simple terms, the  
14 subject matter and purpose for which such hearing is  
15 requested. Such petition shall be signed by five (5)  
16 employees or five (5) employers, or by a majority of  
17 employers, in a specific industry, and when such a petition  
18 is filed, the matter shall proceed to hearing and  
19 disposition upon such petition as hereinafter provided.

20 The industrial commission may, on its own motion,  
21 or the motion of any interested party, consolidate for  
22 joint hearing and joint disposition, any number of pending  
23 resolutions and petitions on related subject matters;  
24 provided, that the provisions of this act as to notice  
25 of hearing shall be complied with as to each such  
26 petition or resolution so consolidated.

27 (b) When the industrial commission on its own  
28 initiative determines to consider any rule or rules, or  
29 when such a petition is filed, the commission shall set  
30 a date for a public hearing on such cause, not less than  
31 thirty nor more than ninety days after the date of the  
32 passage of the resolution by the commission of its intention  
33 to proceed on its own initiative, or after the filing of  
34 a petition, as the case may be.

35 (c) Notice of such hearing shall be given at least  
36 thirty days prior to the date of such hearing by publication  
37 in a newspaper of general circulation within the county in  
38 which the hearing is to be held, and by mailing notice  
39 thereof to any employer, and to any association of  
40 employers and to any association of employees who have  
41 filed with the industrial commission their names and  
42 addresses, requesting notice of such hearings, and stating  
43 the particular industry or industries concerning which they  
44 desire such notice. The notice of hearing shall state the  
45 time, place and subject matter of the hearing.

46 (d) Hearing shall be held in places reasonably  
47 convenient to the persons affected.

48 (e) At any such hearing, any interested party may  
49 submit any evidence pertinent to the subject matter of the  
50 hearing.

51 (f) The industrial commission or any member thereof,  
52 shall have the power to administer oaths in connection with  
53 any proceeding under this act.

54 (g) Upon conclusion of the hearing, the industrial  
55 commission shall enter in writing, its decision upon the  
56 subject matter of such hearing. Copies of the decision  
57 shall be mailed to interested parties whose names shall  
58 be on file with the commission, as hereinbefore provided,  
59 and a certified copy thereof shall be filed in the office  
60 of the secretary of state at Des Moines.

61 (h) Within thirty days after the entry of a decision,  
62 rule or rules by the industrial commission, such commission  
63 may correct, modify or vacate such decision, rule or rules  
64 of its own motion, or upon written objection. Within such  
65 thirty days any person affected thereby may object in  
66 writing to the decision, rule or rules entered by the  
67 industrial commission, stating the specific grounds of his  
68 objection. The commission, in its discretion, may or may  
69 not act upon said objection.

70 (i) Any person affected thereby, whether or not such  
71 person participated in the previous proceedings, may  
72 within ninety days after a decision, rule or rules is  
73 entered by the industrial commission, file a praecipe for  
74 a writ of certiorari in the circuit or superior court of  
75 the county in which the subject matter of the hearing is  
76 situated, or, if the subject matter is situated in more  
77 than one county, then in any one of such counties for the  
78 purpose of having the reasonableness or lawfulness of the  
79 decision, rule or rules reviewed.

80 Upon filing of such praecipe, writ of certiorari shall  
81 issue directed to the industrial commission, returnable on  
82 a designated return date not less than ten nor more than  
83 sixty days from the issuance thereof.

84 The person or the parties filing the praecipe for writ  
85 of certiorari, or other interested parties, shall, on  
86 or before the return date as fixed, file in the office of

87 the clerk of the court out of which said writ issued,  
88 specific grounds of objection to the particular decision,  
89 rule or rules sought to be reviewed.

90 Service of such writ of certiorari shall be had by  
91 serving a copy upon any member of the industrial commission  
92 or its secretary, which service shall be service upon the  
93 commission.

94 The commission shall certify the record of the proceedings  
95 to the said court. For the purpose of a writ of certiorari,  
96 the record of the industrial commission shall consist of a  
97 transcript of all testimony taken at the hearing, together  
98 with all exhibits, or copies thereof, introduced in  
99 evidence, and all information secured by the industrial  
100 commission on its own initiative which was introduced in  
101 evidence at the said hearing; a copy of the resolution or  
102 petition filed with the commission which initiated the  
103 investigation, and a copy of the decision filed in the  
104 valid cause, together with all objections filed with the  
105 industrial commission, if any.

106 On such certiorari proceedings, the court may confirm  
107 or reverse the decision as a whole, or may reverse and  
108 remand the decision as a whole, or may confirm any of the  
109 rules contained in such decision, and reverse or reverse  
110 and remand with respect to other rules in said decision.  
111 The order of the court shall be a final and appealable  
112 order except as to such portion of the decision of the

113 commission, or as to such rule or rules therein as may be  
114 remanded by the court.

115 The purpose of such remanding order shall be for  
116 the further consideration of the subject matter of the  
117 particular decision, rule or rules remanded.

118 No new or additional evidence may be introduced in  
119 the court in such proceeding but the cause shall be heard  
120 on the record of the industrial commission as certified  
121 by it. The court shall review all questions of law and  
122 of fact presented by such record, and shall review questions  
123 of fact in the same manner as questions of fact are  
124 reviewed by the court on certiorari proceedings under the  
125 Workmen's Compensation Act.

126 The court first acquiring jurisdiction by virtue of  
127 the filing of a praecipe for writ of certiorari seeking  
128 to review any decision, rule or rules of the industrial  
129 commission, shall have and retain jurisdiction of such  
130 review and of all other reviews from the same decision,  
131 rule or rules until such review is disposed of in said  
132 court.

133 Any person who subsequently, and within the time  
134 herein provided, has filed praecipe for writ of certiorari,  
135 may intervene in said original cause in whatever county  
136 it may be pending by making a proper showing.

137 The industrial commission, in making return to any  
138 writ of certiorari where praecipe is filed subsequent to

139 the first praecipe involving the same subject matter, shall  
140 file as its return, a statement that the record has there-  
141 tofore been filed, or is about to be filed, in response to  
142 the first praecipe theretofore filed.

143 At the time of making such subsequent return, the  
144 industrial commission shall mail to the attorneys whose  
145 names appear on the said writ as attorneys for the  
146 petitioner therein, a true copy of the said return filed  
147 with the said court, which return shall state the county  
148 in which the first praecipe has been filed, the title and  
149 number of the case, and the return date of the said first  
150 writ of certiorari. Any party filing such subsequent  
151 praecipe for writ of certiorari may intervene in the said  
152 original proceeding or shall be foreclosed by the decision  
153 thereon.

154 Such intervenor shall be a party to the said proceeding  
155 to the same extent as the party who had filed the first  
156 praecipe, and may raise any additional question with  
157 respect to the subject matter by filing his specific  
158 objections in the said court within such time as the court  
159 may direct.

160 (j) Appeals from all final orders and judgments entered  
161 by the said court in review of the decision, rule or rules  
162 of the industrial commission, may be taken directly to  
163 the supreme court by either party to the action within  
164 forty-five days after the entry of the order of the said

165 court.

166 Appeals from orders of the said court shall be in the  
167 manner provided by law for other civil cases appealed to  
168 supreme court.

169 Any proceeding in any court affecting a decision, rule  
170 or rules of the industrial commission, shall have priority  
171 in hearing and determination over all other civil proceedings  
172 pending in said court, except election contests.

173 (k) In all reviews or appeals under this act, it shall  
174 be the duty of the attorney general to represent the  
175 industrial commission and defend its decisions and rules.

1 Sec. 8. The industrial commission shall, in its  
2 decision, rule or rules, fix the effective date thereof;  
3 provided, no such decision, rule or rules shall become  
4 effective until ninety days after the entry thereof by  
5 the industrial commission, not shall any such decision,  
6 rule or rules become effective during the pendency of  
7 any proceedings for review or appeal thereof instituted  
8 pursuant to the provisions of this act in which case such  
9 decision, rule or rules shall not become effective until  
10 such review or appeal including appeal to the supreme  
11 court, if any, has been disposed of by final order and the  
12 mandate shall have been filed with the industrial commission,  
13 and until a period of time has elapsed after the filing of  
14 such mandate equal to the period of time between the date  
15 of the entry of such decision, rule or rules by the

16 industrial commission and the effective date as originally  
17 fixed by said commission.

1     Sec. 9. The industrial commission shall make and pub-  
2 lish rules as to its practice and procedure in carrying out  
3 the duties imposed upon it by this act, which rules shall  
4 be deemed prima facie, reasonable and valid.

1     Sec. 10. The owner, operator, manager or lessee of any  
2 place affected by the provisions of this act and his agent,  
3 superintendent, subordinate or employee, and any employer,  
4 affected by such provisions, shall, when requested by the  
5 industrial commission or any duly authorized agent thereof,  
6 furnish any information in his possession or under his  
7 control, which the industrial commission is authorized to  
8 require; shall answer truthfully all questions required to  
9 be put to him; shall admit any member of the industrial  
10 commission or its duly authorized representative to any  
11 place of employment which is affected by the provisions  
12 of this act for the purpose of making inspection, and  
13 shall cooperate in the making of a proper inspection.

1     Sec. 11. The industrial commission or any member  
2 thereof shall have power:

3     (a) To issue subpoenas for and compel the attendance  
4 of witnesses and the production of pertinent books, papers,  
5 documents or other evidence.

6     (b) To hear testimony and receive evidence and to  
7 take or cause to be taken, depositions of witnesses

8 residing within or without this state in the manner  
9 prescribed by law for depositions in civil cases in the  
10 circuit court. Subpoenas and commissions to take  
11 testimony shall be under the seal of the industrial commission.

12 (c) Service of subpoenas may be made by any sheriff  
13 or constable, or any other person. The circuit, superior  
14 or county court of the county where any hearing is pending,  
15 or any judge thereof, either in term time or vacation, upon  
16 application of the industrial commission, or any member  
17 thereof, may, in his discretion, compel the attendance of  
18 witnesses, the production of pertinent books, papers,  
19 records or documents and the giving of testimony before  
20 the industrial commission or any member thereof, by an  
21 attachment proceedings, as for contempt, in the same manner  
22 as the production of evidence may be compelled before said  
23 court.

1 Sec. 12. The industrial commission shall make an  
2 annual report of its work under the provisions of this  
3 act to the governor on or before the first day of February  
4 of each year; and a biennial report to the legislature on  
5 or before the first day of February of each odd-numbered  
6 years.

1 Sec. 13. All notices, orders, decisions, rules and  
2 other official action shall be in the name of the  
3 industrial commission.

1 Sec. 14. The industrial commission shall keep a full

2 and complete record of all proceedings had before it or  
3 any member thereof, and all testimony shall be taken by a  
4 stenographer appointed by the industrial commission. The  
5 commission shall also keep records which will enable any  
6 employer, employee or their agents, to determine all action  
7 taken by the industrial commission with respect to the  
8 subject matter in which such employer and employee is  
9 interested. All such records shall be open to public  
10 inspection.

1 Sec. 15. At least once each year, the industrial  
2 commission shall publish, in printed form, all of its  
3 rules made pursuant to section four (4) of this act which  
4 are in full force and effect at the time of such publication.

1 Sec. 16. The record required to be furnished by the  
2 industrial commission as a return to the writ of certiorari  
3 shall be furnished by the industrial commission without  
4 cost. In any appeal from the decision of the circuit or  
5 superior court to the supreme court under this act, the  
6 clerk of such circuit or superior court in making up the  
7 record for use in the supreme court, shall incorporate  
8 therein the original transcript filed by the industrial  
9 commission in such circuit or superior court as a return  
10 to writ of certiorari, in lieu of a copy thereof.

1 Sec. 17. It shall be the duty of the department of  
2 labor to enforce the rules of the industrial commission  
3 promulgated by virtue of this act; provided, the said

4 industrial commission shall not take any part in the  
5 enforcement of any of its rules made in accordance with  
6 section four (4) of this act.

7 The department of labor, through its authorized  
8 agents, is hereby empowered to visit, and inspect at all  
9 reasonable times, all places of employment in this state  
10 affected by any rule made pursuant to section four (4) of  
11 this act; provided, that whenever any secret process is  
12 used in any factory, mercantile establishment, mill or  
13 workshop the owner shall, whenever asked by the department  
14 of labor or its authorized agent file with said department  
15 an affidavit that the owner has in all respects complied  
16 with all effective rules made pursuant to the provisions  
17 of this act and such affidavit shall be accepted in lieu  
18 of inspection of any room or apartment in which such secret  
19 process is carried on.

20 In the enforcement of the provisions of this act, the  
21 department of labor and its authorized agents under the  
22 direction and supervision of the department of labor, shall  
23 give proper notice in regard to any violation of this act to  
24 the persons owning, operating and managing any place of  
25 employment affected by any rule made pursuant to section  
26 four (4) of this act. Such notice shall be written or  
27 printed and signed officially by the director of labor or  
28 any person authorized by him, and said notice may be served  
29 by delivering the same to the person upon whom service is

30 to be had, or by leaving at his usual place of abode, or  
31 business, an exact copy thereof, or by sending a copy  
32 thereof to such person by mail.

1     Sec. 18. Any person, firm or corporation, or any  
2 agent, manager or superintendent of any person, firm or  
3 corporation, who for himself or for such person, firm  
4 or corporation, after due notice by the department of labor  
5 or its authorized agent given in accordance with the  
6 provisions of this act, fails or neglects to comply with  
7 any rule made pursuant to section four (4) or this act,  
8 violation of which is referred to in said notice, or who  
9 obstructs or interferes with any examination or investigation  
10 being made by the department of labor or any of its authorized  
11 agents, shall be guilty of a misdemeanor, and upon conviction  
12 thereof, shall be punished by a fine of not less than twenty-  
13 five dollars and not more than one hundred dollars for the  
14 first offense; and upon conviction of the second or sub-  
15 sequent offense, shall be fined not less than fifty dollars  
16 and not more than two hundred dollars; and in each case shall  
17 stand committed until such fine and costs are paid unless  
18 otherwise discharged by due process of law. In cases of  
19 injury due to violation of this act the employer shall pay  
20 to the employee double the amount specified in Workmen's  
21 Compensation Act, Code

1     Sec. 19. This act shall be known and may be cited as  
2 the "Iowa Health and Safety Act."

3

Part "A"

4

Chapter 1

1     Sec. 1. Purpose and Application. The purpose of  
2 these rules, pursuant to the provisions of the Health and  
3 Safety Act, is to provide reasonable protection to the  
4 lives, health and safety of persons employed in this state,  
5 and these rules shall apply wherever the subject matter  
6 thereof shall exist in any business, occupation, or  
7 enterprise in this state having employees, except as follows:

8     (a) Nothing contained in these rules shall be construed to  
9 apply to any work, employment or operations done, had or con-  
10 ducted by farmers and others engaged in farming, tillage of  
11 the soil or stock-raising, or to those who rent, demise or  
12 lease land for any such purposes, or to anyone in their employ,  
13 or to any work done on a farm or country place, no matter what  
14 kind of work or service is being done or rendered.

15     (b) Nothing contained in these rules shall be construed to  
16 apply to employers and employees in the coal mining industry.

1     Sec. 2. Scope: The scope of these rules, pursuant to the  
2 provisions of the health and safety act, is intended to be  
3 limited to the following only:

4     (a) The proper sanitation and ventilation of all places of  
5 employment to guard against personal injuries and diseases.

6     (b) The arrangement and guarding of machinery and the stor-  
7 ing and placing of personal property to guard against personal  
8 injuries and diseases.

9 (c) The prevention of personal injuries and diseases by  
10 contact with any poisonous or deleterious materials, dusts,  
11 vapors, gases or fumes.

12 (d) The prevention of personal injuries and diseases caused  
13 by exposure to artificial atmospheric pressure.

1 Sec. 3. Arrangement and Numbering: Health and safety rules  
2 made by the industrial commission are divided into main  
3 divisions called "Parts," designated "Part A," "Part B", etc.  
4 Each "Part" is subdivided by chapters; each chapter is sub-  
5 divided by sections, and each section is subdivided by rules.  
6 A separate series of numbers is used in numbering chapters of  
7 each "Part", sections of each chapter, and rules of each section.  
8 Where a rule consists of more than one paragraph, or where sub-  
9 paragraphs are used, such paragraphs and sub-paragraphs are ap-  
10 propriately designated to facilitate ready reference.

1 Sec. 4. Definitions: Rule 1. General Definitions: The  
2 following definitions shall apply in connection with all rules  
3 made by the industrial commission.

4 (a) The term "Health and Safety Act" shall mean the health  
5 and safety act of the State of Iowa.

6 (b) The term "Industrial Commission" shall mean the indus-  
7 trial commission of the State of Iowa.

8 (c) The term "Department of Labor" shall mean the department  
9 of labor of the State of Iowa.

10 (d) The words "shall" or "must" where used in these rules  
11 are to be understood as mandatory.

1     Sec. 5. Interpretation of Rules. Rule 1. General Interpre-  
2 tations: The following interpretations shall apply in connec-  
3 tion with all rules made by the industrial commission:

4     (a) These rules shall be interpreted liberally so as to  
5 effectuate their intent of providing reasonable protection to  
6 the lives, health and safety of employees within the scope  
7 authorized by statute.

8     (b) These rules shall be deemed to constitute minimum stan-  
9 dards for providing reasonable protection to the lives, health  
10 and safety of persons employed in this state. Where protection  
11 equivalent or superior to that afforded by any applicable rule  
12 or rules made by the industrial commission is provided, such  
13 equivalent or superior protection shall be deemed compliance  
14 with such rule or rules.

15     (c) Nothing contained in these rules shall be interpreted  
16 as prohibiting any employer from enforcing additional safe-  
17 guards or regulations for protection to the lives, health and  
18 safety of persons employed by such employer, provided such  
19 additional safeguards or regulations do not conflict with  
20 rules made by the industrial commission.

21

#### Part "B"

22 Rules and Regulations relating to guarding of mechanical  
23 power-transmission apparatus, prime movers, and moving  
24 parts of machinery, and guarding of operation of mach-  
25 inery.

26

Chapter 1

27

Scope and Definitions

1     Sec. 1. Scope and Definitions: Rule 1. Scope. The  
2 scope of Part "B" of rules made by the industrial commission  
3 comprises rules made primarily for the purpose of prevention  
4 of personal injuries to employees due to accidents.

5     Rule 1. Definitions: The following definitions shall  
6 apply in connection with all rules included in Part "B" of  
7 rules made by the industrial commission:

8     Class "A" or "B": The designation "Class A" with a rule  
9 means that the rule applies for all kinds of work. The des-  
10 ignation "Class B" means that the rule applies unless the  
11 nature of the work will not permit.

12     Exposed to Contact. The term "exposed to contact" shall  
13 mean such location of any object as will permit contact with  
14 same by any person in the course of employment.

15     Guarded: Unless otherwise specified, the term "guarded"  
16 shall mean that the object is so covered, fenced or enclosed  
17 that accidental contact with the point of danger is reasonably  
18 remote.

19     Guarded by Location: "Guarded by location" means that the  
20 object is so located that it is not "exposed to contact".

21     Point of Operation: "Point of operation" of a machine  
22 means that part of the machine where stock is actually inserted  
23 and/or maintained during any process of forming, shaping or  
24 other necessary operation.

25     Danger Zone. The term “danger zone” shall mean any place  
26 at the point of operation, where the operator may be caught  
27 between moving parts of the machine or between moving and  
28 stationary parts of machine, or between the material and the  
29 moving part or parts of the machine.

30     Securely Fastened. “Securely fastened” means that the  
31 safety device or object referred to shall be so secured in  
32 place that it cannot be moved under normal operating conditions  
33 or circumstances.

34     Substantial Construction. “Substantial construction” shall  
35 mean construction of such strength, of such material, and of  
36 such workmanship that the object referred to shall, under  
37 normal or reasonably foreseen circumstances, withstand all  
38 reasonably expected shock, wear, usage, and deterioration for  
39 which the object was designed.

40     Standard Railing. A “standard railing” is a barrier of  
41 substantial construction.

42     Standard Toe Board. A “standard toe board” is a vertical  
43 barrier at floor or working level to prevent falls of tools  
44 and materials.

45     Maintenance Runway. “Runway” means any permanent runway  
46 or platform used for oiling, maintenance, running adjustment  
47 or repair work, but not for passageway.

48     Plant Roadway. The term “plant roadway” shall be deemed  
49 to mean a plant roadway wide enough to be used for horse drawn

50 vehicles or highway motor driven vehicles, and shall not be  
51 construed to include ordinary aisles and passageways.

52 Part "B"

53 Chapter 2

54 Guarding of mechanical power-transmission apparatus,  
55 prime movers, and moving parts of machinery.

1 Section 1. Scope and Definitions: Rule 1. Scope: The  
2 rules contained in this chapter two of Part "B" of rules made  
3 by the industrial commission shall apply to all moving parts  
4 of machinery and equipment used in the mechanical transmission  
5 of power, including prime movers, intermediate equipment, and  
6 driven machines, up to the machine proper and excluding point  
7 of operation. They also include connecting rods, cranks,  
8 flywheels, shafting, spindles, pulleys, belts, chains and  
9 sprockets, ropes and rope drives, gears, friction drives, cams,  
10 couplings, counterweights, revolving or reciprocating parts up  
11 to but not including point of operation. Also all bolts, keys,  
12 set screws, oil cups, or similar projections.

13 Rule 2. Definitions: The following definitions shall apply  
14 to chapter two of Part "B" of these rules:

15 Belt Pole. A "belt pole", sometimes called a "belt shipper"  
16 or "shipper pole", is a device used in shifting belts on and  
17 off pulleys on line or countershaft where there are no loose  
18 pulleys.

19 Belt Shifter. A "belt shifter" is a device for mechanically  
20 shifting belts from tight to loose pulleys or vice versa, or

21 for shifting belts on cone pulleys.

22 Nip Point. The term “nip point” shall mean the point of  
23 contact between the belt and pulley on the inrunning side.

24 Flywheels. The term “flywheel” shall include flywheels,  
25 balance wheels, and pulleys mounted and revolving on crank  
26 shaft of engine or other shafting.

27 Gears. The term “gears” shall include a set or train of  
28 gears comprising two or more intermeshing gears.

29 Prime Mover. The term “prime mover” includes steam, gas,  
30 oil, and air engines, electric generators and motors, steam  
31 and hydraulic turbines.

32 Sheaves. “Sheaves” are to be considered as grooved pulleys  
33 and so classified unless used as flywheels.

34 Sprockets. A set of “sprockets” comprise two or more  
35 sprockets carrying one or more chains.

1 Sec. 2. Moving Machinery. Rule 1. Moving Machinery: On  
2 all machines where a moving part leaves less than eighteen (18)  
3 inches between another machine or between a wall or any other  
4 stationary object when it reaches the limit of its travel, such  
5 part if exposed to contact must be guarded or the space shall  
6 be barred against passage.

7 Dangerous moving parts of machinery shall not be oiled or  
8 cleaned while in motion.

1 Sec. 3. Prime Movers. Rule 1. Flywheel Guards: Flywheels  
2 located so that any part is six (6) feet or less above the  
3 floor or platform shall be guarded in one of the following ways:

4 (a) With a standard railing. The railing must be placed  
5 not less than six (6) inches nor more than twenty (20)  
6 inches from the wheel, provided that it shall be not less  
7 than fifteen (15) inches from the spokes of wheel or projections.  
8 If wheel extends into pit or within two (2) inches of the  
9 floor, a standard toeboard shall be installed. If passage over  
10 journal or bearing is necessary, the passageway shall be pro-  
11 vided with a standard railing and toeboard.

12 (b) With an enclosure of sheet, perforated, or expanded  
13 metal or woven wire. When such guard is placed less  
14 than six inches from wheel, it shall be not less than  
15 six feet high, except if flywheel is less than six feet  
16 high, the guard shall be not less than the height of the  
17 wheel from the floor. In no case shall guard be less  
18 than three feet six inches high unless wheel is completely  
19 enclosed, including the top. Where clearance of guard  
20 from flywheel at any point is under four inches, the  
21 largest mesh or opening allowable shall not be more than  
22 one-half inch. Where such clearance is from four to  
23 fifteen inches, largest mesh or opening allowable shall  
24 not be greater than two inches.

25 (c) Flywheels, with smooth rims, five feet or less  
26 in diameter, other than wheels having solid web centers,  
27 where the preceding methods cannot be applied shall be  
28 provided with a disc having a smooth surface and edge  
29 attached to the flywheel in such a manner as to cover the

30 spokes of the wheel on the exposed side. The disc may be  
31 four inches smaller in radius than the radius of the inner  
32 surface of the wheel if it is desired to provide space  
33 for bar in turning over the wheel. Keys and other dangerous  
34 projections not covered by disc shall be cut off or covered.

35 (d) An adjustable guard may be used where it is  
36 necessary to start engine or for making adjustments.

37 (e) A slot opening for jack bar will be permitted.

38 (f) Spokes of pulleys, balance wheels or flywheels  
39 other than a prime mover, the bottom of which is six  
40 feet or less above the floor or other working level shall  
41 be protected by filling in the spokes or by guarding as  
42 required for belts.

43 Rule 2. Cranks and connecting rods: Cranks and  
44 connecting rods, unless guarded by location, shall be  
45 enclosed in such a way as to prevent accidental contact  
46 with them, or shall be guarded by a standard railing  
47 placed not less than fifteen inches nor more than twenty  
48 inches from the moving parts.

49 Rule 3. Tail rods or extension piston rods: Tail  
50 rods or extension piston rods shall be enclosed in such a  
51 way as to prevent accidental contact with them, or shall  
52 be guarded by a standard railing on sides and end, with a  
53 clearance at end of not less than fifteen inches when rod  
54 is fully extended.

55 Rule 4. Governor balls: Revolving governor balls

56 exposed to contact six feet or less from the floor or  
57 other working level, shall be guarded by a substantial  
58 wire screen of not less No. 20 U. S. standard gauge, or  
59 solid enclosure extending to the top of the governor balls  
60 when at their highest position.

61 Rule 5. Governors and automatic Engine stops: Where  
62 mechanically possible, every engine or turbine shall be  
63 equipped with an effective governor to automatically  
64 control the speed of the engine under varied loads; except  
65 in case of reversing engines or other special types of  
66 engines without flywheel effect and operating against a  
67 constant load.

68 The governing mechanism shall be such that in the event  
69 of failure of the speed governor, the flow of energy to the  
70 machine will stop.

71 In case the main speed governor is of such design  
72 that it stops flow in event of its own failure, and is  
73 provided with a blocking mechanism to facilitate  
74 restarting, such blocking mechanism shall automatically  
75 fall out of the blocking position when the machine is  
76 started.

77 In case the main speed governor is of such design that  
78 it leaves the governing valve open in event of its own  
79 failure, an independent governing mechanism shall stop  
80 the flow of energy to the machine in case of overspeed,  
81 and shall be of such type that, having operated, it must

82 be reset by hand before the machine can again be started.

83 In every tenant factory building where power is  
84 furnished from a prime mover not under control of a tenant,  
85 means shall be provided for the tenant to disconnect his  
86 main shaft from main power supply.

1 Sec. 4. Power-transmission equipment: Rule 1.

2 Guarding horizontal shafting: (a) All exposed parts of  
3 horizontal shafting exposed to contact, six feet or less  
4 from floor, walkway level or working platform, except  
5 runways used exclusively for oiling or making adjustments,  
6 shall be completely encased with stationary guards or by  
7 a trough encasing sides and top or sides and bottom of  
8 shafting as location requires.

9 (b) Wherever shafting extends over a plant roadway  
10 it shall be completely encased with stationary guards or a  
11 trough enclosing both sides and bottom unless it is located  
12 fifteen feet or more above the said roadway.

13 (c) Transmission shafting under bench machines shall  
14 be— (1) Completely encased with stationary guards, or  
15 (2) By a trough encasing sides and top or sides and bottom  
16 of shafting as the location requires; the sides of the  
17 trough shall come within at least six inches of the under-  
18 side of the table, or if the shafting is located near the  
19 floor, within six inches of the floor. In every case the  
20 sides of the trough shall extend at least two inches above  
21 or below the shafting, as the case may be; or (3) Shall be

22 protected on exposed sides with a rigid guard of not  
23 greater than two-inch mesh extending from the underside  
24 of bench top to bottom line of shafting; such guards shall  
25 be at least six inches from the shafting.

26 Rule 2. Guarding vertical or inclined shafting:

27 Vertical or inclined shafting exposed to contact within  
28 six feet or less of floor or working platform, except  
29 runways used exclusively for oiling or making adjustments,  
30 shall be substantially encased with stationary guards to  
31 a height of six feet from the floor or other working level.

32 Exception—This rule shall not apply to shafting which is  
33 an integral part of a machine such as vertical boring mills.

34 Rule 3. Shafting, pulleys and belts in basement,

35 towers and rooms: When shafting, pulleys and belts are  
36 located in basements, towers, and rooms used exclusively  
37 for power transmission equipment, the requirements for  
38 safeguarding shall not apply if the following conditions  
39 are met:

40 (a) Where the basements, towers or rooms, or the  
41 shafting, pulleys and belts located therein, are guarded by  
42 location; or

43 (b) Where effective means are taken to prevent  
44 entrance to the basements, towers or rooms while the  
45 shafting, pulleys or belts located therein and exposed to  
46 contact are in operation.

47 Rule 4. Guarding of clutches and couplings:

48 (a) All shaft coupling hereafter installed shall be  
49 of the safety type, with bolts and nuts countersunk or  
50 protected by a flange.

51 (b) Existing couplings not of the safety type, and  
52 all clutches if exposed to contact, shall be substantially  
53 encased, except that existing couplings mounted on shafting  
54 heretofore guarded by standard railings placed not less than  
55 twelve (12) inches nor more than twenty (20) inches from any  
56 moving part, shall be accepted.

57 Rule 5. Projecting shafts ends: Projecting shafts  
58 ends shall have a smooth edge and end and shall not project  
59 more than one-half ( $\frac{1}{2}$ ) the diameter of the shaft unless  
60 guarded by nonrotating caps, safety sleeves or enclosures.

61 Rule 6. Keys, set screws and other projections on  
62 revolving shafts:

63 (a) All set screws in collars or couplings shall be  
64 made flush or countersunk beneath the surface of the metal  
65 part in which they are inserted, or they may be protected  
66 with cylindrical safety sleeves. The covering of set screws  
67 with leather bands or wooden blocks other than cylindrical  
68 wooden sleeves shall not be permitted.

69 (b) All keys, bolts, set screws, oil cups and similar  
70 projections, when not within the plane of the rim of pulley,  
71 gear or wheel shall be either removed, made flush or protected  
72 with cylindrical safety sleeves or by a stationary enclosure.  
73 Such projections on the hubs of pulleys, when within the

74 plane of the rim, shall be guarded if the pulley is twenty-  
75 four (24) inches or more in diameter, when the hubs are  
76 within six (6) feet of the floor and are within eighteen  
77 (18) inches of a shafting bearing.

78 (c) Pulleys, gears, pinions and sprockets that are  
79 broken shall be removed from revolving shafting.

80 (d) Unused key-ways shall be filled up or covered.

81 Rule 7. Gears, friction drives, sprockets and chains:

82 Gears, friction drives, sprockets and chains, except where  
83 guarded by their location, shall be guarded as follows:

84 (a) The gears and sprockets shall be completely  
85 enclosed or fitted with a band guard covering the face and  
86 having side flanges extending inward beyond the root of the  
87 teeth. In the case of arm or spoke gears or sprockets having  
88 a spoke hazard, provisions shall be made to guard the opening  
89 between arms or spokes; or

90 (b) With a solid casing or screen guard covered on the  
91 top, unless the sides of the guard are at least three (3)  
92 feet high and extend at least two (2) feet above the top of  
93 the gear. The maximum required height for such guards shall  
94 be six (6) feet from the floor or working level. When the  
95 guard is within four (4) inches of gears the maximum mesh  
96 opening shall not be more than one-half ( $\frac{1}{2}$ ) inch.

97 Rule 8. Friction drives:

98 (a) The contact points of all friction drives when  
99 exposed to contact shall be enclosed.

100 (b) In case of friction drives having an arm or spoke  
101 hazard, provision shall be made to guard openings between  
102 arms or spokes.

103 (c) In case of web friction drives with holes in the  
104 said web, the holes shall be covered or the drives be enclosed.

105 (d) All projecting bolts on friction drives where exposed  
106 to contact shall be guarded.

107 (e) The chains of sprockets and chain drives, located  
108 within seven (7) feet of the floor or other working level, and  
109 traveling at a speed of forty (40) feet or more per minute,  
110 shall be enclosed on all exposed sides, or guarded by a standard  
111 railing placed not less than twelve (12) inches nor more than  
112 twenty (20) inches from a moving part.

113 (f) This rule shall not apply to chain conveyors.

114 Rule 9. Static Electricity from Belts or Shafting:

115 Where explosives, explosive dusts or explosive vapors  
116 are present, the hazard of sparks from static electricity  
117 from belts or shafting shall be removed by means of metallic  
118 flexible tooth combs or a grounded spring copper brush in  
119 contact with the shafting. When metallic flexible tooth  
120 combs are used, they shall be the same width as the belts.  
121 One comb shall be placed within ten (10) inches of the line  
122 of contact where the belt leaves each pulley or flywheel.  
123 These combs shall be in contact with and placed transversly  
124 to the belt and shall also be well grounded with insulated  
125 copper wire. The teeth of the comb shall point in the

126 direction of the belt motion.

127 Rule 10. Belts, Ropes, Pulleys and Balance Wheels or  
128 Flywheels, other than those attached to a prime mover: Belts,  
129 ropes, pulleys and balance wheels or flywheels six (6) feet  
130 or less from floor, walkway level or working platform (except  
131 runways used exclusively for oiling or making adjustments),  
132 other than those attached to a prime mover, shall be completely  
133 enclosed or effectively guarded and the guards shall be  
134 securely fastened in place and shall be of substantial  
135 construction, as follows:

136 (a) The uprights used for support shall be made of  
137 substantial material such as structural shapes, rods, tubing,  
138 pipe or other materials, the sizes varying according to the  
139 weight and size of guard and its location with respect to  
140 aisles and passageways and possibility of being damaged by  
141 moving equipment.

142 (b) The guard or filling material shall be expanded  
143 metal, perforated or solid sheet metal, wire mesh or other  
144 material of equivalent strength and so constructed that no  
145 sharp joints or edges will be exposed.

146 (c) Any panel in a guard exceednig forty-two (42)  
147 inches in width shall be supported across its width.

148 (d) Where it is necessary to have openings in guards  
149 to permit access to parts enclosed by such guards, doors,  
150 gates or suitable means shall be provided for closing such  
151 openings. Such devices for closing openings in guards

152 hereafter installed shall be provided with suitable means  
153 for securing the closing device in the closed position.

154 (e) Where guard or enclosure is within four (4) inches  
155 from mechanism to be guarded, it shall completely enclose the  
156 mechanism or be not less than six (6) feet in height. Any  
157 opening through guard shall reject a ball one-half ( $\frac{1}{2}$ ) inch  
158 in diameter.

159 (f) Where guard or enclosure is more than four (4)  
160 inches and less than fifteen (15) inches distant from  
161 mechanism to be guarded it shall completely enclose the  
162 mechanism or be not less than five (5) feet in height. Any  
163 opening through guard shall reject a ball one and one-half  
164 ( $\frac{1}{2}$ ) inches in diameter. Slatted guards, if used, shall not  
165 have openings greater than one (1) inch in width.

166 (g) Where rods, pipes, or like material are being  
167 handled by workmen, guards specified in this Rule 10 shall be  
168 so constructed that such materials will not enter the openings  
169 in the guards and come in contact with moving machinery.

170 (h) Where belts are manipulated by hand and wire lacing  
171 is used, the ends of the wire shall be drawn through and  
172 clinched at the outer surface in such a manner as to prevent  
173 the ends from becoming loose and projecting beyond either  
174 surface of the belt; where belt hooks or other metal fasteners  
175 are so used, no clinched points or other metal parts shall  
176 protrude through the belt, or be fastened on the pulley or  
177 inside surface of belt. Any metal on outside surface of

178 belt shall be smooth and free from any projection. Frequent  
179 inspections shall be made to assure proper condition of wire  
180 lacing and metal fasteners.

181 Rule 11. Standard Railings—Construction: Standard  
182 railings shall be 42" in height with a rail midway between  
183 the top rail and the floor or working level. Posts shall not  
184 be more than eight (8) feet apart. They are to be permanent  
185 and substantial, smooth and free from protruding nails, bolts  
186 and splinters. If made of pipe, the pipe shall be  $1\frac{1}{4}$ " inside  
187 diameter or larger. If made of metal shapes or bars, the  
188 section shall be equal in strength to that of  $1\frac{1}{2}$ " x  $1\frac{1}{2}$ " x  
189  $\frac{3}{16}$ " angles. If made of wood, the post shall be 2" x 4" or  
190 larger. The top rail, if of wood shall be 2" x 4" or two  
191 1" x 4" strips, one on top and one at the side of the post.  
192 The center rail, if wood, may be 1" x 4" or more. Where wood  
193 is used it shall be straight grained and free from defects.

194 Where panels are fitted with expanded metal, wire mesh,  
195 or perforated metal, the middle rail may be omitted.

196 Standard railings shall be placed not less than fifteen  
197 (15) inches nor more than twenty (20) inches from the object  
198 being guarded.

199 The rails (metal shapes, metal bars or wood) shall be  
200 on the side of the post which gives the best protection and  
201 support.

202 Rule 12. Standard Toe Boards—Construction: Standard  
203 toe boards shall not be less than four (4) inches in height

204 of wood, metal or other substantial material, or of metal  
205 grill not exceeding one (1) inch mesh. Toe boards at flywheel  
206 pits shall be placed as close to the edge of the pit as  
207 practicable.

208 Rule 13. Disc Guards: A disc guard shall consist of  
209 a sheetmetal disc not less than No. 22 gauge fastened by  
210 "U" bolts or rivets to spokes of pulleys, flywheels or gears.  
211 Where possibility of contact with sharp edges of the disc  
212 exists, the edge shall be rolled or wired. In all cases the  
213 nuts shall be provided with lock nuts which shall be placed  
214 on the unexposed side of the wheel.

215 Rule 14. "U" or Trough Guards: "U" or trough guards  
216 shall be constructed of materials specified in Rule 10 of  
217 this Sec. 4 of Chapter 2 of Part "B" of these rules. Edges  
218 shall be smooth and if size of guard requires, these edges  
219 shall be reinforced by rolling, wiring, or by binding with  
220 angle or flat iron.

221 Rule 15. Guards for Belts, Rope Drives and Pulley Drives:

222 (a) Rope drives or round belts where exposed to contact  
223 shall be guarded as required herein for belts. In such cases,  
224 the point where the rope drive or round belt runs onto the  
225 sheave must be guarded.

226 (b) Inclined belt guards shall be so installed that  
227 the vertical clearance between the lower run of the belt  
228 and the floor shall be not less than six (6) feet six (6)  
229 inches at any point outside of guard.

230 (c) Except in the case of inclined belts; a standard  
231 railing placed not less than fifteen (15) inches nor more  
232 than twenty (20) inches from any point of the belt shall be  
233 accepted.

234 (d) Where standard railings are used to guard inclined  
235 belts, the vertical clearance between the lower run on the  
236 belt and the floor at the point where railings pass under the  
237 belt shall be not less than six (6) feet six (6) inches.

238 (e) Where both runs of a horizontal belt are within  
239 seven (7) feet of the floor level, the guard shall extend  
240 at least fifteen (15) inches above the belt or to the height  
241 of six (6) feet, but in no case shall it be less than forty-  
242 two (42) inches high unless the belt is completely enclosed.

243 (f) Overhead horizontal belts with lower run seven (7)  
244 feet or less from floor or platform level should be guarded  
245 on bottom and sides to a height not less than six (6) inches  
246 above the lower run of the belt except where this would bring  
247 the guard more than seven (7) feet above the floor.

248 (g) Where pulleys are of such dimension and so located  
249 as to permit passage between upper and lower runs of horizontal  
250 belts, standard railing shall be provided and a substantial  
251 passageway guarded on sides and top shall be constructed; or  
252 all space traversed by belt shall be completely barred against  
253 passage.

254 (h) Horizontal overhead belts located seven (7) feet or  
255 more above the floor of a passageway or work place shall be

256 guarded:

257 (1) In the case of belts six (6) inches or more  
258 in width, if traveling 1,000 feet or more per minute; or

259 (2) In the case of belts four (4) inches or more  
260 in width and containing more than two splices, if traveling  
261 800 feet or more per minute.

262 (i) Guards for overhead belt shall run the entire lower  
263 run of the belt and follow the line of the pulley to top of  
264 pulley or be carried to the nearest wall, thus enclosing the  
265 belt run effectively.

266 The guard and all its supporting members shall be securely  
267 fastened.

268 The interior surface of all guards, by which is meant  
269 the surface of the guard with which a belt may come in contact,  
270 shall be free from all projections of any character, except  
271 where construction demands it.

272 Guards shall be constructed of materials as specified  
273 in Rule 10 of this Section 4 of chapter 2, Part "B" of these  
274 rules, of sufficient strength to retain the belt in event of  
275 breakage.

276 Rule 16. Guard for Overhead Rope and Chain Drives:

277 Overhead rope and chain-drive guard construction shall conform  
278 to the rules for overhead-belt guard construction except that  
279 the filling material shall be of the solid type as specified  
280 in Rule 10 of this Section 4 of Chapter 2 of Part "B" of these  
281 rules unless the fire hazard demands the use of open construction.

282 A side guard member of the same solid filling material shall  
283 be carried up in a vertical position two (2) inches above the  
284 level of the lower run of the rope or chain drive and two (2)  
285 inches within the periphery of the pulleys or sprockets which  
286 the guard encloses, thus forming a trough.

287 Where it is necessary to have access to parts enclosed by  
288 guards, suitable doors or gates shall be provided in accordance  
289 with paragraph (4) of Rule 10 of Section 4 of Chapter 2 of  
290 Part "B" of these rules.

291 Rule 17. Exceptions to Rules:

292 (a) Flat belts two (2) inches or less in width and  
293 round belts three-quarters ( $\frac{3}{4}$ ) of an inch or less in diameter,  
294 need not be guarded except at point of contact, unless they  
295 run at a speed in excess of seventeen hundred (1700) feet per  
296 minute.

297 (b) Flat belts over two (2) inches wide and not over  
298 three (3) inches wide, running at a speed of not over 1,000  
299 feet per minute need be guarded only to a point six (6) inches  
300 outward from face of pulley nearest its opposing pulley.

301 (c) Belts on inside cone pulleys requiring frequent  
302 manipulation by hand need not be guarded. Where cone pulleys  
303 are located less than three (3) feet from the floor or working  
304 level, the cone pulley and belt shall be guarded to a height  
305 of three (3) feet regardless of whether the belt is shifted  
306 by a belt shifter or by hand.

307 (d) Guards shall not be required for belts or pulleys

308 that are effectively guarded by location. Where space between  
309 machines, or between machines, walls or adjacent objects is so  
310 limited as to prevent the use of such space as a passageway or  
311 aisle, the guarding of all belts and pulleys located in such  
312 place shall not be required if such space is effectively barred  
313 against use.

314 Rule 18. Emergency Stops:

315 (a) Effective power controlling devices, emergency stops  
316 or switches shall be provided in each room, section or department  
317 so that any particular unit or group of machines or power-  
318 transmission equipment therein can be promptly and effectively  
319 shut down.

320 (b) Emergency stopping devices shall be properly marked  
321 and shall be easily accessible to the employees affected, and  
322 so located that it is not necessary to travel more than 100  
323 feet to reach them, provided this shall not apply to rolling  
324 processes where operator is in constant attendance at the  
325 controls.

326 (c) When a clutch or other power-disengaging device is  
327 used effective means for throwing such device into or out of  
328 engagement shall be provided.

329 (d) In case failure of equipment within a room could  
330 produce a hazardous condition, such as noxious, toxic, or  
331 explosive vapors or gases, an additional control point for  
332 such device shall be placed outside the room but adjacent to  
333 it and properly marked.

334 (e) All electrical switches used for emergency stops  
335 shall operate by the opening of a normally closed circuit.

336 (f) The shifting part of jaw clutches and the shifting  
337 mechanism part of friction clutch couplings, unless properly  
338 guarded, shall be attached to the driven shaft, i.e., the  
339 shaft that will be idle when the clutch is disengaged.

340 (g) Every machine having individual electric drive  
341 or drives shall have the electrical switches so located that  
342 the power can be shut off from the normal point of operation.

343 Rule 19. Belt Shifters:

344 (a) Tight and loose pulleys shall be equipped with a  
345 permanent belt shifter provided with mechanical means to  
346 prevent belt from creeping from loose to tight pulley.

347 (b) Belt shifter and clutch handles shall be rounded  
348 and be located as far as possible from the danger of  
349 accidental contact but within easy reach of the operator.

350 (c) Where overhead belt shifters are not located over  
351 machine or benches, the handle shall be cut off six (6) feet  
352 six (6) inches above floor level. Control handles shall be  
353 so arranged that the operator can stop the equipment from the  
354 usual operating position and should be so arranged that they  
355 will automatically latch in the neutral position. The handle  
356 shall be located outside the guard when clutch is guarded.

357 (d) When a foot treadle is used to operate a belt shifter  
358 or clutch it shall be so guarded that it cannot be struck  
359 accidentally and start the machine.

360 Rule 20. Belt Perches :

361 (a) Where loose pulleys or idlers are not practicable  
362 belt perches in form of brackets, rollers, etc., shall be  
363 used to keep idle belts away from the shaft. Perches shall  
364 be substantially made and so designed that the shipping of  
365 belts to and from them can be safely accomplished.

366 (b) Paper or fibre tubing at least  $\frac{1}{4}$  inch thick,  
367 inside bore at least  $\frac{3}{8}$  inch larger than shafting, split  
368 its entire length to facilitate installation and taped at  
369 both ends and center after installation may be used instead  
370 of belt perches. Other tubing with smooth exterior surfaces  
371 may be used for this purpose.

372 PART "B"

373 CHAPTER 3

374 GUARDING OF POINTS OF OPERATION OF MACHINERY

1 Sec. 1. DEFINITIONS

2 Rule 1. Definitions: The following definitions shall  
3 apply to Chapter 3 or Part "B" of these rules.

4 Power Press. A power press is a power-driven machine,  
5 fitted with plungers, or dies for the purpose of blanking,  
6 trimming, drawing, punching, stamping or forming cold material.

7 Foot, Kick and Hand Presses. Foot, kick and hand presses  
8 are machines actuated by foot or hand power only, and fitted  
9 with plungers or dies for the purpose of blanking, trimming,  
10 drawing, punching or stamping cold material.

11 Drop Hammers. Drop hammers are hammers operated by rope,

12 belt or board, either where the manual effort of the operator  
13 in lifting the hammer or weight is supplemented by the power  
14 of the shaft or those fully mechanically operated when used  
15 on cold material.

16 Plunger. Where the word "plunger" is used it means the  
17 reciprocating moving part of the machine or any die piece  
18 attached to it, which ever come closest to the stationary die.

1 SEC. 2. METAL WORKING MACHINES

2 Rule 1. Power Presses, Foot, Kick and Hand Presses, and  
3 Drop Hammers: Class A.

4 Power presses, foot, kick and hand presses, and drop ham-  
5 mers, having a grinding, shearing, punching, pressing, squeez-  
6 ing, drawing, forming or cutting action, in which the hand or  
7 hands of the employees engaged in connection with the operation  
8 of such machines come within the danger zone shall be so con-  
9 structed or provided with effective safety devices that will  
10 prevent the hand or hands of such employees from being in the  
11 danger zone at the time of operation. The following shall be  
12 deemed compliance with this rule:

13 (a) Automatic Feed. A feed of such character that  
14 services of an operator are not required except at  
15 intervals to restock the feeding device or magazine.

16 (b) Semi-Automatic or Mechanical Feed. An arrange-  
17 ment such as dial feed, slide feed, push feed, rotating  
18 feed or other similar arrangement actuated by or attached  
19 to the machine, by means of which stock is fed under the

20 plunger without necessitating the operator's hands enter-  
21 ing the danger zone, and provided with a guard, enclosure  
22 or barrier in front of the plunger.

23 (c) Limited Plunger Travel (Hand Feed). The machine  
24 shall be so arranged that the maximum distance traveled  
25 by plunger, from the die, is three-eighths ( $\frac{3}{8}$ ) inch.

26 (d) Plunger Enclosure (Hand Feed). Where the press  
27 is safeguarded by enclosing the ram, the enclosure shall  
28 be substantially constructed. The opening between the  
29 bottom of the enclosure and the work or the working sur-  
30 face shall not exceed three-eighths ( $\frac{3}{8}$ ) inch in excess  
31 of the thickness of the material. The top of the en-  
32 closure shall extend at least as high as the upper limit  
33 of travel of the ram. There shall be no dangerous shear  
34 points between the guard and any moving part.

35 There shall be no openings in the guard which will permit  
36 the insertion of a one-half ( $\frac{1}{2}$ ) inch ball if within four  
37 (4) inches of any moving point; if farther away than  
38 four (4) inches, opening shall not permit the insertion  
39 of a one and one-half ( $1\frac{1}{2}$ ) inch ball.

40 (e) Gate Guard (Hand Feed). A guard or gate op-  
41 erated by the tripping device of the press, which inter-  
42 poses a barrier in front and on sides of the plunger be-  
43 fore the plunger descends and will not permit the press  
44 to operate until the hand or hands of the operator have  
45 been removed from the danger zone.

46 (f) Sweep Guard or Movable (Hand Feed). A guard  
47 actuated by some movable part of the machine, designed  
48 and constructed to furnish protection to the operator  
49 at the point of contact or which throws the hands of  
50 the operator out of the way as the plunger descends.

51 (g) Pull Device (Hand Feed). A mechanically  
52 operated device attached to the operator's hands or  
53 arms which withdraws the operator's hands or arms from  
54 the danger zone as the plunger descends.

55 (h) Hand-operated Device (Hand Feed). An arrange-  
56 ment whereby hands instead of feet are used for tripping  
57 the press; the simultaneous action of both hands being  
58 required whereby the operator's hand or hands are with-  
59 drawn from the danger zone as the plunger descends.

60 (i) Fixed Guard across Front and along Sides (Hand  
61 Feed). A fixed guard or enclosure across front and along  
62 both sides of plunger, so arranged that a finger or  
63 fingers cannot go under, over or around the guard or  
64 enclosure while feeding stock.

65 (j) One-Hand Device for Foot or Kick Press (Hand  
66 Feed). An arrangement whereby the tripping mechanism  
67 of the press is operated by one hand.

68 (k) Hand Tools. Vacuum pick-ups or other effective  
69 hand tools for placing stock under the plunger which  
70 do not necessitate the operator bringing the hand or  
71 hands within the danger zone of plunger while feeding

72 the press.

73 Rule 2. Squaring Shears: Class B. Squaring shears  
74 either mechanical, foot or hand power, and fed by hand, shall  
75 have the knives substantially guarded. This rule shall not  
76 apply where the material sheared is more than eighteen (18)  
77 inches, measured from back gauge to knife. This guard may  
78 be a fixed barrier, set not more than three-eighths ( $\frac{3}{8}$ ) inch  
79 above the table or the material being sheared. Automatic  
80 clamps when cut-outs are filled in so that the fingers of the  
81 operator cannot enter the danger zone shall be acceptable as  
82 a guard.

83 Rule 3. Circular Metals Saws: Class B.

84 (a) Circular Metal saws shall be provided with a  
85 hood which will cover the saw at all times to at least  
86 the depth of the teeth.

87 (b) The hood shall automatically adjust itself to  
88 the thickness of and remain in contact with the material  
89 being cut at the point where the stock encounters the  
90 saw, or

91 (c) Shall be a fixed or manually adjusted hood or  
92 guard provided the space between the bottom of the guard  
93 and the material being cut does not exceed three-eighths  
94 ( $\frac{3}{8}$ ) inch at any time; provided that this rule shall not  
95 apply to

96 (1) Saws used for cutting hot metal and saws  
97 with periphery speed less than 500 feet per minute, or

98       (2) Sterotype saws, electrotype saws and saws  
99 used for cutting zinc, copper, or brass into photo  
100 engraving plants, if a plate glass shield or barrier  
101 is provided above the saw, so placed as to afford  
102 protection to the operator.

103       (d) The exposed parts of the saw blade under the  
104 table shall be guarded.

105       Rule 4. Bar Stock Machine: Class A. On machines where  
106 the revolving bar stock is being machined the bar stock shall  
107 be guarded by a trough or tube where it extends beyond the  
108 machine, unless guarded by location.

109       Rule 5. Centrifugal Oil Extractor: Class A.

110       (a) Extractors shall be provided with a cover for  
111 the revolving container and the cover shall be kept  
112 closed at all times when container is in motion; pro-  
113 vided this rule shall not apply to revolving containers  
114 equipped with a top ring.

115       (b) The outer casing or shell shall also be provided  
116 with a cover made of at least No. 20 U.S. Standard gauge  
117 metal or its equivalent, which shall be kept closed while  
118 revolving container or drum is in motion.

119       Rule 6. Metal Embossing Machines: Class B:

120       Metal embossing machines shall be guarded at the point of  
121 operation in the same manner as power presses, or shall be pro-  
122 vided with feed which does not require the hands of the operator  
123 to come into contact with the die while feeding.

124 Rule 7. Effective power controlling devices, emergency  
125 stops or switches shall be provided so that any particular unit  
126 or group of wire drawing machines can be promptly and effective-  
127 ly shut down. Such machines hereafter installed shall be guarded  
128 as follows:

129 (a) Reel Guard. A stopping device so arranged that  
130 it will automatically shut down the take-up block in case  
131 the operator should be caught in the wire as it runs from  
132 the reel or in case the reel should be drawn up to the  
133 frame.

134 (b) Take-up Block Guard. A stopping device so ar-  
135 ranged that it will automatically shut down the take-up  
136 block in case the operator should be caught on the block  
137 and carried around it.

138 Rule 8. Planers: Openings in the bed of all metal planers  
139 shall be covered with substantial metal or other suitable cover-  
140 ing. Where the table or work thereon travels to within eighteen  
141 (18) inches of a wall or other object, the clearance space be-  
142 tween the end of the table or work thereon and such wall or object,  
143 shall be protected by a standard railing on each side of such  
144 clearance space.

### 1 SEC. 3. WOOD WORKING MACHINES

2 Rule 1. Band Saw or Band Knife: Class A. Band wheels  
3 of band saws or band knives and all parts of the blade shall  
4 be enclosed or guarded except the part between the guide and  
5 table that is necessary for the thickness of the material being

6 cut. If a metal guard is used it shall be of not less than 20 U. S.  
7 Standard Gauge; if other material is used, the guard shall be  
8 of equal strength and firmness.

9 Rule 2. Band Resaw: Class A. Band wheels of band re-  
10 saws and all portions of the blade shall be enclosed or guarded  
11 except the portion between the guide and table that is necessary  
12 for the thickness of the material being cut. If a metal guard  
13 is used it shall be of not less than No. 20 U. S. Standard Gauge;  
14 if other material is used, the guard shall be of equal strength  
15 and firmness. The feed rolls shall be enclosed, except such  
16 part as may be necessary to feed stock.

17 Rule 3. Cork Cutter. Class A. Cork cutters shall be  
18 guarded in one of the following ways:

19 (a) Circular knife.

20 (1) A hood shall be provided that will cover the  
21 knife at all times to at least the depth of the cutting  
22 edges.

23 (2) The hood shall automatically adjust itself to the  
24 thickness of and remain in contact with the material being  
25 cut at the point where the stock encounters the knife, or

26 (3) May be a fixed or manually adjusted hood or  
27 guard, provided the space between the bottom of the guard  
28 and the material being machined does not exceed three-  
29 eights ( $\frac{3}{8}$ ) inch at any time.

30 (4) The exposed parts of the cutter blade under the  
31 table shall be guarded.

## 32 (b) Band Knife.

33 Band wheels of band knives and all parts of the blade shall  
34 be enclosed except that part between the guide and the table  
35 that is necessary for the thickness of the material being cut.  
36 If a metal guard is used, it shall be not less than No. 20  
37 U. S. Standard Gauge; if other metal is used, it shall be of  
38 equal strength and firmness.

## 39 Rule 4. Circular Rip Saw (Manual Feed) : Class B.

40 (a) A hood shall be provided that will cover the  
41 saw at all times to at least the depth of the teeth.

42 (b) The hood shall automatically adjust itself to  
43 the thickness of and remain in contact with the material  
44 being cut at the point where the stock encounters the saw,  
45 or may be a fixed or manually adjusted hood or guard pro-  
46 vided the space between the bottom of the guard and the  
47 material being cut does not exceed three-eighths ( $\frac{3}{8}$ ) inch  
48 at any time.

49 (c) The hood or other guard shall be so designed as  
50 to prevent a "kick-back" or a separate attachment that  
51 will prevent a "kick-back" shall be provided. "Kick-back"  
52 devices shall be effective for all thicknesses of material  
53 that are cut.

54 (d) Except when grooving, dadoing or rabbeting, a  
55 spreader shall be provided and fastened securely at the  
56 rear of saw in alignment with saw blade. It shall be  
57 slightly thinner than the saw kerf and slightly thicker

58 than the saw discs.

59 (e) The exposed parts of the saw blade under the  
60 table shall be guarded.

61 Rule 5. Self-Feed Circular Rip Saw: Class A.

62 (a) A hood or guard shall be provided that will cover  
63 the saw at all times at least to the depth of the teeth.

64 The hood or guard need not rest upon the table nor upon the  
65 material being cut, but shall extend to a line not more than  
66 one-half ( $\frac{1}{2}$ ) inch above the plane formed by the bottom of  
67 the feed rolls.

68 (b) The feed rolls shall be enclosed, except such  
69 parts as may be necessary to feed stock.

70 (c) A spreader shall also be provided and fastened  
71 securely at the rear of saw in alignment with saw blade,  
72 except where a roller wheel is provided back of saw. The  
73 spreader shall be slightly thinner than the saw kerf and  
74 slightly thicker than the saw discs.

75 (d) The exposed parts of the saw blade under the table  
76 shall be guarded.

77 Rule 6. Self-Feed Band Rip Saws: Class A.

78 (a) Band Wheels of self-feed band rip saws and all  
79 portions of the blade shall be enclosed or guarded except  
80 the portion between the guide and table that is necessary  
81 for the thickness of the material being cut. If a metal  
82 guard is used it shall be of not less than No. 20 U.S.

83 Standard gauge; if other material is used, the guard shall

84 be of equal strength and firmness.

85 (b) The feed rolls shall be enclosed, except such  
86 part as may be necessary to feed stock.

87 Rule 7. Circular Cross Cut Saws: Class B.

88 (a) A hood shall be provided that will cover the saw  
89 at all times at least to the depth of the teeth.

90 (b) The hood shall automatically adjust itself to  
91 the thickness of and remain in contact with the material  
92 being cut at the point where the stock encounters the saw,  
93 or may be a fixed or manually adjusted hood or guard pro-  
94 vided the space between the bottom of the guard and the  
95 material being cut does not exceed three-eighths ( $\frac{3}{8}$ ) inch  
96 at any time; provided this rule shall not apply to circular  
97 cross cut saws with stationary tables where the saw moves  
98 forward when cutting.

99 (c) Circular cross cut saws with stationary tables  
100 where the saw moves forward when cutting have a hood or  
101 guard securely fastened to the table that will cover the  
102 saw when running idle. The hood or guard shall extend at  
103 least two (2) inches in front of the saw teeth, when the  
104 saw is in its back position.

105 (d) The exposed parts of the saw blade under the table  
106 shall be guarded over its entire travel.

107 Rule 8. Swing Cut Off Saw: Class A.

108 (a) A guard shall be provided that will cover the  
109 saw, and such guard shall adjust itself to the thickness

110 of the stock being cut.

111 (b) There shall be an effective device to return the  
112 saw automatically to the back of the table when released  
113 at any point of its travel.

114 (c) If a counter-weight is used all bolts supporting  
115 the bar and weight shall be provided with cotter pins. A  
116 bolt shall be put through the extreme end of counterweight  
117 bar to prevent dropping of weight, or where the weight  
118 does not enclose the rod, a safety chain shall be attached  
119 to it to prevent dropping.

120 (d) Limit chains or other positive stops shall be  
121 provided to prevent the saw from swinging beyond the front  
122 edge of the table.

123 Rule 9. Circular Resaws: Class A.

124 (a) A hood shall be provided that will cover the saw  
125 at all times, except where the material is being cut.

126 (b) A spreader shall also be provided and fastened se-  
127 curely at the rear of saw in alignment with the saw blade,  
128 except where a roller wheel is provided back of saw. The  
129 spreader shall be slightly thinner than the saw kerf and  
130 slightly thicker than the saw disc.

131 (c) Feed rolls shall be enclosed except such part as  
132 may be necessary to feed stock.

133 Rule 10. Portable Circular Saws. Class A.

134 Portable circular saws shall be provided with a hood that  
135 will cover the saw teeth at all times except where the material

136 is being cut.

137 Rule 11. Jointer or Buzz Planer: Class A.

138 (a) A cylindrical cutting head shall be provided.

139 (b) A guard which adjusts automatically over the  
140 cutting head shall be provided. All exposed parts of  
141 cutting head shall be guarded.

142 (c) Where equipped with automatic feed, the feeding  
143 mechanism shall be guarded.

144 (d) Where knives are exposed beneath the table, they  
145 shall be guarded.

146 Rule 12. Combination Woodworking Machines. Class B.

147 Each point of operation of any tool shall be guarded as  
148 required for such tool in a separate machine.

149 Rule 13. Automatic Lathes: Class A.

150 A hood or cover shall be provided enclosing the cutter  
151 blades, except at the contact points, while the stock is being  
152 cut.

153 Rule 14. Matcher: Class A.

154 (a) Matchers shall be guarded by hoods or other en-  
155 closures that shall be so arranged and maintained as to  
156 effectively guard all cutting heads and knives.

157 (b) Feed rolls shall be enclosed, except such part  
158 as may be necessary to feed stock.

159 Rule 15. Mortising Machines: Class A.

160 (a) Mortising machines except hollow chisel mortisers,  
161 shall be provided with thumb stops at each side of the

162 chisel.

163 (b) Chain mortisers shall be guarded by enclosure  
164 on top.

165 Rule 16. Moulder: Class A.

166 (a) Moulders shall be guarded with hoods or other en-  
167 closures that shall be so arranged and maintained as to  
168 guard effectively all cutting heads and knives.

169 (b) Feed rolls shall be enclosed, except such part  
170 as may be necessary to feed stock.

171 Rule 17. Panel Raiser: Class A.

172 (a) Panel raisers shall be guarded with hoods or  
173 other enclosures so arranged and maintained as to guard  
174 effectively all cutting heads and knives.

175 (b) Feed rolls shall be enclosed, except such part  
176 as may be necessary to feed stock.

177 Rule 18. Planer: Class A.

178 (a) Planers shall be guarded with hoods or other en-  
179 closures so arranged and maintained as to guard effective-  
180 ly all cutting heads and knives.

181 (b) Feed rolls shall be enclosed, except such parts  
182 as may be necessary to feed stock.

183 Rule 19. Disc Sanders: Class A.

184 Disc sanders shall have the periphery and back of re-  
185 volving head guarded, and the space between revolving discs and  
186 edge of table shall not be greater than one-quarter ( $\frac{1}{4}$ ) inch.

187 Rule 20. Drum Sander: Class A.

188 (a) The exposed parts of the drum, except that portion  
189 where the material comes in contact with the abrasive sur-  
190 faces, shall be guarded.

191 (b) Feed rolls shall be enclosed except such part as  
192 may be necessary to feed stock.

193 Rule 21. Shaper: Class B.

194 The cutting heads of wood shapers shall be provided with  
195 a guard that will prevent the hands of the operator from coming  
196 in contact with the knives; provided this rule shall not apply  
197 when covered templates at shapers are used, through which  
198 work may be fed and which will hold the work up to knife  
199 collars; or on inside on circular or irregular shaped pieces.

200 Rule 22. Sticker: Class A.

201 (a) Stickers shall be guarded with hoods or other  
202 enclosures so arranged and maintained as to guard effec-  
203 tively all cutting heads and knives.

204 (b) Feed rolls shall be enclosed, except such part  
205 as may be necessary to feed stock.

206 Rule 23. Tenoner: Class A.

207 Tenoners shall be provided with hoods or other enclosures  
208 so arranged and maintained as to guard effectively all cutting  
209 parts and saws.

210 Rule 24. Wood Heel Turning Machines: Class A.

211 Wood heel turning machines shall be provided with a guard  
212 or shield in front of the cutters, except while it is necessary  
213 to expose a part of the cutter while turning stock.

214 Rule 25. Stave Jointer: Class A.

215 The upper half of the rotating head or disc carrying the  
216 knives of stave jointers shall be provided with a cover over  
217 the sides and front.

218 Rule 26. Veneer Clipper or Slicer: Class A.

219 Veneer clippers, or slicers, shall be provided with prong  
220 guards or shields, both in front and back of the knife, so  
221 arranged that the hands of the operator and the man taking  
222 away, cannot be caught.

1 SEC. 4. PRINTING AND PAPER MACHINES

2 Rule 1. Job Platen Press: Class A.

3 Job platen presses with or without mechanical power shall  
4 be provided with one of the following:

5 (a) An automatic feed which does not require the  
6 operator's hands to be placed between the platen and  
7 bed, or an automatic stop which will prevent the platen  
8 from closing if the hand or hands of operator are caught  
9 between the platen and the bed, or

10 (b) A guard, gate or sweep motion, mechanically  
11 operated, which will throw the operator's hands out of  
12 the way as the press closes. If of the type which lifts  
13 the hands out of the danger zone, the guard shall rise at  
14 least four (4) inches above the platen as the press closes  
15 and the guard shall descend by gravity or be drawn down  
16 by springs. The guard shall be arranged so that it will  
17 prevent a shear between the guard and the top of the platen,

18 or

19 (c) Any other device that will prevent the platen  
20 from fully closing, if the hands of the operator are  
21 caught between the platen and bed.

22 Rule 2. Cylinder, Rotary and Lithographic Presses: Class A.

23 (a) Cylinder and Lithographic Presses: The in-run-  
24 ning sides of the cylinders and rollers shall be provided  
25 with a guard that will protect the operator from being  
26 caught between the cylinders, rollers, or bed of the press  
27 when working or passing along the sides of the press while  
28 the press is in operation, except when guarded by location.

29 (b) Rotary Presses: The in-running sides of power  
30 operated rollers and cylinders, except cutting and pinch  
31 rollers, shall be provided with a guard or a gate so  
32 arranged that any part of the operator's clothing or body  
33 will not be drawn into the in-running rollers or cylinders  
34 while the press is in operation.

35 Rule 3. Embossing Machines: Class A.

36 Embossers of the platen or head type shall be equipped with:

37 (a) A fixed guard enclosing front and sides of platten  
38 with space for feeding stock. The guard shall be so arranged  
39 as to protect the operator's fingers from going between  
40 the platen and the die while feeding stock, or

41 (b) A fixed or a movable guard on the sides and a  
42 movable guard in front connected with the operating mechan-  
43 ism in such a manner that the operator's fingers will not

44 be caught by the platten while feeding stock, or

45 (c) A starting device which requires the simultaneous

46 action of both hands to trip the machine, or

47 (d) A mechanically operated device attached to the op-

48 erator's hands or arms which withdraws the operator's hands

49 from the danger zone as the platen ascends or descends.

50 Provided, however, that this Rule 3 shall not apply to

51 machines which feed in such a manner that the hands of the

52 operator do not come between the platen and the bed while

53 feeding.

54 Rule 4: Paper Punch: Class B.

55 Mechanical or foot power punches, except line perfo-

56 rators shall be provided with a gate guard to protect the oper-

57 ator's fingers from coming between the punch and die while the

58 machine is in operation.

59 Rule 5. Paper Cutters. Class B.

60 Hand and Foot Power: Hand and foot power paper cutters

61 shall be provided with a rod or plate so arranged on the feed-

62 ing side that the hands of the operator will not reach the

63 cutting edge while holding the paper in place.

64 Rule 6. Power-driven Guillotine Paper Cutters: Class B.

65 Power-driven guillotine paper cutters shall be provided

66 with:

67 (a) A non-repeat device that will within its own

68 action automatically lock the clutch mechanism into

69 place so that the cutter cannot make a second stroke

70 until the hand lever is again moved into the cutter

71 starting position, or

72 (b) A buffer that will interpose a positive stop

73 to some moving part of the machine whenever the clutch

74 fails to perform the function of preventing the cutter

75 from making a repeat stroke.

76 In addition to the non-repeat device or buffer, power-

77 driven guillotine paper cutters shall be provided with:

78 (a) A starting device which requires the simultaneous

79 action of both hands during a cutting motion of the

80 knife, or

81 (b) An arrangement on the starting device or other

82 part of the machine that will interpose a barrier or

83 interlock between the starting level and clutch which

84 must be released through a movement of the hand starting

85 lever before such lever can be moved to the position

86 where it applies power to the cutter.

87 Provided, however, that this Rule 6 shall not apply to

88 continuous feed trimmers.

89 Rule 7. Cutters and Creasers: Class A.

90 Drum cylinder type of cutters and creasers shall be

91 guarded so as to protect the operator's hands being caught

92 between the cylinder and the bed.

93 Where the operation is similar to that of a platen print-

94 ing press the machine shall be guarded in same manner as

95 provided for in Rule 1 for job platen presses.

96 Rule 8. Rotary Scoring Machines: Class A.

97 Scorers shall have a guard in front of in-running discs  
98 to protect operator's hands from injury while machine is in  
99 operation.

100 Rule 9. Rotary Creaser and Slitter. Class A.

101 Paper creasers and slitters shall be guarded so as to  
102 protect the fingers of the operator from coming into contact  
103 with the creasing or cutting discs while machine is in operation.

104 Rule 10. Slotters: Class A.

105 (a) Slotters of vertical type: The knife shall be  
106 primarily provided with a stripper, or shall be provided  
107 with a guard in front of knives so arranged as to protect  
108 the hands of the operator from coming in contact with the  
109 knives while machine is in operation.

110 (b) Rotary Slotters: A guard shall be provided in  
111 front of the knives to protect the hands of the operator  
112 from coming into contact with the knives while machine  
113 is in operation.

114 Rule 11. Corner Cutter: Class A.

115 Corner cutter, single and double machines with or without  
116 mechanical power, shall be provided with a guard to protect  
117 the operator's fingers from being injured by the knives.

118 Rule 12. Corner Stayer: Class A.

119 Corner stayer with or without mechanical power shall be  
120 provided with:

121 (a) An automatic devise that will instantly stop

122 the downward motion of the plunger, should the fingers  
123 of the operator come between the plunger and the anvil,  
124 or

125 (b) A fixed guard so arranged as to protect the  
126 operator's fingers from getting under the plunger while  
127 the machine is in operation.

128 Rule 13. Ending and Edge Attaching Machines: Class A.

129 Paper box ending and edge attaching machines shall be pro-  
130 vided with an automatic device which will prevent the applica-  
131 tion of injurious pressure if the fingers of the operator are  
132 between the top of the form and the pressure head.

133 Rule 14. Lacing or Ply-Leafing Machines. Class A.

134 The pressure plunger shall have attached across its lower  
135 front edge a strip of soft rubber or other material of equal  
136 elasticity and of at least one-half ( $\frac{1}{2}$ ) inch width to protect  
137 the operator's fingers from injury while feeding stock.

1 SEC. 5. PAPER MAKING MACHINES

2 Rule 1. Calendar Rolls: Class B.

3 (a) The calendar rolls shall be guarded or equipped  
4 with a feeding device at in-running side so arranged that  
5 the material can be fed without permitting the fingers of  
6 the operator to be caught between the rolls.

7 (b) The bottom rolls of the calendar stack shall be  
8 guarded at rear of stack in such manner as to prevent  
9 persons from putting broken paper through the bottom  
10 rolls.

11 Rule 2. Paper Slitter: Class B.

12 (a) The discs of paper slitters exposed to contact  
13 shall be so guarded that the operator cannot come into  
14 contact with the cutting edge of disc.

15 (b) Discs are exposed to contact when within reach  
16 of operator while standing on the working floor or platform.

1 SEC. 6. TEXTILE, LAUNDRY AND FABRIC

2 PROCESSING MACHINERY

3 Rule 1. Shuttles: Class B.

4 All looms shall have a shuttle guard constructed in such  
5 a manner as to prevent shuttle flying from machine.

6 Rule 2. Cards: Class A.

7 (a) The cylinder cover on revolving flat type cards  
8 must be provided with an interlock, or securely bolted in  
9 place, or shall be provided with a stripping device so  
10 arranged that the operator cannot come in contact with  
11 point of operation.

12 (b) A licker-in cover shall be provided on all cards  
13 and shall be bolted securely in place so that it cannot be  
14 readily opened by the operator. The use of thumb screws  
15 or wing nuts in same is prohibited.

16 Rule 3. Centrifugal Wringers and Extractors: Class A.

17 All centrifugal wringers and extractors shall be equipped  
18 with safeguards as follows:

19 (a) Centrifugal wringers or extractors shall be  
20 equipped with a cover that will prevent the operator

21 from contacting the revolving basket or its contents,  
22 and such cover shall be made of materials at least equiva-  
23 lent in strength to No. 20 U. S. gauge steel.

24 (b) Centrifugal wringers and extractors **shall be**  
25 equipped with an interlocking device which shall prevent  
26 the power operation of the basket while the cover is open.

27 (c) Centrifugal wringers or extractors installed after  
28 adoption of this rule shall be equipped with an interlock-  
29 ing device that will prevent the cover from being opened  
30 while the basket is in motion.

31 (d) Centrifugal wringers or extractors shall be secure-  
32 ly fastened to a foundation to reduce vibration to a mini-  
33 mum and such foundation shall be sufficient to prevent ex-  
34 cessive vibration of the equipment when there is an extreme  
35 out-of-balance load in the basket.

36 (e) Centrifugal wringers and extractors shall not be  
37 operated at a speed in excess of the safe speed in revolu-  
38 tions per minute indicated by the manufacturer of the equip-  
39 ment and such safe speed shall be permanently marked in  
40 a conspicuous place on the equipment in letters and figures  
41 not less than  $\frac{1}{4}$ -inch in height. When the safe maximum op-  
42 erating speed cannot be ascertained from the manufacturer  
43 of the equipment, the maximum speed in revolutions per  
44 minute shall not exceed the equivalent of more than 9400  
45 peripheral feet per minute for centrifugal wringers and  
46 extractors up to and including 48 inches in diameter and

47 for centrifugal wringers and extractors over 48 inches in  
48 diameter and not more than 56 inches in diameter, the  
49 peripheral speed shall not exceed 8600 feet per minute,  
50 and for centrifugal wringers and extractors over 56 inches  
51 in diameter and not over 63 inches in diameter the peri-  
52 pheral speed shall not be greater than 7800 feet per  
53 minute.

54 (f) When such centrifugal wringers or extractors are  
55 operated by engines or other variable speed driving equip-  
56 ment the centrifugal wringer or extractor or variable  
57 speed driving equipment shall be provided with a speed  
58 limit governor that will not permit the wringer or ex-  
59 tractor to operate beyond its safe rated speed.

60 Rule 4. Cotton Picker, Opener and Willower: Class A.

61 The beater cover shall be provided with a device so  
62 arranged that the cover cannot be opened while the beater is  
63 revolving or shall be securely bolted in place. The use of  
64 thumb screws and wing nuts is prohibited.

65 Rule 5. Picker Machines: Class A.

66 All machines used in picking wool, hair, rags or other  
67 material shall have rolls completely covered, except opening  
68 necessary to feed stock. This opening shall be so constructed  
69 or guarded that the operator's fingers cannot come in contact  
70 with the rolls.

71 This rule shall not apply in case of machines covered by  
72 next preceding Rule 4.

73 Rule 6. Carpet Frayer: Class A.

74 Cylinder door or cover shall be provided with a device,  
75 so constructed that the cover cannot be opened while the roller  
76 is revolving, or the cover shall be clamped in place and the  
77 slot be so constructed and guarded that the operator's fingers  
78 cannot come in contact with the roller.

79 Rule 7. Carpet Trimmer: Class A.

80 Revolving knives shall be provided with cover or guard  
81 which will prevent the operator's fingers from coming in con-  
82 tact with the knives.

83 Rule 8. Pile Cutter: Class A.

84 Knife rolls shall be provided with a cover or guard which  
85 will prevent the operator's fingers from coming in contact with  
86 the rolls.

87 Rule 9. Washing Machines, Drying Tumblers and Drum  
88 Shakers: Class A.

89 Washing machines, drying tumblers or drum shakers having  
90 revolving inner cylinders and stationary outer cases, and ex-  
91 cepting only drying tumblers of the open end type shall be  
92 safeguarded in the following manner:

93 (a) A positive locking device either electrical or  
94 mechanical shall be provided which will prevent the in-  
95 side cylinder from moving while the case doors are open  
96 and also prevent these doors from being opened while the  
97 inside cylinder is in motion, except that such device shall  
98 not prevent the inching of the cylinder by hand or by inch-

99 ing device.

100 (b) Washing machines, drying tumblers and drum  
101 shakers having revolving cylinders regardless of whether  
102 they are equipped or not equipped with outer cases shall  
103 be provided with a device which will securely hold the  
104 cylinder doors in an open position while being loaded  
105 or unloaded.

106 Rule 10. Garnett Machines: Class B.

107 Openings in lower frame and between lower frame and floor  
108 shall be guarded. Where metal guard is used, it shall be not  
109 less than No. 20 U. S. Standard Gauge.

110 Rule 11. Unhairing Machines: Class A.

111 All knives used in removing hair from pelts shall be guarded  
112 by a solid metal enclosure, completely enclosing knives ex-  
113 cept opening in guard necessary to feed stock.

114 Rule 12. Shredding Machines: Class A.

115 The revolving knives and the stationary shearing knife  
116 shall be enclosed with a metal or wire mesh guard, openings not  
117 to exceed one-half ( $\frac{1}{2}$ ) inch, extending from the top of feed con-  
118 veyor to a point below the cutting edge of knives.

119 Rule 13. Marking Machines: Class A.

120 Power operated marking machines shall be guarded at the  
121 point of operation in the same manner as power presses, to pre-  
122 vent the fingers and hands of operators from coming in contact  
123 with the marking die.

124 Rule 14. Power Wringers: Class A.

125 The feed or pressure rolls of power operated wringers shall  
126 be provided with a guard at the run-in side the full length of  
127 the rolls and so arranged as to allow the material to be fed in  
128 without permitting the fingers of the operators to become caught  
129 between the rolls; or a quick stopping or reversing device shall  
130 be provided which shall cause the rolls to stop or reverse if  
131 the guard is contacted by the operator's hands.

132 Rule 15. Dampening Machines: Class A.

133 Every roll type dampening machine shall have the rolls  
134 entirely enclosed and provision shall be made for feeding the  
135 material into the rolls through the enclosure by means of a  
136 slot not over  $\frac{1}{4}$ -inch in width.

137 Rule 16. Cylinder and Chest Type Ironers: Class A.

138 Flat work ironing machines, body, sleeve, bosom, collar,  
139 cuff, band and combination ironers and the like, equipped with  
140 power pressure rolls, excepting such types of equipment operated  
141 by foot pressure, shall be guarded as per the following:

142 (a) All such ironing machines shall be equipped with  
143 a safety guard located directly in front of the feeding  
144 point so constructed that fingers or hands of the operators  
145 cannot touch any part of the rolls on the run-in side with-  
146 out tripping the guard. This guard shall be substantially  
147 constructed and pivoted to move freely toward the direction  
148 of feed, and shall be connected to the main driving clutch  
149 in such a manner as to disengage the clutch and posi-  
150 tively stop the machine within a distance not greater than

151 the distance between the normal position of the guard and  
152 the point of pressure roll contact in case of a slight move-  
153 ment of the guard toward the direction of feed.

154 (b) Flat work ironers only shall be provided with a  
155 combination ventilating hood and enclosure guard over the  
156 top of the heating elements. Such hood or guard shall be  
157 open only at the feeding and discharge ends of the ironer.  
158 Otherwise the hood or guard shall prevent employees from  
159 coming in contact with the pressure rolls. The ventilating  
160 hood or guard shall be connected to a mechanical exhaust  
161 system which shall be kept in operation during the operation  
162 of the ironer and such exhaust system shall provide a  
163 flow of air into all openings in the hood of not less  
164 than an average velocity of 50 feet per minute. Such  
165 hood or guard shall be made so that it can be readily  
166 removed for inspection and maintenance of the machine. The  
167 hot humid air exhausted from such ironers shall be dis-  
168 charged out-of-doors in such a manner as to prevent its  
169 reentering the building or being forced into adjacent  
170 buildings.

171 (c) During the operation of reclothng the rolls on  
172 flat work ironers only, the power shall be shut off and  
173 the machine turned over manually; except in the case of  
174 power driven speed control ironers where the low speed  
175 does not exceed 25 peripheral speed per minute on the  
176 ironer rolls, the reclothng may be done by means of power.

177 When rolls are reclothed by means of power an employee  
178 shall be stationed at the power shut-off control to shut  
179 off the power in case the reclothing operator comes in  
180 contact with the rolls.

181 Rule 17. Treadle Operated Pressers and Ironers: Class A.

182 Treadle operated pressers and ironers shall be so operated  
183 as not to require in excess of 75 pounds foot treadle pressure.  
184 The foot treadle of such pressers and ironers shall be so located  
185 that when the treadle is pressed to its maximum stroke the sur-  
186 face of the treadle is level with the floor or working platform.

187 Rule 18. Press Type Body Ironers: Class A.

188 Press type body ironers shall be guarded at the point of  
189 operation in the same manner as power presses.

190 Rule 19. Hand Ironing: Class A.

191 The ironing board for hand ironing shall be adjustable  
192 for height or the height of such ironing board shall be ad-  
193 justed to the height of the operator by means of working  
194 platforms.

195 Rule 20. Power Sewing Machines: Class A.

196 Power operated sewing machines for sewing, stitching,  
197 button-holing, attaching buttons, darning and the like shall  
198 be equipped with a guard firmly attached to the pressure foot  
199 or other part of the sewing machine that will prevent the op-  
200 erator's fingers from passing under the needle point during  
201 any part of the stroke of the needle. Such guard shall permit  
202 threading of the needle without the necessity of loosening or

203 removing the guard, and such guard shall provide for visability  
204 of the sewing operation.

1 SEC. 7. LEATHER, PROXYLINE AND COMPOSITION GOODS  
MACHINES

2 Rule 1. Skiving Machines: Class A.

3 The feed rolls shall be so guarded that the operator's  
4 fingers cannot go between the rolls.

5 Rule 2. Stripper: Class B.

6 Strippers shall be provided with a starting device which  
7 requires the simultaneous action of both hands during the cutting  
8 moovements of the knife.

9 Rule 3. Dinking Machines: Class A.

10 One of the following types of protection shall be pro-  
11 vided:

12 (a) Dies known as "safety type" shall be used through-  
13 out. Such dies shall be at least three (3) inches in  
14 height with safety grooves or flanges to reduce the danger  
15 of the operator's fingers being caught between top of die  
16 and beam, or they shall be provided with horizontal handles  
17 or with vertical handles at least two and one-half (2½)  
18 inches in height above the top of the die proper.

19 (b) Provision of a sliding table which does not  
20 require the operator to place his hands under the beam.

21 (c) A two-handled device that requires both hands  
22 of the operator to be removed from under the beam at the  
23 time of tripping the machine.

24 Rule 4. Embossing Machines: Class B.

25 Embossers of the platen or head type shall be equipped with:

26 (a) A fixed guard enclosing front and sides of platen  
27 with space for feeding stock. The guard shall be placed  
28 so as to prevent the operator's fingers being caught be-  
29 tween the platen and die while feeding or removing stock,  
30 or

31 (b) A fixed or a movable guard on the sides and a  
32 movable guard in front connected with the operating  
33 mechanism in such a manner that the operator's fingers  
34 cannot be caught between the platen and die while feeding  
35 or removing stock, or

36 (c) A starting device which requires the simultaneous  
37 action of both hands of the operator to trip the machine.

38 (d) When two operators are operating the machine,  
39 a starting device which requires the simultaneous action  
40 of both hands of each of the operators to trip the machine  
41 shall be provided.

42 This rule shall not apply to machines with automatic or  
43 other feed where the hands of the operator cannot come in con-  
44 tact with the die while feeding.

45 Rule 5. Heel Compressing Machines: Class A.

46 Heel compressing machines shall be equipped with a start-  
47 ing device that requires the simultaneous action of both hands  
48 to trip the machine, or shall be provided with a mechanical  
49 feeding device so that the hands of the operator cannot come

50 within the danger zone.

51 Rule 6. Splitter: Class A.

52 (a) Feed rolls on stationary knife splitters shall  
53 be so guarded that the operator's fingers cannot go be-  
54 tween the rolls.

55 (b) Band knife splitters shall have all exposed por-  
56 tions of the knife as well as band sheaves enclosed or  
57 guarded.

58 Rule 7. Tanning Drums: Class A.

59 Horizontal revolving drums shall be enclosed or guarded  
60 so as to prevent any person coming in contact with them and  
61 in addition the drum shall be provided with a substantial  
62 device such as a rack, drum or hand wheel locking bar, to  
63 prevent the movement of the drum while loading or unloading.

1 SEC. 8. FOOD AND TOBACCO MACHINES

2 Rule 1. Horizontal Tilting Type Dough Mixers: Class A.

3 (a) Horizontal tilting type dough mixers shall be  
4 provided with a cover over the top of the mixer. An  
5 interlocking device shall be provided, so arranged that  
6 power cannot be applied to the agitators unless the mixer  
7 is in operating position with cover in place.

8 (b) The mixer when tilted may be operated with the  
9 cover open:

10 (1) If equipped with an electrical push button,  
11 that will require the operator to keep his fingers on  
12 the button when operating the mixer with the cover

13 open, the button shall be located so that the operator  
14 cannot reach into the mixer while pressing the button,  
15 or

16 (2) If belt drive, the belt shifter shall be so  
17 arranged that it will move the belt to the loose  
18 pulley and hold it there while the mixer bowl is  
19 tilted and uncovered, unless the operator holds the  
20 belt on the tight pulley. The belt shifter must be  
21 so located that the operator cannot reach into the  
22 mixer while holding the shifter, or

23 (3) If clutch driven, the clutch lever shall be  
24 so arranged that it will move the clutch out of en-  
25 gagement and hold it out while the mixer is tilted  
26 or uncovered, unless the operator holds the clutch  
27 in engagement. The clutch lever shall be so located  
28 that the operator cannot reach into the mixer while  
29 holding the lever.

30 Rule 2. Horizontal Non-Tilting Dough Mixers: Class A.

31 Horizontal non-tilting type dough mixers shall have a  
32 cover with an interlocking device so arranged that power cannot  
33 be applied to the agitators unless the cover is in place on the  
34 mixer; provided this rule shall not apply to dough mixers that  
35 have agitators which are removed for cleaning.

36 Rule 3. Rotary Kneaders: Class A.

37 Rotary dough kneaders, with open top shall have the top  
38 of the kneading cog wheel guarded so the operator's hands can-

39 not come in contact with the cog wheel.

40 Rule 4. Dough Brake: Class A.

41 Rolls on dough brakes shall be enclosed so that the op-  
42 perator's hands cannot come in contact with the rolls when in  
43 motion.

44 Rule 5. Cake Cutter: Class A.

45 Band wheels and band knives shall be completely housed  
46 above and below the table. That portion of the band knife be-  
47 tween the bottom of the wheel housing and top of table shall  
48 be guarded with a square or circular expanded metal or mesh  
49 guard to provide visibility and prevent operator's hand from  
50 coming in contact with band knife.

51 The guard shall be made of not more than three-quarters  
52 ( $\frac{3}{4}$ ) inch expanded metal or mesh of not less than number 20 U. S.  
53 Standard Gauge, with rounded edges.

54 Rule 6. Candy Cutter: Class A.

55 The rolls or knives of roller and fan type candy cutters  
56 shall be provided with a cover or guard, so arranged that the  
57 fingers of the operator cannot come in contact with same.

58 Rule 7. Caramel Slitter: Class B.

59 The circular knives of caramel slitters shall be provided  
60 with a guard which will cover the knives down to the surface  
61 of material being fed.

62 Rule 8. Candy Breaker: Class A.

63 The chains on the chain type candy breakers shall be com-  
64 pletely enclosed in a sheet metal cover or wire mesh not to exceed

65 one-quarter ( $\frac{1}{4}$ ) of an inch so that the fingers of the operator  
66 cannot come into contact with the chains when feeding the ma-  
67 chine or removing the stock.

68 Rule 9. Meat, Fish and Other Food Grinders: Class A.

69 Shall be provided with a hopper of such size and arrange-  
70 ment that the operator's fingers cannot come in contact with  
71 the cutting or feeding knives or worm.

72 Rule 10. Ice Breaker or Crusher: Class A.

73 Ice breakers or crushers shall be provided with a hopper  
74 of such size and arrangement that the hands of the operator  
75 cannot come into contact with the revolving teeth or prongs  
76 while the machine is in operation.

77 Rule 11. Bottling Machine: Class A.

78 Pressure bottling machines shall be provided with an en-  
79 closure made of sheet metal not less than No. 18 U. S. Standard  
80 gauge, wire mesh or screen openings not to exceed one-quarter  
81 ( $\frac{1}{4}$ ) of an inch, and shall be so arranged on the machine that  
82 broken glass cannot fly in any direction and strike employees.  
83 The enclosure shall extend downward at sides and rear to a point  
84 level with the base of that part of the machine on which the  
85 bottle stands while being filled, and upward to a point at  
86 least four (4) inches higher than the top of the bottle, and  
87 be so constructed that each bottle, when being filled, shall  
88 be protected similarly by a solid guard on the side facing the  
89 operator. When the bottling is done under a pressure of more  
90 than seventy-five (75) pounds, such enclosure shall be con-

91 structured of metal not less than No. 12 U. S. Standard Gauge.

92 Rule 12. Tobacco Stem Crusher: Class A.

93 The rolls shall be so enclosed that it will not be possible  
94 for the operator's fingers to come in contact with them.

95 Rule 13. Cigar Cutter: Class A.

96 (a) The knives shall be provided with a metal cover  
97 that will enclose the knives, or

98 (b) A feed hopper or feed belt shall be provided  
99 of such size and so arranged that material may be fed  
100 without the operator's fingers coming in contact with  
101 the knives.

1 SEC. 9. CHEMICAL MACHINES

2 Rule 1. Linter: Class A.

3 Breast when hinged, shall be provided with a device so  
4 arranged that it cannot be raised while the saw cylinder is  
5 running. When not hinged, breast shall be securely bolted  
6 in place, excluding the use of thumb screws and wing nuts.  
7 Shields shall be provided in front of openings beneath the  
8 lower breast and grate fall and beneath the grate fall which  
9 will prevent the operator from reaching up into the saws.

10 Rule 2. Washing Machines: Class A.

11 (a) Each washing machine shall be equipped with an  
12 interlocking or other device that will prevent the in-  
13 side cylinder from moving, when the outer door on the  
14 case or shell is open more than six (6) inches.

15 (b) The movement of the inner cylinder by a hand

16 operated worm wheel or by the operation of an inching  
17 device is permitted.

18 (c) Each washing machine shall be provided with  
19 means for holding open the doors or covers of the inner  
20 cylinder and outer shell, while being loaded or unloaded,  
21 except when doors of inner cylinders and outer shell are  
22 hinged at bottom or slide downwardly.

23 Rule 3. Extractors: Class B.

24 Centrifugal extractors shall be provided with a cover for  
25 outer casing or shell, which shall be kept closed at all times  
26 while basket is in motion.

27 Rule 4. Mills: Class A.

28 (a) Mills shall be equipped with a quick stopping  
29 or reversing device, so arranged that the operator can  
30 actuate the device while in his usual working position  
31 should his hands be caught, or

32 (b) Shall be provided with a hopper of such size  
33 and arrangement that the hands of the operator cannot  
34 come in contact with the rolls.

35 Rule 5. Soap Presses: Class A.

36 Hand fed soap presses shall be guarded, at point of  
37 operation, as specified in Rule 1 of Sec. 2 of Chapter 3  
38 of Part "B" of these rules.'

1 SEC. 10. RUBBER, COMPOSITION AND BONE WORKING  
MACHINES

2 Rule 1. Calendar Rolls: Class A.

3      Calendar machines shall be equipped with a quick stopping  
4 or reversing device, so arranged that the operator can actuate  
5 the device while in his usual working position should his hands  
6 be caught.

7      Rule 2. Chopper (Rubber) : Class B.

8      Rubber choppers shall be provided with an adjustable metal  
9 or wire mesh guard with openings not to exceed one-quarter ( $\frac{1}{4}$ )  
10 inch. The guard shall extend across the front and rear of the  
11 cutting blade, so that the fingers of the operator cannot come  
12 in contact with the knife.

13      Rule 3. Chopper-Rubber Band (Revolving Type) : Class A.

14      The cutter head and knives shall be enclosed with a guard  
15 made of sheet metal or wire mesh with slots or openings not to  
16 exceed one-quarter ( $\frac{1}{4}$ ) inch. The guard shall extend at least  
17 twelve (12) inches below on the discharge side, not less than  
18 six (6) inches in front of cutting head and not more than three  
19 (3) inches above the table on the feed side.

20      Rule 4. Cutter-Bevel (Circular Knife) : Class A.

21      The circular knife shall be enclosed in a metal hood which  
22 shall cover all exposed parts of the blade, except the part which  
23 shall be used for cutting material. The sliding table shall be  
24 provided with a stop that will limit its travel so the knife  
25 cannot extend beyond the table.

26      Rule 5. Cutter-Sheet Rubber (Horizontal cutter type) :  
27 Class A.

28      The exposed portion of the knife at the sides of the

29 sliding table shall be covered with a metal enclosure. When  
30 enclosure is not of solid type, openings shall not exceed  
31 one-quarter ( $\frac{1}{4}$ ) inch.

32 Rule 6. Rubber Mills: Class A.

33 (a) Mills shall be equipped with a quick stopping  
34 or reversing device, so arranged that the operator can  
35 actuate the device while in his usual working position  
36 should his hands be caught, or

37 (b) Shall be provided with a hopper of such size  
38 and arrangement that the hand or hands of the operator  
39 cannot come in contact with the rolls.

40 Rule 7. Saws and Slitters: Class A.

41 (a) A guard shall be provided that will cover the saw  
42 or knife at all times to at least the depth of the teeth  
43 or cutting edge. The guard shall:

44 (1) automatically adjust itself to the thickness  
45 of and remain in contact with the material being cut  
46 at the point where the stock encounters the saw or  
47 knife, or

48 (2) be a fixed or manually adjusted hood or guard  
49 if the space between the bottom of the guard and the  
50 material being cut does not exceed three-eighths ( $\frac{3}{8}$ )  
51 inch at any time.

52 (b) The exposed part of saw blades under the tables  
53 shall be guarded.



13 In the case of such open vats, pans and tanks, where  
14 the top is less than three (3) inches from the floor or  
15 other working level, a standard toe-board shall be in-  
16 stalled in addition to the railing.

17 (b) The sides of tanks used in connection with paper  
18 mill beater engines shall in existing installations be not  
19 less than thirty-six (36) inches above the floor or other  
20 working level; and in future installations not less than  
21 forty-two (42) inches above the floor or other working  
22 level. If less than thirty-six (36) inches in existing  
23 installations and forty-two (42) inches in future in-  
24 stallations, such tanks shall be guarded by a substantial  
25 rail not less than forty-two (42) inches nor more than  
26 fifty-four (54) inches from the floor, extending to a  
27 point not less than seven (7) feet from cover of beater  
28 cylinder.

### 1 SEC. 13. COUNTERWEIGHTS

2 Rule 1. Counterweights Suspended Vertically: Class A.

3 Counterweights suspended vertically and exposed to contact  
4 shall be guarded the entire distance from the floor or bottom  
5 support. Such guard shall be constructed of wood or metal, and  
6 shall extend to at least one-half ( $\frac{1}{2}$ ) the height of the counter-  
7 weight, when it is at its highest position; other equally effective  
8 devices may be used. This rule shall not apply to governor  
9 counterweights, and all other kinds of counterweights of less  
10 than ten (10) pounds weight, when the bottom of the weight at

11 the highest point of its travel is eight (8) feet or less from  
12 the floor.

13 Rule 2. Counterweights on Rods or Levers: Class A.

14 Counterweights on rods or levers shall be secured thereto  
15 to prevent them from falling. A pin or piece welded or riveted  
16 to the rod which carries the counterweight shall be provided to  
17 form a stop. Auxiliary chains or cables shall be used where  
18 counterweights are in a location where they constitute a hazard  
19 to employees.

1 SEC. 14. FANS

2 Rule 1. Fans: Class A.

3 Fan blades on any fan exposed to contact, in regular  
4 course of employment, shall be guarded with a substantial  
5 wire mesh screen. If such guard is within 4 inches of the  
6 impellor, the opening of the guard shall not permit the in-  
7 sertion of a ½ inch ball. If further away than 4 inches, the  
8 opening in the guard shall not permit the insertion of a 1½  
9 inch ball.

10 CHAPTER 4. ELECTRICAL INSTALLATIONS

11 Rule 1. Electrical Installations: Class A.

12 All electrical wiring, switches, motors and other electrical  
13 equipment shall be of a safe type and installed in a safe manner  
14 to prevent injury to employees. Compliance in this respect with  
15 the National Electrical Code of the National Fire Protection  
16 Association shall be deemed as compliance by the employers  
17 with this rule.

18 Rule 2. Grounding of Equipment in Contact with Electrical  
19 Circuits: Class A.

20 All stationary equipment which is electrically operated  
21 and the electrical equipment is attached to or is a part of  
22 the equipment operated, or where electric heating units are  
23 incorporated in the equipment, or where lighting circuits  
24 are attached to the equipment, or where there are any other  
25 types of electrical connections to the equipment operated,  
26 shall be electrically bonded and permanently and effectively  
27 grounded to an underground water piping system or equivalent  
28 grounding electrodes (1) if the equipment to be operated is  
29 located on wet or damp ground or floors; (2) if the equipment  
30 is within 7 feet of any metal part of the building structure,  
31 piping system or metallic building equipment; (3) if the equip-  
32 ment uses or contains liquids with a water base in which the  
33 operators have to work.

34 CHAPTER 5. STEAM INSTALLATIONS

35 Rule 1. Steam Pipes and Steam Heated Equipment: Class A.

36 All steam pipes or steam heated equipment except such heated  
37 surfaces that are exposed for the purpose of operation in con-  
38 nection with heat processes or such steam pipes and heated surfaces  
39 pertaining to a building heating system shall be guarded when  
40 so located that employees may come in contact with the hot sur-  
41 faces in their regular course of employment, and shall be cov-  
42 ered with an insulation material of such quality and thickness  
43 that the outer surface of the insulating cover does not exceed

44 170 degrees Fahrenheit surface temperature; or such surfaces  
45 shall be so guarded by enclosures that the employees shall not  
46 come in contact with the hot surfaces. This requirement shall  
47 not include valves, fittings or accessories that must necessarily  
48 remain exposed for the proper functioning or control of the steam  
49 heated process or system.

50 Rule 2. Shut-Off Valves: Class A.

51 All steam or hot water supply to any equipment except build-  
52 ing heating systems, shall be provided with a shut-off valve  
53 either manually or automatically operated, serving each equip-  
54 ment, and such valve equipment shall be conveniently located  
55 with respect to the individual equipment supplied with steam  
56 or hot water so that in case of failure of the steam or hot  
57 water system on the equipment, the supply can be readily shut  
58 off. Such valves shall be of a type that is capable of with-  
59 standing the maximum pressure on the line.

## 60 CHAPTER 6. MISCELLANEOUS

61 Rule 1. First Aid: Class A.

62 In a plant where there is no regularly equipped plant  
63 dispensary manned by trained personnel, or where regular first  
64 aid service is not immediately available in the neighborhood,  
65 a standard first aid kit with dressings for first aid treatment  
66 of minor wounds shall be provided. The contents of this kit  
67 shall be kept in a sterile, usable condition, and replenished  
68 whenever necessary. Any one treating such wounds, however,  
69 shall be trained in the fundamentals of first aid.

70 Such first aid equipment shall be kept in a designated  
71 accessible place, free from dust and dirt.

72 PART "C"

73 RULES RELATING TO REMOVAL OF DUSTS, VAPORS, FUMES  
74 OR GASES FROM GRINDING, POLISHING AND  
75 BUFFING OPERATIONS

76 CHAPTER I

77 SCOPE AND DEFINITIONS

1 Sec. 1. Scope and Definitions

2 Rule 1. Scope: These rules shall apply where grinding  
3 polishing, buffing, scratch brushing or abrasive cutting-off  
4 wheels, grinding and polishing straps or belts are used, and  
5 the dusts, vapors, gases or fumes generated thereby constitute  
6 a hazard to the health of the employees engaged in or about  
7 any such operations; provided, however, that the rules con-  
8 tained in this Part "C" shall not apply to the following:

9 (a) Grinding machines upon which a liquid is used  
10 at the area of grinding contact, or any other abrasive  
11 grinding, polishing or honing operations in which a  
12 liquid is used to prevent the escape of dust and  
13 particles given off by the operations.

14 (b) Intricate and precision grinding of parts  
15 where the grinding pencils, discs or wheels are not  
16 over one inch in outside diameter;

17 (c) The grinding and polishing of jewelry and  
18 instruments made from solid gold, silver or platinum;

- 19 (d) The internal grinding of dies ;
- 20 (e) Portable grinders and polishers ;
- 21 (f) The operation of grinding or scratch brushing  
22 wheels and discs not over 20" in diameter for occasional  
23 work when performed in a room, compartment, or work  
24 place of not less than 200 square feet in floor area  
25 and having a ceiling height of not less than ten feet,  
26 and the operation upon all such grinding or scratch  
27 brushing wheels or disc shall not exceed the equivalent  
28 of the operation of one such grinder in such room, com-  
29 partment or work place for a period of not more than  
30 two hours out of every eight consecutive hours ; pro-  
31 vided, however, that in larger rooms, compartments, or  
32 work places every separate floor area of 5,000 square  
33 feet and having a ceiling height of not less than ten  
34 feet, shall be considered a separate room, compartment,  
35 or work place for the purpose of this exemption ;
- 36 (g) The operation of polishing and buffing wheels  
37 for occasional work when performed in a room, compart-  
38 ment, or work place of not less than 200 square feet in  
39 floor area and having a ceiling height of not less than  
40 ten feet, and the operation upon all such polishing or  
41 buffing wheels shall not exceed the equivalent of the  
42 operation of one such polisher or buffer in such room,  
43 compartment, or work place for a period of not more than  
44 two hours out of every eight consecutive hours.

## 45 Rule 2. Definitions:

46 The following definitions shall apply in connection with  
47 rules contained in this Part "C".

48 Grinding Wheels. Grinding wheels shall mean all  
49 power driven, rotatable, grinding or abrasive wheels  
50 except disc wheels as hereinafter defined, consisting  
51 of abrasive particles held together by artificial or  
52 natural mineral or organic bonds and used for grinding  
53 purposes.

54 Disc Wheels. Disc wheels shall mean all power  
55 driven, rotatable discs faced with abrasive materials.  
56 Such disc facings may be textile fabric or paper coated  
57 with abrasive particles or may be abrasive held to-  
58 gether by artificial or natural mineral or organic  
59 bonds and used for grinding or polishing.

60 Polishing and Buffing Wheels. Polishing and buffing  
61 wheels shall mean all power driven rotatable wheels com-  
62 posed all or in part of textile fabrics, wood, felt,  
63 leather, paper, etc., and may be coated with abrasives  
64 and used for polishing, buffing and light grinding pur-  
65 poses on the periphery of the wheel.

66 Scratch Brush Wheels. Scratch brush wheels shall  
67 mean all power driven rotatable wheels made from wire,  
68 bristles, etc., and used for scratch cleaning and brush-  
69 ing purposes.

70 Straps and Belts. Straps and belts shall mean all

71 power driven, flexible, coated bands used for grinding,  
72 polishing or buffing purposes.

73 Abrasive Cutting-Off Wheels. Abrasive cutting-off  
74 wheels shall mean all power driven, rotatable organic  
75 bonded wheels, the thickness of which is not more than  
76 1/48 of their diameter for those up to 20 in. in diameter,  
77 and used for cutting-off, grooving, slotting, coping,  
78 jointing, etc.

79 Cradle. Cradle shall mean a counter-balanced  
80 movable fixture, which is usually hung or supported  
81 at a point in back of an enclosure with the front end  
82 terminating in handle bars or other means so that the  
83 operator can manipulate the fixtures upon which the  
84 part to be ground or polished is placed under the  
85 grinding or polishing wheel.

86 Hood. Hood shall mean the structure or partial  
87 enclosure through which air enters an exhaust system  
88 during operation.

89 Swing Frame Grinder. Swing frame grinder shall  
90 mean any power driven, rotatable, grinding, polishing,  
91 or buffing wheel mounted in a framework that is hung  
92 or supported in such a manner that the wheel with its  
93 supporting framework can be manipulated over stationary  
94 objects for grinding, polishing or buffing purposes.

95 Portable Grinder. Portable grinder shall mean any  
96 power driven, rotatable, grinding, polishing or buffing

97 wheels where the grinders are sufficiently light in weight  
98 to be manually handled or counter-balanced and manually  
99 manipulated in the grinding, polishing or buffing  
100 operations.

101 Horizontal Single Spindle Disc Grinder. A single  
102 spindle disc grinder shall mean a grinding machine carry-  
103 ing an abrasive disc wheel upon one or both ends of a  
104 power driven, rotatable single horizontal spindle.

105 Horizontal Double Spindle Disc Grinder. A double  
106 spindle disc grinder shall mean a grinding machine carry-  
107 ing two power driven rotatable, coaxial, horizontal  
108 spindles upon the inside ends of which are mounted  
109 abrasive disc wheels used for grinding two surfaces  
110 simultaneously.

111 Vertical Spindle Disc Grinder. A vertical spindle  
112 disc grinder shall mean a grinding machine having a  
113 vertical, rotatable power driven spindle carrying a  
114 horizontal, abrasive disc wheel.

115 Exhaust System. An exhaust system shall mean a  
116 system of branch pipes connected to hoods or enclosures,  
117 one or more headers, an exhaust fan and discharge stack  
118 where required and means for separating entrained dust  
119 and dirt from the air flowing in the system.

120 Header Pipe. A header pipe shall mean a pipe into  
121 which one or more branch pipes enter and which connects  
122 such branch pipes to the exhaust system.

123 Branch Pipe. Branch pipe shall mean that part of  
124 an exhaust system which connects a hood or an enclosure  
125 to the header pipe.

126 Pitot Tube. A pitot tube shall mean a velocity  
127 pressure indicating instrument consisting of an impact  
128 tube within an outer or static pressure tube. The static  
129 pressure tube shall have not less than four 0.02 in.  
130 diameter static holes on at least two sides located  
131 not less than 8 tube diameters from the upstream or  
132 impact end of the tube and an equal distance from the  
133 elbow or bend of the tube. The end opposite the impact  
134 end shall terminate in connections to be attached to a  
135 manometer gauge.

136 Velocity Pressure. Velocity pressure shall mean the  
137 pressure required to accelerate air from a state of rest  
138 to the particular velocity required.

139 CHAPTER 2

140 EXHAUST SYSTEMS

1 SEC. 1. INSTALLATION AND OPERATION OF EXHAUST  
SYSTEMS,

2 INCLUDING DESIGN, SPECIFICATIONS,  
3 AND TESTING THEREOF.

4 Rule 1. Requirements for installation and operation of  
5 Exhaust Systems:

6 (a) Where grinding, polishing, buffing, scratch  
7 brushing or abrasive cutting-off wheels, grinding and

8 polishing straps or belts are used, there shall be pro-  
9 vided in the area where dusts, vapors, gases or fumes  
10 are generated, hoods that are connected to exhaust  
11 systems which will remove such dusts, vapors, gases  
12 or fumes, and such exhaust systems shall be operated  
13 continuously during any such operations on aforesaid  
14 equipment and such exhaust systems shall be provided  
15 with dust arresters, collectors, or precipitators to  
16 collect the dust before the air or gases from such ex-  
17 haust systems are discharged therefrom.

18 (b) Exhaust systems shall discharge out of doors;  
19 provided, however, that where an exhaust system washes,  
20 scrubs or filters the exhausted air of dusts, vapors,  
21 gases or fumes, such air may be discharged indoors if  
22 same does not constitute a hazard to the health of the  
23 employees.

24 Rule 2. Design of Exhaust Systems:

25 (a) All branch pipes shall enter the header pipe  
26 at an angle of forty-five degrees or less. All bends,  
27 turns or elbows used in exhaust pipes shall be made with  
28 a throat radius of two pipe diameters except greater or  
29 smaller throat radii may be used to clear obstructions.

30 (b) All branch pipes shall connect with a header  
31 pipe. The area of the header pipe at any point shall  
32 not be less than the combined areas of the branch pipes  
33 joining it between such point and the small end of the

34 header. Such header pipes shall be connected to an ex-  
35 haust fan to produce a minimum air velocity in the branch  
36 pipes of 4,500 feet per minute or such greater air  
37 velocity reasonably required to remove dusts, vapors,  
38 gases or fumes generated if same constitute a hazard  
39 to the health of employees. Where cradles are used for  
40 handling the parts to be ground, polished or buffed, or  
41 where swing grinders are used, and large partial en-  
42 closures to house the complete operation are required,  
43 the opening in such enclosures shall have a minimum  
44 average air velocity of 100 feet per minute and shall be  
45 connected to branch pipes of an exhaust system of such  
46 area as to produce a minimum air velocity of 2,000 feet  
47 per minute in the branch pipes.

48 Rule 3. Hoods and Branch Pipes for Exhaust Systems:

49 (a) Hoods connected to exhaust systems shall be  
50 used and such hoods shall be so designed, located and  
51 placed that the dust or dirt particles will fall or be  
52 projected or drawn into the hoods in the direction of the  
53 air flow. No wheels, discs, straps, or belts shall be op-  
54 erated in such manner and in such direction that will cause  
55 the dust and dirt particles to be thrown into the operators  
56 breathing zone.

57 (b) The exhaust outlet of the hoods and the branch  
58 pipes connected thereto, of grinding wheels on floor stands,  
59 pedestals, benches, swing frames, and special purpose grind-

60 ing machines and abrasive cutting-off wheels shall not  
 61 have less than the following minimum inside diameter.

62		Minimum in-	
63		side diameter	Maximum
64	Size of grinding or abrasive	of hood outlet	Wheel
65	cutting-off wheel inches	and branch	Surface
66		pipe inches	(Sq. inches)
67	Up to 9" dia. incl. not over 1½" thick	3"	43
68	Over 9" to 16" dia. incl. not over 2" thick	4"	101
69	Over 16" to 19" dia. incl. not over 3" thick	4½"	180
70	Over 19" to 24" dia. incl. not over 4" thick	5"	302
71	Over 24" to 30" dia. incl. not over 5" thick	6"	472
72	Over 30" to 36" dia. incl. not over 6" thick	7"	679

73 (c) The exhaust outlet in the hood and branch pipes  
 74 connected thereto of brush wheels over 6" in diameter and  
 75 all buffing and polishing wheels mounted on floor stands,  
 76 pedestals, benches or special purpose machines shall have  
 77 not less than the following minimum inside diameter:

78	Size of buffing, polishing and	Minimum in-	Maximum
79	scratch brush wheel inches	side diameter	Wheel
80		of hood outlet	Surface
81		and branch	(Sq. inches)
82		pipe inches	
83	Up to 9" dia. incl. not over 2" thick	3½"	57
84	Over 9" dia. to 16" dia. incl. not over		
85	3" thick .....	4½"	151

86	Over 16" dia. to 19" dia. incl. not over		
87	4" thick .....	5"	239
88	Over 19" dia. to 24" dia. incl. not over		
89	5" thick .....	5½"	377
90	Over 24" dia. to 30" incl. not over		
91	6" thick .....	6½"	565

92 (d) In case a grinding, polishing, buffing or  
 93 scratch brushing wheel is thicker than given in the  
 94 tables set out herein, the diameter of the hood outlet  
 95 and branch pipe connected thereto shall not be less  
 96 than called for by its wheel surface.

97 When the grinding, polishing, buffing or scratch  
 98 brushing wheel surface exceeds 679 square inches, the  
 99 inside area of the hood outlet and branch pipe connected  
 100 thereto shall be increased in size in the ratio of one  
 101 square inch of opening to 17 square inches of wheel  
 102 surface.

103 (e) Grinding wheels or discs for horizontal single  
 104 spindle disc grinders shall be hooded to collect the dust  
 105 or dirt generated by the grinding operation and the hoods  
 106 shall be connected to branch pipes of the following mini-  
 107 mum diameters:

108	Minimum
109	inside diameter
110	of hood outlet

111		and branch
112	Size of wheel or disc inches	pipe inches
113	Up to 12" diameter .....	3"
114	Over 12" to 19" diameter inclusive .....	4"
115	Over 19" to 30" diameter inclusive .....	5"
116	Over 30" to 36" diameter inclusive .....	6"
117	(f) Grinding wheels or discs for double spindle	
118	disc grinders shall have a hood enclosing the grinding	
119	chamber and such hood shall be connected to one or more	
120	branch pipes of the following minimum diameters:	
121		Minimum Number
122		and inside
123		diameter of hood
124		outlet and branch
125	Size of wheel or disc inches	pipe inches
126	Up to 19" diameter inclusive .....	1 pipe —5"
127	Over 19" dia. to 25" dia. inclusive .....	1 pipe —6"
128	Over 25" dia. to 30" dia. inclusive .....	1 pipe —7"
129	Over 30" dia. to 53" dia. inclusive .....	2 pipes—6"
130	Over 53" dia. to 72" dia. inclusive.....	4 pipes—8"
131	(g) Grinding wheels or discs for vertical single spindle	
132	disc grinders shall be encircled with a hood to remove the	
133	dust generated in the operation and such hoods shall be	
134	connected to one or more branch pipes of the following	
135	minimum inside diameters:	

---

136		Minimum Number
137		and inside
138		diameter of hood
139		outlet and branch
140	Size of disc inches	pipe inches

---

141	Up to 20" diameter .....	1 pipe —4½"
142	Over 20" dia. to 30" dia. inclusive .....	2 pipes—4"
143	Over 30" dia. to 53" dia. inclusive .....	2 pipes—6"
144	Over 53" dia. to 72" dia. inclusive .....	2 pipes—8"

145 (h) Grinding and polishing straps and belts shall  
 146 be provided with hoods to remove dust or dirt generated  
 147 in the operation and such hoods shall be connected to  
 148 branch pipes of the following minimum inside diameters:

---

149		Minimum inside
150		diameter of hood outlet
151	Strap or belt size inches	and branch pipe inches
152	Up to 3" wide .....	
153	Over 3" wide .....	for each 2" or fraction
154	thereof increase in strap or belt width	
155	add ½" or fraction thereof to the hood	
156	outlet and branch pipe size.	

157 The above sizes of inside diameter of hood outlets  
 158 and branch pipes shall apply to all new installations of  
 159 hood outlets and branch pipes after these Rules become  
 160 effective.

161 (i) The Rules in this Part "C" shall not apply to  
162 exhaust systems in operation at the time these Rules be-  
163 come effective where the hood outlet and branch pipe  
164 diameter are not less than 80 per cent of the diameter  
165 required for new installations.

166 Rule 4. Testing of Exhaust Systems:

167 A pitot tube shall be used to measure the velocity pressure  
168 of the air flow in the branch pipes and such measurements must  
169 be taken in the center of a straight portion of the branch pipe  
170 near the hood at a point that is ten pipe diameters away from  
171 an elbow or bend or as near this location as the branch pipe  
172 installation will permit and the velocity pressure shall not  
173 be less than 1.53 inches of water for 4,500 foot velocity per  
174 minute and 0.31 inches of water for 2,000 foot velocity per  
175 minute as indicated in a "U" shaped tube.

176 All tests for air velocity shall be made with all branch  
177 pipes and hoods of the exhaust fully open at the same time.

178 PART "D"

179 RULES AND REGULATIONS

180 Relating to the Removal of Dusts, Gases, Vapors, Fumes and Mists  
181 released from

182 Spray, Flow, Dip and Brush Coating Operations

1 SEC. 1. SCOPE AND DEFINITIONS

2 RULE 1. SCOPE: These rules and regulations shall apply  
3 where spray, flow, dip and brush coating operations are used  
4 and the dusts, gases, vapors, fumes and mists generated there-

5 from constitute a hazard to the health of persons engaged in  
6 spray, flow, dip and brush coating operations. And it shall be  
7 the duty of every employer in this State to comply with these  
8 rules wherever the subject matter of such rules exist in any  
9 business, occupation or enterprise having employees. These rules  
10 shall not apply to the following:

11 (a) EXEMPTION FOR SMALL QUANTITIES. Where the  
amount  
12 of material used in any one day is not more than an aggre-  
13 gate of one (1) quart on the basis of an eight-hour work  
14 date provided, however, that in any establishment a separate  
15 work room shall be considered a separate establishment for  
16 the purpose of this exemption.

17 **RULE 2. DEFINITIONS:**

18 The following definitions shall apply in connection with all  
19 rules included herein:

20 (a) BRUSHING. The term "brushing" shall mean the  
21 method by which coating materials are applied with brushes.

22 (b) DIPPING. The term "dipping" shall mean the im-  
23 mersion of an article, or any part thereof, into a container  
24 of coating material.

25 (c) SPRAY COATING EQUIPMENT. The term "spray" coating  
26 equipment" shall mean any and all devices and equipment  
27 used in the application by atomization of coating materials  
28 by pressure methods.

29 (d) COATING MATERIALS. The term "coating materials"

30 shall mean paint, lacquer, varnish, stain, shellac, enamel,  
31 oil, wax, vitreous, metallic, flock, paint and varnish re-  
32 mover and in addition thereto any other coatings constituting  
33 a health, fire or explosion hazard.

34 (e) COATING APPLICATIONS. The term “coating applica-  
35 tions” shall mean brushing, dipping, spray coating, flow  
36 coating, roll coating, tumbling or and in addition thereto  
37 any other coating methods used for applying coating material  
38 where the application of such coating materials constitutes  
39 a health, fire or explosion hazard.

40 (f) MECHANICAL EXHAUST VENTILATION. The term  
“mechanical  
41 exhaust ventilation” shall mean any exhaust system operated  
42 by mechanical means.

43 (g) RESPIRATORY PROTECTIVE DEVICE. The term “respira-  
44 tory protective device” shall mean a device which is worn  
45 over the nose and mouth to provide protection to the wearers’  
46 respiratory system from substances which constitute a hazard  
47 to the health of the employee.

48 (h) THE TERMS “Harmful to health of the employees”,  
49 and “hazardous”, shall include any health, fire or explosion  
50 hazard to one or more employees.

51 (i) BREATHING ZONE. The immediate area around the nose  
52 and mouth.

53 (j) HAZARDOUS AREAS. The term “hazardous areas” shall  
54 mean areas where the concentration of dust, gases, vapors,

55 fumes or mist are harmful to the health of the employees.

56 (k) NON-COMBUSTIBLE MATERIAL. The term “non-com-  
57 bustible material” shall mean any material that will not  
58 burn or support combustion and has fire retardant character-  
59 istics equivalent to three-quarter inches of cement plaster  
60 on metal lath.

61 (l) BOOTHS FOR SPRAY COATING OPERATIONS.

62 (1) CABINET BOOTH shall mean an enclosure open on  
63 one side or an enclosure open on one side and other  
64 openings to permit the ingress and egress of materials  
65 to be coated.

66 (2) CANOPY BOOTH shall mean an overhead hood open  
67 on one or more sides.

68 (3) SPRAYING ROOM shall mean a room or enclosure  
69 specifically used for spray coating operations on large  
70 objects.

71 (4) TUNNEL BOOTH shall mean an enclosure, with both  
72 ends open.

73 (5) STAGGERED TUNNEL BOOTH shall mean an enclosure  
74 open on two opposite sides in staggered arrangement and  
75 provided with openings on opposite ends for ingress and  
76 egress of materials to be coated.

77 (6) DOWN DRAFT BOOTH shall mean an enclosure open  
78 at the top.

79 (m) BRUSHING TABLE shall mean a table, bench or other  
80 elevation provided with a down draft exhaust to remove the

81 dust, gases, vapors, fumes and mists from the work conducted  
82 on such table, bench or elevation.

1 SEC. 2. GENERAL RULES APPLYING TO ALL COATING  
2 OPERATIONS

3 RULE 1. SCOPE:

4 These rules shall be applicable to all coating operations  
5 where such operations constitute a hazard to the health of the  
6 employees.

7 RULE 2. EQUIPMENT:

8 (a) SPRAYING EQUIPMENT. All spraying equipment shall  
9 be capable of proper adjustment so as to control the for-  
10 mation of mist.

11 (b) PAINT PRESSURES FOR SPRAY COATING. Paint pressure  
12 shall not exceed that necessary to produce a free flow of  
13 paint at the nozzle when the gun is operated independent  
14 of atomizing pressure.

15 (c) SPRAY COATING AT DIFFERENT LEVELS. At no time  
16 shall  
17 two or more operators engaged simultaneously in spray coat-  
18 ing at elevations differing more than eight feet, use paint  
19 from the same supply tank unless spray guns are equipped  
20 with regulating valves.

21 RULE 3. PROTECTION OF PERSON:

22 (a) NOSE AND MOUTH PROTECTION.

23 (1) RESPIRATORY PROTECTIVE DEVICES. When natural  
or mechanical ventilation is not adequate to protect

24 coating operators and helpers or other persons working  
25 in the hazardous areas where there are harmful substances  
26 present, whether these locations be exterior or interior,  
27 such persons shall be protected with respiratory protective  
28 devices.

29 (2) TYPES OF RESPIRATORY PROTECTIVE DEVICES. When  
30 hazardous substances used in coating operations are in  
31 the particulate form and a respiratory protective device  
32 is used it shall be the filter type. When the substances  
33 are in the form of gas or vapor, the respiratory pro-  
34 tective device as required shall contain gas or vapor  
35 absorbents or adsorbents, such as activated charcoal.  
36 For protection against a combination of particulate  
37 matter and gases or vapors, the respiratory protective  
38 device shall contain both a mechanical filter and an  
39 absorbent or adsorbent. A positive pressure respira-  
40 tory protective device may be used as a protective from  
41 either the particulate matter or gases or vapors or a  
42 combination of both of them instead of the particular  
43 type specified. All such respiratory protective devices  
44 which shall meet the minimum requirements of  
45 the United States Bureau of Mines for similar equip-  
46 ment for the particular hazard to be guarded against  
47 shall be deemed compliance with this rule.

48 (b) CLEANSING OF RESPIRATORY PROTECTIVE DEVICES.

Every

49 respiratory protective device in use shall be cleansed at  
50 least once each day with warm potable water and soap, where  
51 the filter type respirator is used, the filter shall be re-  
52 placed as often as necessary. In case of intermittent use of  
53 a filter type of respirator, it shall be cleaned and filter  
54 replaced at least once each calendar day of use. The cleansed  
55 respirators shall be returned to the same individuals who  
56 used them prior to the cleansing, unless such respiratory  
57 protective devices have been sterilized before using again.  
58 The cleansing of respiratory protective devices shall be  
59 done as follows: Remove head bands and filtering elements  
60 and thoroughly wash the devices in warm soapy water. After  
61 this any one of the following solutions may be used for  
62 sterilizing purposes: (1) A solution of one part of  
63 formaldehyde solution in nine parts of water; (2) a 2 per  
64 cent solution of lysol; (3) a 3 per cent solution of carbolic  
65 acid; (4) exposure at room temperature for ten minutes in a  
66 moist atmosphere or antiseptic gas preferable formaldehyde;  
67 (5) scrub with a brush in a solution of five fluid ounces of  
68 cresolis compound and four gallons of water; (6) immersion for  
69 not less than 10 seconds in a solution of sodium hypochlorite  
70 containing not less than 100 parts per million available  
71 chlorine. Following this the devices shall be thoroughly  
72 rinsed with warm potable water and allowed to dry before  
73 using.

74 (c) BODY PROTECTION. Body shall be covered with clothing

75 as close fitting as consistent with comfort, paying particular  
76 attention to fit at neck and wrists.

77 (d) HAND PROTECTION. Hands shall be protected by gloves  
78 or by non-irritating protective skin coating.

79 (e) FACE AND NECK PROTECTION. All exposed parts of the  
80 body shall be kept protected with non-irritating protective  
81 skin coatings during coating applications.

82 (f) CLEAN RAGS. Clean rags or cloths for use on body  
83 shall be furnished by the employer.

84 RULE 4. CONTAINERS:

85 (a) CONSTRUCTION OF PRESSURE TANKS. Every  
pressure tank  
86 supplying a spray nozzle shall be made from such materials and  
87 so constructed in order to adequately withstand the pressure  
88 for which it is designed to be used for, and will not burst or  
89 explode under operation. Compliance in this respect with the  
90 current rules for the construction of unfired pressure vessels  
91 of the American Society of Mechanical Engineers shall be deemed  
92 compliance by the employer with this rule. Every pressure tank  
93 meeting these specifications shall be so marked. All tanks of  
94 two gallon capacity and larger shall be designed so that the  
95 bottom of the tank will not be in contact with the floor.

96 (b) PRESSURE CUPS. All pressure cups shall be capable of  
97 withstanding sixty pounds pressure without distortion.

98 (c) GRAVITY TANKS. All gravity tanks supplying spray  
99 nozzles shall be provided with metal covers that shall be kept

100 in place and those not resting on the floor shall be supported  
101 on metal brackets or be suspended by wire cables or heavy metal  
102 rods.

103 (d) SOLVENT CONTAINERS. Containers used for solvents  
104 for cleaning and for thinning purposes used in connection with  
105 coating operations shall be kept in non-combustible containers  
106 having self-closing or automatically closing covers.

107 RULE 5. MAINTENANCE AND HOUSEKEEPING:

108 (a) DIRTY RAGS. All used wiping and cleaning rags when  
109 used with inflammable materials shall be kept in covered non-  
110 combustible containers when not in use and such rags shall be  
111 removed daily and disposed of in a safe manner.

112 (b) DISPOSAL OF RESIDUE, WASTE, CLEANING AND  
WIPING MATERIALS.

113 Combustible linings of booths and scrapings and drain boards, pans  
114 and floors which have been removed in the course of cleaning and  
115 rags, waste and other materials which have been used for wiping  
116 or cleaning shall be deposited in covered non-combustible con-  
117 tainers or under water in open containers and removed daily and  
118 disposed of in a safe manner.

119 (c) STORAGE OF MATERIALS—VOLATILE LIQUIDS. The  
main supply  
120 of solvents, paints, lacquers and other volatile materials shall  
121 be stored in a location remote from the coating process, or in a  
122 separate building or a room constructed of non-combustible mate-  
123 rials.

124 (d) OPEN LIGHT, FIRES, ETC. Open lights, fires and welding  
125 operations shall be kept at least 50 feet from where coating  
126 operations are performed, and out of the path of dusts, gases,  
127 vapors, fumes and mists caused by such operations. If due  
128 to special conditions the minimum of 50 feet is inadequate  
129 then at such safe distance that will give the necessary  
130 protection.

1 SEC. 3. BRUSH AND SPRAY COATING OF BUILDING AND  
STRUCTURES BOTH  
2 INTERIOR AND EXTERIOR—AND OUTDOOR COATING OPER-  
ATIONS

3 RULE 1. SCOPE:

4 These rules and regulations shall apply to all brush and  
5 spray coating operations on the interior and exterior of buildings,  
6 ships, and structures of any kind or nature, and to all out-door  
7 brush and spray coating operations.

8 RULE 2. OPERATION:

9 (a) COATING OPERATIONS IN CONFINED SPACES. When-  
ever  
10 brush or spray coating operations are performed in any room,  
11 vault, bin, vat, tank, hopper, or any confined space in which  
12 there is no natural ventilation the employees engaged there-  
13 in shall be provided with forced ventilation or shall be pro-  
14 vided with adequate respiratory protective devices that will  
15 protect employees. Any employee working in such confined  
16 places shall be provided with a lifebelt and line and such



19 building or to a salvage tank located outside of the building.  
20 Such drain pipe shall have an area of not less than one  
21 square inch per each eighty gallons of tank capacity and  
22 in no event shall such pipe be less than three inches in-  
23 side diameter, which will permit the contents of the tank,  
24 vat, tub, or other container to drain off without spilling  
25 over the sides of such containers in the event the normal  
26 working level of the coating material within is exceeded.  
27 Such overflow pipe shall be attached to the side of the  
28 container and the overflow level of the pipe located just  
29 above the normal working level of the container. The over-  
30 flow pipe shall be trapped below the normal working level  
31 of the coating material to prevent a fire traveling through  
32 the overflow pipe.

33 (c) DRIP BOARDS AND PANS. All coating drip boards or  
34 pans used in connection with all permanently located tanks,  
35 vats, tubs, or other containers containing inflammable materials  
36 used for dip and flow coating purposes shall be provided with  
37 a smooth sheet metal top of not less than 16 U.S.S. gauge.  
38 The boards or pans shall be sloped or troughed to the center  
39 and also be pitched to drain the coating drippings into the  
40 coating container. The lowest pitched-end of the board or  
41 pan shall be diked off with a dike not less than 6" high  
42 so that the coating material will only return into the con-  
43 tainer through 1 $\frac{1}{8}$ " diameter hole located on a level with  
44 the lowest point of the trough so that in the event water or

45 other fire-extinguishing materials are poured on the board  
46 or pan, the dike will prevent most of the water or other  
47 substances from entering the tank, and such water or other  
48 substances will flow off the board or pan at the ends of the  
49 dike onto the floor.

50 (d) SPACE UNDER DRIP BOARDS AND PANS. All drip boards  
51 or pans used in connection with permanently located coating  
52 containers containing flammable materials for dipping and  
53 flow coating purposes, in which any part of such pan or board  
54 is within 4' of the floor, shall be completely housed or  
55 screened in underneath to prevent refuse from accumulating  
56 underneath, or to prevent such underneath space being used  
57 for storage purposes.

58 (e) FIRE PROTECTION FOR CONTAINERS. All permanently  
59 located tanks, vats, tubs, and other containers used for  
60 dip and flow coating purposes containing flammable coating  
61 materials shall be provided with automatic covers that will  
62 cover the opening of such containers when a fire occurs in  
63 or about such container, unless the nature of the dipping or  
64 flow coating operations will not permit the use of automatic  
65 covers, and in such cases the containers shall be protected  
66 against fire by automatic fire extinguishers filled with an  
67 extinguishing material suitable for putting out a fire caused  
68 by the type of coating used in the container.

69 RULE 3. VENTILATION REQUIREMENTS FOR DIP AND  
FLOW COATING

## 70 OPERATIONS AND FOR AIR DRYING OF COATED SURFACES:

71 (a) DIP AND FLOW COATING OPERATIONS. The immediate  
72 area surrounding dip and flow coating containers having  
73 more than six square feet of exposed surface containing  
74 coating substances having volatile vehicles or thinners  
75 shall be mechanically ventilated during the dip or flow  
76 coating operations on the basis of the removal of a minimum  
77 of 2.5 cu. ft. of air per minute per sq. ft. of floor space  
78 as represented by an imaginary boundary line extending 25'  
79 horizontally in all directions from the edges of the dip  
80 coating container, except that mechanical ventilation shall  
81 not be required if the net open area of the doors and windows  
82 in the outside walls kept open during operations is five per  
83 cent or more of the gross floor area of the work room.

84 (b) AIR DRYING OF COATED SURFACES. All parts coated  
85 with coating materials containing volatile vehicles and  
86 thinners which are air dried in rooms where workmen are  
87 employed, shall have the drying space ventilated during  
88 the period of occupancy on the basis of the removal of a  
89 minimum of 2.5 cu. ft. of air per minute per sq. ft. of  
90 floor space, as represented by an imaginary boundary line  
91 extending 25' horizontally in all directions from the out-  
92 side edges of the group of parts being air dried, except  
93 that mechanical ventilation shall not be required if the  
94 net open area of the doors and windows in the outside walls  
95 kept open during the period of occupancy is five per cent

96 or more of the gross floor area of the work room.

97 If ventilated spray booths are used in the same room or  
98 area in which there is air drying of parts, the amount of  
99 air exhausted through the booth exhaust system may be con-  
100 sidered as applying to the amount of air to be exhausted  
101 from the air drying of coated surfaces requirements.

102 (c) SMALL WORK PLACES OR ROOMS. In no case under the  
103 provisions of (a) and (b) of this section shall it be  
104 necessary to change the air of work rooms or spaces more  
105 than ten air changes per hour unless unusual conditions  
106 should require more ventilation.

107 **RULE 4. SPRAY COATING APPLICATIONS.**

108 All spray coating applications on objects inside of buildings  
109 shall be performed within booths equipped with mechanical exhaust  
110 ventilation with the following exceptions:

111 (a) OBJECTS NOT SUITABLE FOR BOOTHS. Objects not a  
112 regular part of the plant production and not occurring in  
113 regular sequence and for which there is no ventilated  
114 booth adaptable.

115 (b) LARGE OBJECTS. Large objects such as heavy ma-  
116 chinery and equipment, large castings and structural mem-  
117 bers not adaptable to booth spray coating.

118 **RULE 5. BOOTH AND ROOM CONSTRUCTION:**

119 (a) BOOTHS. Booth construction shall be constructed of  
120 metal in such a manner as to facilitate effective maintenance  
121 and control of required ventilation.

122 (1) FLOORS. If the building floor on which any booth  
123 is installed is of combustible material, the floor within  
124 the booth and for a distance of four feet in front of  
125 the booth openings shall be covered with non-combustible  
126 material, except that bench type booths shall not be  
127 required to have non-combustible building floor covering  
128 under the benches nor for a distance of four feet in  
129 front thereof.

130 BOOTHS in which vitreous enamel is used exclusively  
131 shall not be required to have non-combustible floors.

132 (2) FIRE CURTAINS. Every booth opening shall be  
133 constructed with a fixed metal curtain along the upper  
134 outer edge of the booth. Such curtain shall project  
135 downward from the inside top of the booth not less than  
136 two and one-half inches.

137 (3) INSIDE SURFACES. The inside surfaces of booths  
138 shall be of smooth construction and free from obstruc-  
139 tions to facilitate cleaning.

140 (b) SPRAYING ROOMS.

141 (1) ROOM CONSTRUCTION. Every spraying room installed  
142 in a building of non-combustible construction and in  
143 which all parts of the spraying room are of non-combus-  
144 tible construction or in any type of building where au-  
145 tomatic sprinkler protection is provided may be used  
146 without further fire protection.

147 Spraying rooms installed in combustible type of build-

148 ings which are not sprinklered, or any parts of the spray-  
149 ing rooms which are constructed of combustible material in  
150 any type of building, shall have the combustible wall  
151 and ceiling surfaces and the exposed structural members  
152 covered with at least  $\frac{3}{4}$  inches of cement-plaster of  
153 metal lath.

154 (2) EXITS. Any spraying room having more than  
155 400 square feet of floor area shall be provided with  
156 means of ingress and egress located in two separate  
157 walls.

158 RULE 6. VENTILATION REQUIREMENTS:

159 (a) The following rules shall apply while the booths  
160 are in use:

161 (1) CABINET BOOTHS. All cabinet booths shall be  
162 provided with mechanical exhaust ventilation that will  
163 provide a minimum average of 100 linear feet per minute  
164 of air flow into all openings, but in no event shall the  
165 velocity of the air be less than an average of 100 linear  
166 feet per minute in any vertical cross sectional area in  
167 the booth in which the operator works.

168 (2) CANOPY BOOTHS. All canopy booths shall be pro-  
169 vided with mechanical exhaust ventilation that will pro-  
170 duce a minimum average of 100 linear feet of air flow  
171 into the canopy or hood over the entire projected area  
172 of the canopy or hood.

173 (3) TUNNEL BOOTH. Tunnel booths shall be provided

174 with mechanical exhaust ventilation that will provide a  
 175 minimum average of 100 linear feet per minute of air  
 176 flow into all openings, but in no event shall the mini-  
 177 mum amount of air in cubic feet per minute exhausted  
 178 from such tunnel booth be less than the product of the  
 179 projected floor area in square feet of such tunnel booth  
 180 multiplied by seventy-five.

181 (4) SPRAYING ROOMS. (i) All spraying rooms except  
 182 as exempted herein shall be provided with mechanical  
 183 exhaust ventilation that will give not less than the fol-  
 184 lowing number of air changes per hour based on the gross  
 185 cubical content of such rooms, but in no case shall the  
 186 total amount of air exhausted per hour be required to ex-  
 187 ceed twice the minimum requirements for one spray gun  
 188 operation.

189 In applying the requirements of this clause, artists'  
 190 signpainters' and stencilers' and touch-up spray guns  
 191 passing not more than two cubic feet of atomizing air  
 192 per minute shall not be considered as spray guns in  
 193 calculating the number of room air changes per hour:

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194		Minimum Number of	Number of Air
195		Air Changes Per	Changes Per Hour
196	Cubic Contents	Hour for One	To Be Added for
197	of Room	Spray Gun	Each Additional
198			Spray Gun
199			Operated

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200	Rooms up to and includ-	30	10
201	ing 7,500 cubic feet		
202	Rooms over 7,500 and not	20	6 $\frac{2}{3}$
203	to exceed 15,000 cubic		
204	feet		
205	Rooms over 15,000 cubic	15	5
206	feet		

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207 (ii) Any spraying room of over 35,000 cubic feet  
 208 cubical content, in which the spray operators and  
 209 helpers in proximity of the spraying operation are  
 210 provided with positive air pressure respiratory  
 211 protective devices and all others away from the  
 212 proximity of the spraying operation are provided  
 213 with mechanical respiratory protective devices,  
 214 shall be provided with not less than ten air changes  
 215 per hour.

216 (b) DIRECTION OF AIR FLOW IN ALL TYPES OF BOOTHS.  
 217 The direction of air flow in all types of booths shall  
 218 be such as to convey the dust spray, mist and fumes away  
 219 from the breathing zone of the operator and others, work-  
 220 ing in such booth, to the air discharge outlet.

221 (c) MECHANICAL EXHAUST VENTILATION COMMON TO  
 TWO OR  
 222 MORE BOOTHS. Two or more booths shall not be connected  
 223 to the same common mechanical exhaust ventilation system  
 224 if different spray residues produced in the booths are

225 not removed before commingling in the exhaust system as  
226 a result of which heat will be generated and cause a  
227 fire hazard.

228 (d) EXHAUST OUTLET LOCATION. The exhaust outlets  
229 from all types of booths shall be located, or the booth  
230 provided with distribution plates, as to maintain an  
231 average uniform air velocity toward the exhaust outlet.

232 (e) REMOVING COATING MATERIAL FROM EXHAUSTED  
AIR.

233 Every exhaust system applied to any booth shall be pro-  
234 vided with a distribution or collector plate or plates  
235 or some type of air cleaner that will aid in the removal  
236 of the coating material from the exhausted air before  
237 such air reaches the air flow producing equipment. All  
238 distribution or collector plates shall be removable and  
239 supported by non-ferrous supports to minimize sparking.

240 (f) DISCHARGE OF EXHAUSTED AIR. All air exhausted  
241 from booths shall be discharged out of doors. The dis-  
242 charge of any exhaust pipe out of doors shall be located  
243 so that the discharged material does not constitute a  
244 hazard. The discharge outlet shall extend above the roof  
245 line of any adjacent building.

246 (g) BRUSHING TABLES. All brushing tables when in use  
247 shall be provided with not less than an average of 200  
248 linear feet per minute air velocity flowing over the entire  
249 area of the table and in no event shall the object being

250 brushed be closer than six inches to the edges of the table.

251 (h) AIR FLOW PRODUCING EQUIPMENT. All mechanical ex-  
252 haust ventilation equipment located in the airways or piping  
253 of exhaust systems handling flammable materials shall be  
254 constructed of materials which will minimize sparking. No  
255 motors shall be installed in airways or piping which exhaust  
256 flammable materials. All belt-drive passageways in airways  
257 of piping shall be totally enclosed in an air tight enclosure  
258 inside the airway or pipe. Bearings of fans located inside  
259 of airways or piping shall be arranged to permit oiling from  
260 the outside of the airway or pipe.

261 RULE 7. AIR SUPPLY:

262 (a) QUANTITY. Fresh clean air shall be supplied either  
263 by natural or mechanical means to at least equal the amount  
264 of air exhausted to all rooms containing mechanical exhaust  
265 systems. Where a mechanical exhaust system is located in  
266 building or room and the volume of air exhausted through  
267 the booth is only a small portion of that available, and  
268 the withdrawal of this air is such that it does not  
269 appreciably affect the air conditions or distribution in  
270 other working areas, it shall not be necessary to provide  
271 air supply other than through the general ventilation  
272 system or natural infiltration.

273 (b) LOCATION. The air supply for replacement purposes  
274 shall be delivered at a point or points so that excessive  
275 drafts will not be produced.

## 276 RULE 8. EXHAUST PIPING:

277 (a) PIPING AND DUCT WORK. All piping and duct work in  
278 the exhaust system shall be of non-combustible materials and  
279 shall be as short, direct and free from resistance to air  
280 flow as practicable.

281 (b) GATES AND DAMPERS. Where gates and dampers are  
282 provided for the purpose of shutting off flow of cold air  
283 into buildings when the exhaust system is not operating,  
284 such gates and dampers in the entire exhaust system shall  
285 be fully opened during the time of operation of the exhaust  
286 system.

## 287 RULE 9. ELECTRICAL EQUIPMENT:

288 (a) All electrical equipment shall be installed so as  
289 the fumes from the paints or lacquer will not cause an ex-  
290 plosion or fire hazard. Compliance with this respect with  
291 the current provisions of the National Electrical Code of  
292 the National Fire Protection Association, shall be regarded  
293 prima facie evidence of compliance by the employer with this  
294 rule.

295 (b) LIGHTING EQUIPMENT INSTALLED OUTSIDE BOOTHS.

Every

296 booth, other than a spraying room, in which flammable mate-  
297 rials are handled, where artificial illumination is necessary,  
298 shall be lighted with vaportight or explosion proof types of  
299 lamps located outside of the walls and ceilings of the booth.  
300 The edges of the openings in the ceilings or walls of the

301 booth through which the light rays are admitted shall not  
302 be closer than one inch to the lamp. Vaportight or explosion  
303 proof types of lamps may be installed just outside the booth  
304 at the booth openings.

305 (c) LIGHTING EQUIPMENT INSTALLED INSIDE OF BOOTHS  
AND

306 SPRAY SPRAYING ROOMS. Illumination of any booth or spraying  
307 room in which flammable materials are handled and where  
308 internal lighting is installed shall be with explosion  
309 proof type lamps.

310 RULE 10. GROUNDING OF EQUIPMENT IN CONNECTION  
WITH SPRAY

311 COATING: All exposed non-current carrying metal parts of elec-  
312 trical equipment serving any booth in which flammable material  
313 is used, and all metal parts of any booth in which flammable  
314 material is used, shall be electrically bonded and permanently  
315 and effectively grounded to a metallic underground water piping  
316 system or equivalent grounding electrodes.

317 RULE 11. BOOTH AND SPRAYING ROOM COATING OPERA-  
TIONS:

318 (a) OBJECT TO BE SPRAY COATED. The portion of every  
319 object to be spray coated shall be inside the booth or  
320 spraying room during spray operations, and shall be arranged  
321 to permit easy access and manipulation, and so that the  
322 direction of spray will be toward the exhaust outlet.

323 (b) SELF-PROPELLED OBJECTS. No self-propelled object

324 shall be driven into or out of a booth or spraying room while  
325 there is any spraying being done or shall any such object be  
326 sprayed if the temperature of any part of such object is  
327 above 400 degrees Fahrenheit.

328 (c) MATERIALS SPRAYED ALTERNATELY. There shall be no  
329 spray coating or lacquers in any booth or spraying room in  
330 which oils, varnishes or paints are used, unless the booth  
331 and all parts, including all equipment, are thoroughly cleaned  
332 between operations so that there will be no mixture of the  
333 different ingredients to cause a fire hazard, except that  
334 parts of a booth and exhaust equipment in a water-wash  
335 installation shall not have to be cleaned in or beyond the  
336 water wash.

337 RULE 12. MAINTENANCE AND HOUSEKEEPING:

338 (a) CLEANING OF BOOTHS AND SPRAYING ROOMS. Every  
booth  
339 and spraying room in which continuous spray coating operations  
340 are performed shall have accumulations of coating residue re-  
341 moved at least once a week. Scrapers and rubbers shall be  
342 of non-ferrous and nonflinty material.

343 (b) CLEANING OF EXHAUST SYSTEMS. All exhaust airways  
344 and piping and air-flow producing equipment shall be cleaned  
345 at sufficiently frequent intervals to maintain the required  
346 air-flow.

347 (c) CLEANING OF OTHER EQUIPMENT. Floors, walls and ceil-  
348 ings in coating areas shall be kept clean and tanks, mixers,

349 spray guns and equipment shall be kept clean and free from  
350 accumulations of coating materials.

351 (d) BOOTHS PROHIBITED AS STORE-ROOMS. No materials or  
352 equipment shall be stored in any spray booth or spraying  
353 room.

354 RULE 13. FIRE PROTECTION EQUIPMENT:

355 Fire extinguishers or fire fighting equipment suitable  
356 for nature of the hazard and materials involved, where flammable  
357 materials are used, shall be provided and located within twenty-  
358 five feet of any booth or dipping or flow coating operations.  
359 Every spraying room in which flammable materials are used shall  
360 be equipped with fire extinguishers or fire fighting equipment  
361 suitable for the nature of the hazard and materials involved.

362 PART "E"

363 RULES AND REGULATIONS

364 Relating to

365 THE SAFETY AND HEALTH OF WORKERS

366 Employed in Ferrous and Non-Ferrous Operations Where Castings  
367 of Base Metals are Made and Shall Include All Operations  
368 in Connection Therewith

1 SECTION 1. SCOPE

2 RULE 1. SCOPE:

3 These rules and regulations shall apply to all ferrous and  
4 non-ferrous operations where castings of base metals are made and  
5 shall include all operations in connection therewith, to protect  
6 the safety and health of persons engaged therein from injury and

7 harmful dusts, gases, vapors, and fumes and it shall be the duty  
8 of every employer in this State to comply with these rules wherever  
9 the subject matter of such rules exist in any business or enter-  
10 prise having employees.

1 SECTION 2. GENERAL RULES APPLYING TO PREVENTION  
OF ACCIDENTAL  
2 INJURY TO EMPLOYEES.

3 RULE 1. SCOPE:

4 The rules and regulations under this section shall apply to  
5 all operations, equipment, and maintenance for the prevention of  
6 accidental injury to employees engaged in operations defined in  
7 Section 1, Rule 1.

8 RULE 2. PLACES OF EMPLOYMENT:

9 (a) VENTILATION OF PLACES OF EMPLOYMENT. All places  
of  
10 employment in which processes covered in Section 1, Rule 1  
11 of this Part are carried on shall have windows, skylights,  
12 transoms, or ventilating flues which are used exclusively  
13 for the ventilation of the general atmosphere within the  
14 room or enclosure, doors not included, opening to outside  
15 areas, the net open area of which shall be not less than  
16 5% of the floor area of the room or enclosure, except as  
17 provided for in Paragraphs (b) and (c) of this Rule.

18 (b) PLACES OF EMPLOYMENT FOR DEFENSE PURPOSES.

Places  
19 of employment, designed exclusively for national defense

20 purposes, may be located underground or designed for black-  
21 out purposes, and windows, skylights, transoms, and venti-  
22 lating openings may be eliminated, if mechanical ventilation  
23 is provided and operated during periods of occupancy so that  
24 the amount of ventilation provided shall be not less than one  
25 cubic foot of air, drawn from an uncontaminated out-of-doors  
26 source per square foot of floor space per minute.

27 (c) BUILDING CONSTRUCTIONS WHICH DO NOT COMPLY  
WITH  
28 RULE 2, PARAGRAPH (a).

29 In all places of employment in which openings to the out-  
30 side are not provided, as required in Rule 2, Paragraph (a)  
31 of this Part, shall have mechanical ventilation which shall  
32 be operated during periods of occupancy so that the amount  
33 of ventilation provided shall be not less than one cubic foot  
34 of air, drawn from an uncontaminated out-of-doors source per  
35 square foot of floor space per minute.

36 RULE 3. ENTRANCES:

37 Entrances to heated buildings shall be protected during cold  
38 weather in such a way as to eliminate harmful drafts striking  
39 employees employed within the building, and in such a manner as  
40 to permit the passage of conveyances regularly used in plant  
41 operations except that this rule shall not apply to entrances  
42 used for railroad or industrial cars handled by motive power or  
43 for travelling cranes, horsedrawn vehicles, trucks, and automobiles.  
44 These entrances shall remain open during cold weather only for such

45 time as is necessary for the ingress and egress of such equip-  
46 ment.

47 **RULE 4. LOCOMOTIVES AND LOCOMOTIVE CRANES**

**OPERATED IN**

48 **BUILDINGS.**

49 Fuel fired or internal combustion engine operated locomo-  
50 tives or locomotive cranes operating on rails shall not remain  
51 in buildings during regular occupancy and shall only enter such  
52 buildings during regular occupancy for the specific purpose of  
53 moving cars or switching.

54 **RULE 5. VISION THROUGH SWINGING DOORS:**

55 All doors of the double acting swinging type shall be pro-  
56 vided with an opening not less than the equivalent of an 8 x 8 in.  
57 opening located at normal eye level distance above the floor so  
58 that a view can be had beyond the door.

59 **RULE 6. STAIR RAILINGS:**

60 All stairways, open on one or both sides, shall have the  
61 open sides protected with standard guard rails and shall comply  
62 with Rule 11 of Part "B".

63 **RULE 7. FLOORS, PITS AND GALLERIES:**

64 (a) **CONDITION OF FLOORS.** All floors shall be kept firm  
65 and level and shall be cleaned and leveled as often as  
66 necessary to provide and maintain safe working conditions.

67 (b) **FLOOR ADJOINING TRACKS.** The floor immediately ad-  
68 joining tracks over which employees frequently pass shall  
69 be firm and flush with the top of the rail. Clearance for

70 passage of truck wheel flanges shall be provided between  
71 floor and track.

72 (c) FLOORS AT MELTING UNITS. The floor beneath and im-  
73 mediately surrounding melting units shall be pitched away  
74 from the melting unit to provide drainage. The floor shall  
75 be kept free from pools of water and shall only be damp  
76 enough to hold down the dust in order to prevent an ex-  
77 plosion hazard.

78 (d) GUARDING OF FLOOR OPENINGS. All floor openings  
79 shall be covered or railed when not in use.

80 (e) PITS. All pits connected with ovens or furnaces  
81 shall be at all times protected with either a protecting  
82 cover or standard guard rail.

83 (f) MOLTEN METAL PITS. All pits in which molten metal  
84 is handled shall be free from dampness in order to avoid  
85 danger of explosion and splashing of metal.

86 (g) GALLERIES. Galleries where molten metal is poured  
87 into molds shall be provided with solid, leak-proof floors  
88 and partitions of materials resistive to molten metal. The  
89 partitions shall be not less than 42 in. high and shall be  
90 installed on the open sides of such galleries.

91 (h) PROTECTION AGAINST MOLTEN METAL ON FLOORS.

Molten

92 metal poured into pig beds or from overflow from molds or  
93 from accidental runouts from melting units, ladles, or molds  
94 shall be railed off while such metal is in the molten state

95 as to places which any employee is required to use.

96 RULE 8. GANGWAYS FOR GENERAL TRAFFIC:

97 (a) GENERAL GANGWAYS. Gangways other than those for  
98 carrying molten metal shall be at least 3 ft. wide and shall  
99 at all times be kept in good condition, sufficiently firm to  
100 withstand the travel for which they are intended and uni-  
101 formly smooth and free from obstructions.

102 (b) CONDITION OF GANGWAYS. Every gangway employed for  
103 the handling of molten metal shall, during the progress of  
104 distribution and pouring of metal, be kept uniformly smooth,  
105 clear of obstructions and free from pools of water.

106 (c) FOR TRUCK AND MANUALLY OPERATED MONORAIL  
LADLES.

107 Gangways where molten metal is distributed in trucks or  
108 manually operated monorail ladles shall not be less than  
109 24 in. wider than the extreme width of the ladle equip-  
110 ment.

111 (d) FOR HAND SHANK LADLES AND CRUCIBLES.

112 (1) BY NOT MORE THAN TWO EMPLOYEES. Gangways  
113 where molten metal is distributed in hand shank ladles  
114 or crucibles which are carried by not more than two  
115 employees shall be not less than 3 ft. wide.

116 (2) BY MORE THAN TWO EMPLOYEES. Gangways where  
117 molten metal is distributed in hand shank ladles or  
118 crucibles which are carried by more than two employees  
119 shall be not less than 4 ft. wide.

120 (e) GANGWAYS USED FOR PARALLEL MOLTEN METAL  
OPERATIONS.

121 Gangways in which truck or manually operated monorail  
122 ladles travel parallel shall be not less than twice the  
123 width required for one ladle operations.

124 RULE 9. AISLES SERVING MOLDING FLOORS:

125 (a) CONDITION OF AISLES. Every aisle in which molten  
126 metal is being handled shall be kept in good condition,  
127 clear of obstructions, firm, uniformly smooth and free  
128 from pools of water at all times when molten metal is  
129 being handled.

130 (b) FOR HAND LADLES OR CRUCIBLES (NOT MORE  
THAN TWO

131 EMPLOYEES). Aisles where molten metal is carried in hand  
132 ladles or crucibles and poured into molds on the molding  
133 floor by not more than two employees per ladle or crucible  
134 shall be not less than 15 in. wide except where molds  
135 alongside the aisles are more than 20 in. high above  
136 the aisle level; in which case the aisle shall be not  
137 less than 24 in. wide.

138 (c) FOR HAND LADLES OR CRUCIBLES (MORE THAN TWO  
139 EMPLOYEES). Aisles where molten metal is carried in  
140 hand ladles or crucibles and poured into molds on  
141 molding floors by more than two employees per ladle  
142 or crucible shall be not less than 36 in. wide.

143 RULE 10. CUPOLA CHARGING EQUIPMENT:

144 The space underneath any cupola charging elevators, ma-  
145 chines, lift hoists, skip hoists and cranes shall be railed  
146 off or guarded to prevent material dropping on employees below,  
147 during charging operations.

148 **RULE 11. BLAST GATES:**

149 Blast gates shall be provided in the air blast pipe  
150 that supplies air to the melting equipment and such gates  
151 shall be closed off when the air supply fails or the melt-  
152 ing equipment is shut down to prevent the accumulation of  
153 combustible gases in the air supply system and minimize the  
154 explosion hazard. Except that in the case of cupolas the  
155 blast gate may be omitted if alternate tuyeres are opened  
156 to permit air circulation.

157 **RULE 12. REPAIRING CUPOLA LININGS.**

158 A substantial screen or guard shall be provided in the  
159 cupola and located above any employee working therein to  
160 protect them against falling objects. Such screens or  
161 guards shall be constructed of not less than  $1\frac{1}{2} \times 1\frac{1}{2} \times \frac{1}{4}$ -in.  
162 angle iron covered with a screen, the equivalent in strength  
163 of a 1-inch mesh of  $\frac{3}{16}$  in. wire or not less than No. 12  
164 U.S. gauge solid sheet steel. Such screens or guards shall  
165 be securely supported by means of overhead slings or under-  
166 pinnings to resist any falling object.

167 **RULE 13. SLAG HOLE SHIELDS:**

168 Where it is necessary to protect against the splashing  
169 or flowing of slag, the slag spout shall be equipped with

170 a shield or guard.

171 **RULE 14. CUPOLA BOTTOM SUPPORT:**

172 The cupola bottom doors, while the cupola is in  
173 operation shall be supported by at least two metal props  
174 of the required structural strength. Such props shall be  
175 supported on metal prop bases set on a concrete footing,  
176 or other fabricated footing of equivalent strength, and  
177 the props shall be adjusted to proper height by means of  
178 screws or wedges.

179 Temporary supports shall be placed under the cupola  
180 bottom doors while the metal props are being adjusted to  
181 the proper height for the closed doors to prevent the doors  
182 falling on the employees in the event the metal props slip  
183 out of place.

184 When the bottom is dropped either manually or auto-  
185 matically, the employees dropping the bottom shall be  
186 protected by a permanent or movable enclosure or guar.

187 **RULE 15. FURNACE TAP HOLES:**

188 Unless tap out holes are accessible from the ground,  
189 furnaces shall be provided with platforms movable or  
190 stationary, which will allow the employees to perform  
191 their work safely while making or tapping tap holes or  
192 preparing furnace runner spouts.

193 **RULE 16. CRUCIBLE FURNACES:**

194 Where the crown plate of an upright crucible furnace  
195 is elevated above the surrounding floor in excess of 12 in.,

196 (except furnaces in which the crucible is handled into and  
197 out of the furnace by mechanical hoists), the furnaces  
198 shall be equipped with a platform with standard guard  
199 rails and toe boards. Such platform shall be constructed  
200 of metal or other fireproof materials and shall extend  
201 around the front and sides of the furnace flush with the  
202 crown plate and shall be clear of obstructions.

203 When the combined weight of a crucible containing  
204 molten metal and the crucible tongs exceeds 100 lbs. the  
205 crucible shall be removed from the furnace by not less than  
206 two men or by mechanical means, and when the combined  
207 weight of the crucible and tongs exceeds 300 lbs. three  
208 or more men or a mechanical handling device shall be  
209 employed.

210 **RULE 17. LANCING OF TAP OUT HOLES:**

211 Where tap out holes are cut, lanced or burned out  
212 with oxygen, a guard shall be placed in front of the tap  
213 hole to prevent hot material from being blown onto the  
214 employee.

215 **RULE 18. LADLE PITS:**

216 (a) **SAFEGUARDING.** Where pits are required for metal  
217 and slag ladles at melting equipment, such pits shall be  
218 kept clean and dry unless special equipment is installed  
219 for quenching and breaking up slag by means of water. All  
220 such pits shall have at least one foot clearance over the  
221 greatest overall dimension of the ladle. All such pits

222 shall have removable standard guard rails or cover plates  
223 to prevent employees from falling into them when not  
224 in use.

225 (b) EMPLOYEES NOT ALLOWED IN LADLE PITS. An  
226 employer shall not require any employee to enter pits  
227 used for metal or slag ladles while metal or slag is  
228 being poured into the ladles.

229 RULE 19. CHARGING MACHINES:

230 Charging machines shall have all gears and pinions  
231 completely guarded and all wheels moving on tracks shall  
232 be covered with guards extending to within  $\frac{1}{2}$  in. of the  
233 rail to prevent employees from being injured. Charging  
234 machines shall be equipped with a warning sounding device,  
235 operated either automatically or by hand, and when in motion  
236 shall sound a warning. Operators of charging machines shall  
237 be protected from molten metal or sparks by a guard to pre-  
238 vent the operator from being burned.

239 RULE 20. CHARGING BOXES:

240 Charging boxes shall not have less than  $\frac{3}{4}$ -in. diameter  
241 holes in the bottom of not over 6-in. centers to insure  
242 proper drainage.

243 Contents of charging boxes containing ice or snow shall  
244 not be charged into the furnace.

245 RULE 21. OVEN EQUIPMENT:

246 All gaseous and oil fired ladle, core, blacking,  
247 annealing, and other types of ovens of more than 200

248 cu. ft. internal volume shall be provided with means  
249 for thoroughly purging all internal parts of the oven  
250 of combustible gas pockets before the burners can be  
251 lighted. Such purging shall be equivalent to at least  
252 four complete fresh air changes and purging shall not be  
253 construed to mean recirculation.

254 All ovens of 200 cu. ft. internal volume or less and  
255 not equipped to be thoroughly purged before the burners  
256 can be lighted shall be so designed that the oven doors  
257 must be opened in order to light the burner equipment.  
258 Where oven purging is dependent on opening of doors, the  
259 doors shall be fully open for 5 minutes before lighting  
260 the burners. Large fans may be employed in blowing out  
261 ovens before lighting to remove gas pockets.

262 All ovens shall be equipped with combustion safeguards  
263 that prevent unburned fuel discharging from burners into  
264 the ovens, in the event of flame failure. Such combustion  
265 safeguards shall be of the quick-acting type on ovens of  
266 more than 200 cu. ft. internal volume.

267 Explosion vents in the ratio of one sq. ft. of vent  
268 area for 16 cu. ft. of oven volume shall be provided. These  
269 vents shall be in the form of doors held closed by means of  
270 friction latches or loose top panels.

271 Printed instructions for the routine to follow in  
272 lighting ovens shall be plainly posted at the burner equip-  
273 ment.

274      **RULE 22. TILTING AND RESERVOIR LADLES:**

275      Tilting types of ladles for distributing molten metal  
276      or for any reservoir or mixing purposes or for slag and  
277      of any type of construction and mounted on stationary  
278      supports, trucks or handled by overhead crane or monorail  
279      and not of more than 2,000-lb. capacity may be of a hand  
280      shank type and shall be provided with a manually operated  
281      safety lock; or may be of a gear operated type equipped  
282      with an automatic safety lock or brake except all such  
283      ladles of over 2,000-lb. capacity shall be of the gear  
284      operated type equipped with an automatic safety lock or  
285      brake to prevent overturning or uncontrolled swaying. If  
286      ladles are mechanically or electrically operated, an auto-  
287      matic safety lock or brake shall be installed to prevent  
288      overturning or uncontrolled swaying.

289      **RULE 23. HAND LADLE CONSTRUCTION:**

290      All shanks for hand ladles shall be made from solid  
291      material. Tubular material shall not be used.

292      **RULE 24. LIPS ON LADLES:**

293      The rim or lip on hand or bull ladles shall not be  
294      built up above the top of the metal shell with refractory  
295      material more than  $\frac{1}{2}$  in. unless the refractory ladle lining  
296      is  $1\frac{1}{2}$  in. or more in thickness at the rim, in which case the  
297      maximum height shall not be greater than 1 inch.

298      **RULE 25. STORING OF LADLES:**

299      Lined ladles shall not be stored or kept in a damp

300 atmosphere or exposed to any moisture.

301 **RULE 26. DRYING OF LADLES:**

302 All ladles shall be thoroughly dried out before using.

303 **RULE 27. CRANE BUCKETS:**

304 The load carrying parts of crane buckets for the move-  
305 ment of materials by overhead crane shall have a factor of  
306 safety of at least five (5). When buckets have movable bails,  
307 safety locks or catches shall be provided and used to prevent  
308 overturning.

309 **RULE 28. SLINGS AND SLING BEAMS:**

310 All slings used to suspend loads from overhead equip-  
311 ment shall either be so designed that there are safe clear-  
312 ances for a hand grip, or handles shall be provided to hold  
313 the sling. Sling beams which are adjustable for different  
314 sizes of loads shall be so constructed that the slings  
315 cannot slip off the beam.

316 **RULE 29. TRUNNIONS:**

317 Trunnions used on flasks, buckets, ladles and other  
318 equipment to facilitate handling shall be constructed with  
319 a factor of safety of at least ten (10) including the method  
320 of attachment to the equipment. The diameter of the head on  
321 the outside end of the trunnion shaft shall not be less than  
322 1.5 times the diameter of the trunnion shaft. When such  
323 trunnions are used with portable slings for hooks there shall  
324 be at least an overall clearance of  $\frac{1}{4}$  in. between the inside  
325 of the trunnion base and the trunnion head over the maximum

326 size of sling or hook employed. The inside corners where  
327 the trunnion shaft joins the base and the head shall be  
328 filleted to prevent the sling or hook riding the trunnion  
329 base or head.

330 RULE 30. FLOOR OPERATED HOISTS:

331 Air and electric hoists operated from the floor by  
332 means of pull chain switches or valves operated by two  
333 chains or rods shall be equipped with easily recognized  
334 markers on the operating devices to denote "hoist" and  
335 "lower" or words to that effect.

336 All control devices shall be clear of hot metal of  
337 slag containers.

338 RULE 31. SWIVEL LOAD HOOKS:

339 All swivel load carrying hooks on any type of hoisting  
340 equipment that are attached to a shank or bolt by means of  
341 a threaded nut in which the action of the swiveling hook may  
342 cause the nut to turn, shall have the nut locked in place by  
343 means of a pin or other locking device.

344 Rule 32. Crank Track Wheel Bumpers:

345 All overhead and gantry crane tracks shall be equipped  
346 with track wheel bumpers that will stop the movement of the  
347 crane and prevent the crane from running off the crane run-  
348 way or striking the building structure. Such bumpers shall  
349 be accurately located so that the crane can be re-aligned  
350 from them on the runway. All such bumpers shall not only  
351 be anchored to the crane rails, but also to the rail girders

352 or other supporting members.

353 Rule 33. Outside Granes to Be Anchored:

354 All overhead and gantry cranes located out of doors shall  
355 be securely fastened to the crane rails or supporting members  
356 when crane is not in operation, to prevent heavy winds from  
357 moving the crane.

358 Rule 34. Crane Cabs:

359 Operators in crane cabs shall be protected from the out-  
360 door elements or from heat if handling molten metal.

361 Rule 35. Crane and Hoist Construction:

362 All hand and power operated jib, overhead traveling,  
363 gantry and monorail cranes and hoists installed in the  
364 future shall have all load carrying frame members con-  
365 structed of fabricated or cast steel or from a material  
366 equivalent for tensile strength and ductility.

367 Rule 36. Hoisting Mechanism Limit Switches:

368 All mechanically operated hoisting mechanisms shall be  
369 provided with limit switches that will prevent the lower  
370 block being pulled into the hoisting drum.

371 On installations made after the effective date of this  
372 rule, hoisting mechanism shall be provided with a limit switch  
373 to prevent over-travelling in the lowered position.

374 Rule 37. Warning Devices on Crane and Monorail Cabs:

375 All cabs operated overhead and gantry cranes and monorail  
376 hoists shall be provided with warning sounding devices.

377 Rule 38. Riding on Hoists Prohibited:

378 No employer shall permit employees to ride on any hoisting  
379 device or load that is being hoisted, except in cases of emer-  
380 gency or for some special reason an employee may be hoisted to  
381 some elevation by means of a hoist without a load, in which  
382 case the employee shall be provided with a saddle sling and  
383 the employee shall be securely fastened therein and the sling  
384 shall be securely fastened to the hoisting mechanism.

385 Rule 39. Swinging and Dangling Crane Chains:

386 Swinging or dangling crane chains or loads shall be  
387 hoisted to clear all obstructions when the crane is in motion.

388 Rule 40. Overhead Conveyors:

389 When overhead conveyor systems pass over passageways and  
390 working areas, the employees beneath shall be protected with  
391 substantial screens, grilles, or guards, the strength of  
392 which shall be sufficient to resist the fall of the heaviest  
393 piece handled by the conveyor.

394 Rule 41. Chain Conveyor Dogs:

395 When chain conveyors operate at various levels, other  
396 than in a fixed horizontal plane, a mechanism of safety dogs  
397 shall be installed on the up and down grade inclines that  
398 will hold the chain and prevent the loan chain from piling  
399 up at the bottom of the incline in case of chain failure.

400 Rule 42. Shut-Off for Power Conveyors:

401 Where it is necessary that employees work in connection  
402 with a power conveyor at a point where the conveyor passes  
403 into a tunnel or wall opening and there is no space around

404 the conveyor for the passage of a workman, such opening shall  
405 be guarded by a gateguard, hooked up electrically or mechani-  
406 cally, so that when the gate is contacted the conveyor mechanism  
407 will shut off.

408 Rule 43. Conveyor Pallets:

409 Open spaces between the pallets on conveyors at conveyor  
410 turns shall be eliminated or closed up or guarded if accessible  
411 to the employees.

412 Rule 44. Elevators:

413 (a) Elevator Gates Required. All elevator openings  
414 at the floor levels to the elevator hatch shall be pro-  
415 tected by elevator gates, either manually or mechanically  
416 operated.

417 (b) Gate Interlocks. All elevators shall either be  
418 electrically or mechanically interlocked with the elevator  
419 platform so that it is impossible to start the elevator  
420 until the gate is in closed position, and also that it  
421 is impossible to open the gate until the elevator is at  
422 the floor level.

423 (c) Safety Blocks. All elevators other than hydraulic  
424 elevators shall be equipped with safety blocks operated by  
425 speed governor control that will hold the elevator in case  
426 of cable failure or over speeding.

427 (d) Hatch Limit Controls. All types of elevators  
428 shall be equipped with upper and lower travel limit devices  
429 that will prevent the elevator from over traveling.

## 430 Rule 45. Monorails:

431 All monorails or telpherage systems shall be provided  
432 with automatic guards that will prevent the trolley equip-  
433 ment running off at open switches. Permanent guards shall  
434 be provided at the ends of all such equipment.

## 435 Rule 46. Inspection of Equipment.

436 All load carrying equipment, including cranes, hoists,  
437 monorails, chains, slings, cables, bales, buckets, containers,  
438 ladles for the transportation of molten metal, and the like  
439 shall be carefully inspected at least once a month to deter-  
440 mine that the equipment is safe for handling the loads the  
441 equipment was designed for and record of all such inspections  
442 shall be kept on file for the review of the Department of Labor.

## 443 Rule 47. Storage Bins:

444 (a) Hopper Bins. Hopper bins containing material  
445 which is fed out at the bottom either by hand or mechan-  
446 ical means shall be covered with a grating securely  
447 fastened in place which will allow the use of pokers  
448 to break up bridging of the stored material but will  
449 not permit an employee to enter the bin. When it is  
450 necessary to enter the bin, safety belts and lines shall  
451 be furnished and one or more assistants shall be on duty  
452 to attend the safety lines. No bridged material shall be  
453 broken down at any time that any person is in the hopper.

454 (b) Floor Storage Piles. Employers shall instruct  
455 the employees, who are removing materials from bins located

456 at floor level or from storage piles, that they shall not  
457 undermine the pile and thereby prevent cave-ins.

458 Rule 48. Scrap Breakers:

459 (a) Shears. Shears shall be guarded to prevent  
460 operators and passing employees from being injured by  
461 flying particles and a clear, level floor shall be pro-  
462 vided within the working area.

463 (b) Drops. The breaking of castings or scrap by  
464 the use of a drop inside the buildings during working  
465 hours shall be prohibited unless such operations are  
466 performed within a permanent enclosure consisting of not  
467 less than 2-in. planking or equivalent protection. Such  
468 enclosures shall be of sufficient height to protect employees  
469 working in the vicinity from injury by flying fragments of  
470 metal. When the ball is dropped by rope, the rope shall ex-  
471 tend over pulleys to a point clear of the breaking area so  
472 that the operator will be at a safe distance and to prevent  
473 entanglement.

474 Rule 49. Storage of Materials and Equipment:

475 Space shall be provided for the storage of all materials  
476 and equipment. Materials and equipment not in regular use  
477 shall be put into storage. All materials and equipment shall  
478 be stored in a safe, orderly manner on level and substantial  
479 foundations.

480 Rule 50. Flammable Liquids:

481 Flammable liquids of 100 degrees F. Tagliabue closed cup

482 tester and less shall be stored in locations away from the ex-  
483 posure to fire in leak-proof metal containers. Compliance in  
484 this respect with the current rules for the storage of flammable  
485 liquids of the National Fire Prevention Association shall be  
486 deemed compliance of the employer with this Rule.

487 When it is necessary to transport and use flammable  
488 liquids on the job, liquids shall be contained in heavy  
489 metal containers with tight and leakproof opening to pre-  
490 vent accidental ignition. Compliance in this respect with  
491 the current rules for containers for the transporting of  
492 flammable liquids of the Underwriter's Laboratory shall be  
493 deemed compliance by the employer with this Rule.

494 Rule 51. Chipping.

495 Where castings are cleaned or chipped, the area shall  
496 be segregated by permanent or movable screens or partitions  
497 to protect other employees from flying chips. Where the  
498 nature of the work permits, screens or partitions shall be  
499 employed to segregate the individual operations.

500 Rule 52. Finishing Rails or Benches:

501 Where finishing rails or benches are used they shall be  
502 sufficiently far apart to allow the operator to pass between  
503 the rails or benches and walk without being endangered by  
504 falling objects.

505 Rule. 53. Grinding, Polishing and Buffing Equipment:

506 All grinding, polishing and buffing equipment wheels  
507 shall be covered with a guard or enclosed as much as possible

508 consistent with the type of work being performed to reduce  
509 the amount of material being thrown into the atmosphere, and  
510 the enclosure or guard shall be of such strength to withstand  
511 and withhold fragments from a bursted wheel.

512 All steady rests in front of wheels shall be kept adjusted  
513 close to the wheel to prevent the work from jamming between  
514 the wheel and steady rest.

515 Rule 54. Tumbling Mill Equipment:

516 (a) Guard Rails. All tumbling mills not provided  
517 with a complete enclosure shall be provided with a stand-  
518 ard height guard rail, completely protecting the exposed  
519 parts of the mill when operating.

520 (b) Locking Devices. All tumbling mills shall be  
521 equipped with a positive locking device that will prevent  
522 the mill from turning over when loading or unloading the  
523 mill. Such device shall prevent the turning of the mill  
524 due to the unbalancing of the load within the mill or from  
525 the source of power.

526 Brakes shall not be construed as a positive locking  
527 device.

528 Rule 55. Arc Welding Operations:

529 All regular arc welding shall be conducted within an enclo-  
530 sure or partial enclosure to prevent the light rays penetrating  
531 to other employees. Wherever possible, on irregular or mainte-  
532 nance arc welding operations, portable guards shall be used.

533 Rule 56. Fans:

534 Fan blades on any fan exposed to contact shall be guarded  
535 with a substantial wire mesh screen. If such guard is within  
536 4 in. of the impeller, the openings of the guard shall not  
537 permit the insertion of 1/2-in. ball. If further away than 4 in.,  
538 the openings in the guard shall not permit the insertion of  
539 1 1/2-in. ball.

540 Rule 57. Pressure Tanks:

541 All tanks under pressure except pressure of city water  
542 mains shall be made from such materials and so constructed  
543 in order to adequately withstand the pressure for which it is  
544 designed to be used and will not burst or explode under opera-  
545 tions. Compliance in this respect with the current rules for  
546 the construction of unfired pressure vessels of the American  
547 Society of Mechanical Engineers shall be deemed compliance by  
548 the employer with this rule.

549 Rule 58. Pressure Tank Inspection:

550 All pressure tanks operating on pressure other than from  
551 city water mains shall have a visual and hammer test inspection  
552 at least once a year by competent inspectors, or a hydrostatic  
553 test to 150 percent of normal working pressure.

554 Rule 59. Pressure Units Using reducing Valves:

555 When pressure tanks or units operate at a reduced pressure  
556 and receive their pressure from a higher pressure source, a  
557 relief valve shall be used between the pressure regulator and  
558 the tank or unit. Such relief valve shall be set at not more  
559 than 25 percent above the working pressure of such tank or

560 unit. Such relief valves shall be of the lever type and  
561 opened twice each working day to make sure the valve is not  
562 plugged up.

563 Rule 60. Pressure Testing Units:

564 When pressure testing units are used and operate at more  
565 than 20-lb. pressure above atmospheric pressure, such units  
566 shall be given a hydrostatic test every three months of 150  
567 percent of operating pressure.

568 Rule 61. Blowing Down Air Tanks:

569 All compressed air tanks shall be blown down at least  
570 once every 24 hours to remove any moisture entrainment in  
571 the tank, unless such tank is equipped with a trap device  
572 that will automatically function to remove the entrained  
573 moisture.

574 Rule 62. Safety Valves:

575 All units or systems operating under pressure, such as  
576 compressed air systems, and the like, shall be provided with  
577 safety valves set to operate at the maximum operating pressure.  
578 Such safety valve shall be of a type that the valves can be  
579 tested periodically from outside the valve bonnet.

580 Rule 63. Foot Protection from Falling Objects:

581 All employees engaged in manual labor handling heavy ob-  
582 jects, except molten metal, shall have their feet protected  
583 by metal toe caps or metal foot guards.

584 Rule 64. Protective Covering:

585 (a) Protective Covering for Abrasive Cleaning Opera-

586 tions. All operators who must work in the area in which  
587 dust and dirt are generated by abrasive cleaning operations,  
588 shall be provided with protective covering.

589 (b) Covering for Acid and Chemical Operations.

590 (1) Protection Against Alkaline Solutions.

591 Where employees come in contact with alkaline  
592 solutions, the operator shall be provided with fabric  
593 reinforced rubber gloves, and if there is a splashing  
594 hazard the operator shall be provided with rubber boots  
595 and rubber aprons that extend below the boot tops.

596 (2) Covering for Acid Solutions. Where employees  
597 come in contact with acid solutions, the operator shall  
598 be provided with fabric reinforced rubber gloves and  
599 if there are any splashing hazards the operator shall  
600 be provided with rubber boots and rubber aprons that  
601 extend below the boot tops.

602 Rule 65. Eye Protection:

603 (a) Protection of Eyes Against Flying Objects. All  
604 employees who are exposed to eye injuries by dust, flying  
605 chips or fragments, molten metal and from other causes  
606 shall be provided with spectacles or cup goggles properly  
607 fitted to their head, equipped with safety glass lenses  
608 or equivalent protective devices. Where eye correction  
609 is required for safety glass lenses, the same shall be  
610 ground to prescription specifications or suitable type  
611 of cover glass protection used.

612 (b) Tests for Safety Lenses. All lenses used for  
613 protection of eyes against flying fragments shall be  
614 strong enough to stand a drop test without fragmentation  
615 of a  $\frac{5}{8}$ -in. diameter steel ball dropped on the lens  
616 which is supported on a rubber faced steel block at a  
617 distance of 39.4". Compliance with the current rules  
618 for the specification of lenses of the U.S. National  
619 Bureau of Standards' specifications for head and eye  
620 protection Handbook No. H-24 shall be deemed compliance  
621 by the employer with this rule.

622 (c) Protection of Eyes Against Acids and Chemicals.

623 All employees who are exposed to eye injuries from the  
624 splashing of acids or chemicals shall be provided with  
625 acid handlers' goggles equipped with impact resisting  
626 lenses.

627 (d) Welders' Eye Protection.

628 (1) Types of Lenses to Be Used. All welding  
629 operators shall be provided with goggles or helmets  
630 provided with windows or face shields provided with  
631 windows equipped with the proper shaded lens as to  
632 density and absorption in relation to visible and  
633 injurious light radiation as follows:

634 Lens Shade No.

635 A—(Medium) : B—(Dark) : (C)—(Extra dark) : for  
636 electric fusion welding operation or employees  
637 near arc welding operations. Also for protection

638 against glare or reflected light.

639 3—For more intense operations similar to

640 No. A, B and C also light brazing operations.

641 4—For light acetylene operations such as

642 burning, cutting and

643 5—For a little heavier acetylene work than

644 No. 4.

645 6—General acetylene welding operations and

646 maintenance work also setup work on electric arc

647 welding.

648 8—Heavy acetylene welding and cutting and

649 electric metallic arc welding up to 20 amperes.

650 Also for carbon arc observation.

651 10—Electric metallic arc welding up to 250

652 amperes.

653 12—Electric metallic arc welding for more than

654 250 amperes. Also atomic hydrogen welding.

655 14—Electric carbon arc welding.

656 (2) Additional Eye Protection. All welding

657 operators and helpers shall be provided with pro-

658 tective goggles which are fitted with clear or filter

659 lenses to prevent injurious light rays, or impact from

660 injuring the eyes when the regular welding eye pro-

661 tection is removed.

662 (e) Furnace Operator's Eye Protection. All operators

663 and helpers on electric melting furnaces and on any other

664 type of furnaces that create an intense glare, shall be  
665 provided with eye protectors with suitable filter lenses  
666 to eliminate eye strain and damage caused by injurious  
667 light rays and heat.

668 (f) Lenses to be Securely Held in Place. Lenses  
669 shall be firmly held in place in the eye wire, cup, or  
670 frame to prevent rotation and thereby eliminating  
671 changing prismatic effect and to provide for lens  
672 retention in the event of fracture.

673 Rule 66. Water Supply for Removing Acid or Chemical  
674 splashes:

675 Wherever employees work on alkaline or chemical operations,  
676 a portable source of water of at least a  $\frac{3}{4}$ -in. pipe size of  
677 not over 25-lb. pressure equipped with a quick acting valve shall  
678 be provided in close proximity to the operations, with which the  
679 operator's eyes or body may be thoroughly washed with water in  
680 case of accidental splashing.

681 Rule 67. Respiratory Protective Equipment:

682 (a) Abrasive Cleaning Operations. All operators  
683 who must work in the direct presence and in contact with  
684 the dust and dirt generated from the abrasive cleaning  
685 operations shall be provided with fresh air supplied air-  
686 line helmets or masks.

687 The helmets or masks shall be provided with a supply  
688 of fresh filtered air and if such air is cold, due to  
689 climatic conditions, the air shall be heated to at least

690 65 degrees F. before entering the helmets or masks. Com-  
691 pressed air shall not be used as a fresh air supply in  
692 the helmets or masks unless an adequate air filter is  
693 provided to remove all dust and carbon monoxide.

694 All such helmets and masks shall be so constructed  
695 that the operator's breathing zone will not be contaminated  
696 with dust from such cleaning operations. Compliance in  
697 this respect with the current rules for fresh air supplied  
698 helmets and masks of the United States Bureau of Mines  
699 shall be deemed compliance by the employer with this rule.

700 Rule 68. Hand Tools:

701 All hand tools shall be kept properly dressed and free  
702 from mushroomed heads.

703 Rule 69. Electrical Installations:

704 All electrical equipment, wiring, switches, motors and  
705 all other electrical equipment shall be of a safe type and  
706 installed in a safe manner to prevent injury to employees.  
707 Compliance in this respect with the current rules of the  
708 National Electrical Code of the National Fire Prevention  
709 Association shall be deemed compliance by the employer with  
710 this rule.

711 Rule 70. Grounding Portable Electric Equipment:

712 All portable electrically driven equipment shall be  
713 electrically bonded and permanently and effectively grounded  
714 to a metallic underground water pipe system or equivalent  
715 grounding electrodes.

1 SECTION 3. GENERAL RULES AND REGULATIONS FOR  
2 OF INJURY TO THE HEALTH OF EMPLOYEES.  
3

4 Rule 1. Scope:

5 These rules and regulations shall apply to all operations  
6 as defined in Section 1, Rule 1, that produce any dusts, gases,  
7 vapors, or fumes that create a hazard to the health of employees  
8 employed therein.

9 Rule 2. Methods of Controlling Dust, Gasses, Vapors or  
10 Fumes:

11 Every process which generates dust, gases, vapors or  
12 fumes into the breathing zone of employees wherein the con-  
13 taminated substance is injurious to the health and is conducive  
14 to bodily harm shall be provided, whenever the nature of the  
15 process permits without defeating the purpose of the process,  
16 with exhaust hoods or enclosures to control the contaminating  
17 substance to reduce its dispersion into the breathing zone  
18 to a minimum. If the nature of a process does not permit the  
19 application of an exhaust hood or enclosure, one or more of  
20 the following methods or devices shall be employed to reduce  
21 the dispersion of the contaminated substance into the breathing  
22 zone of the employee:

23 (a) General ventilation increased in excess of that  
24 required under Sec. 2, Rule 2.

25 (b) Wetting.

(c) Oiling.

26 (d) Timing of process so as to reduce to a minimum  
27 the number of employees exposed.

28 (e) Isolation of the process.

29 (f) Personal respirators protective equipment.

30 Rule 3. Storage of Materials and Equipment:

31 Materials and equipment which may accumulate dust and  
32 which are not used routinely shall be stored when not in use  
33 in segregated storage areas which shall be provided for this  
34 purpose.

35 Rule 4. Good Housekeeping:

36 Good housekeeping shall be maintained at all times and  
37 shall include cleaning and removal of dirt and waste materials  
38 accumulated on floors, super-structures, and equipment.

39 Rule 5. Exhaust Systems:

40 All exhaust systems shall include hoods or enclosures  
41 properly designed, at the points of generation of dusts, gases,  
42 vapors, or fumes, and connected by means of suitable exhaust  
43 piping to airflow producing equipment, and when necessary air  
44 cleaning equipment, and shall be discharged out of doors.

45 Rule 6. Hoods and Enclosures:

46 Every exhaust hood and enclosure shall be so designed,  
47 located, and placed, that the air borne dusts, gases, vapors,  
48 or fumes generated will fall or be projected or drawn into  
49 the hood or enclosure in the direction of air flow, and all  
50 hoods shall be constructed so as to provide the greatest  
51 possible enclosure in the zone of dust, gas, vapor, or fume

52 generation consistent with the conduct of the process. All  
53 air movement from open doors, windows, moving machinery and  
54 the like which tends to disperse such harmful substances  
55 generated by the equipment or process into the general atmos-  
56 phere shall be eliminated or controlled. Hood openings and  
57 connections to branch pipes shall be shaped so as to minimize  
58 the orifice and resistance losses due to the flow of air into  
59 the system. All hoods and enclosures shall be free of burrs  
60 and sharp edges.

61 Rule 7. Rate of Air Flow Through Hoods and Enclosures:

62 The rate of air flow into every hood and enclosure shall  
63 be sufficient to control the harmful air borne dusts, gases,  
64 vapors, or fumes in accordance with the following requirements:

65 (a) Enclosed Shakeout Grates. Enclosed shakeout  
66 grates shall be ventilated at a rate of not less than  
67 200 cu. ft. per minute per sq. ft. of open area into  
68 the enclosure.

69 (b) Side Hoods on Shakeout Grates. Side hoods on  
70 shakeout grates shall be provided with a total rate of  
71 ventilation of not less than 400 cu. ft. per sq. ft. of  
72 gross grate area.

73 (c) Shakeout Grate Enclosed on Any Two Sides. Any  
74 shakeout grate enclosed on any two sides in which the en-  
75 closure covers a projected area of the grate surface by  
76 at least  $33\frac{1}{3}\%$  shall be provided with ventilation of  
77 not less than 275 cubic feet per minute per sq. ft. of

78 gross grate area.

79 (d) Permanently Located Sand Mixing Equipment. Per-  
80 manently located sand mixing equipment shall be enclosed  
81 and ventilated at a rate of not less than 100 cubic feet  
82 per minute per sq. ft. of open area, including loading  
83 and inspection openings.

84 (e) Sand Handling and Preparation Equipment.

85 (1) Handling Sand of Less Than 2% Moisture-  
86 Content. Foundry sand handling and preparation  
87 equipment located inside of buildings in which the  
88 sand handled contains less than 2% of moisture by  
89 weight, shall be enclosed as completely as possible  
90 and shall be provided with exhaust ventilation at  
91 the following rates.

92 (2) Flat Deck Screens. The rate of ventilation  
93 for flat deck screens shall be not less than 50 cubic  
94 ft. per minute per sq. ft. of screen area, and the  
95 air velocity through the enclosure openings shall be  
96 not less than 200 linear feet per minute.

97 (3) Cylindrical Screens. The rate of ventilation  
98 through cylindrical screens shall not be less than  
99 100 ft. per minute per square ft. of cylindrical  
100 screen cross section.

101 (4) Conveyor Belts. Exhaust hoods over loading  
102 and discharge points on conveyor belts shall be venti-  
103 lated at a rate of not less than 300 cu. ft. per

104 minute per foot of belt width and the air velocity  
 105 through the net open area of the hoods shall not be  
 106 less than 150 linear ft. per minute. When dust is  
 107 released for belts at points other than loading or  
 108 discharge points, they shall be provided with belt  
 109 wipers or enclosed or otherwise controlled to prevent  
 110 the dissemination of dust.

111 (5) Bucket Elevators. Bucket elevators shall be  
 112 enclosed and the point of discharge shall be hooded and  
 113 provided with ventilation at a rate of not less than  
 114 100 linear ft. per minute.

115 (6) Storage Bins. Storage bins located inside  
 116 which have openings that emit dust shall be ventilated  
 117 so as to maintain a negative pressure within the enclosure.

118 (f) Tumbling Mill Ventilation.

119 (1) Stave Type Mills. Tumbling mills of the  
 120 stave type shall be housed in ventilated enclosures.

121 The rates of ventilation shall be not less than the  
 122 following:

123	Inside Dimension of Stave Mill not	Cubic feet of air to be ex-
124	over 70 in. Inside Length	hauster per minute for Mills
125	Side of Diameter of	Not over 70 in. Inside Length
126	Square Mill Round Mill	
127	Up to 24 in. inclusive	800
128	Up to 24 in. incl. 30 in. “	900
129	Up to 30 in. “ 36 in. “	980

130	Up to 36 in. “	42 in. “	1335
131	Up to 42 in. “	48 in. “	1747
132	Up to 48 in. “	54 in. “	2210
133	Up to 54 in. “	60 in. “	2725
134	Up to 60 in. “	66 in. “	3300
135	Up to 66 in. “	72 in. “	3925
136	Up to 72 in. “		4610

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137 For mills in between the sizes listed above, the amount  
 138 of air handled per minute shall be increased in proportion  
 139 to the difference in size and volume of air and such amount  
 140 of air thus obtained, added to the nearest smaller size listed  
 141 above.

142 For mills longer than 70 inches the rate of ventilation  
 143 shall be increased over the above values in direct proportion  
 144 to the increase in length.

145 The air intake into the mill housing or enclosure shall  
 146 be located at the front and bottom of the enclosure and shall  
 147 be of such size that the average air velocity is not less than  
 148 400 feet per minute throughout the air intake opening.

149 (2) Internally and Duct Ventilated Types of Mills.

150 Mills of the internal ventilated type in which air is  
 151 drawn into the mill proper and mills of the duct ventilated  
 152 type in which the dust is picked up in ducts located on  
 153 the shell of the mill shall be ventilated at the following  
 154 rates:

155	Inside Dimension of Mill		Cubic feet	Diameter of Branch
156	Side of	Diameter of	of air to	pipe to give required
157	Square Mill	Round Mill	be	rate of ventilation of
158			exhausted	5000 linear feet per
159			per minute	minute velocity
160	Up to 24" inclusive		430	4"
161	Up to 24" inclusive	30" "	680	5"
162	Up to 30" "	36" "	980	6"
163	Up to 36" "	42" "	1330	7"
164	Up to 42" "	48" "	1750	8"
165	Up to 48" "	54" "	2200	9"
166	Up to 54" "	60" "	2730	10"
167	Up to 60" "	66" "	3300	11"
168	Up to 66" "	72" "	3920	12"
169	Up to 72" "		4600	13"

170 (3) Velocity of Mill Branch Pipes. The air velocity  
 171 in the branch exhaust pipe connected to mills of the  
 172 internally ventilated and duct ventilated types shall  
 173 not be less than 5000 linear feet per minute and in  
 174 the main exhaust pipe to which these branch pipes are  
 175 connected the velocity shall not be less than 4000  
 176 linear feet per minute.

177 (g) Grinding, Polishing and Buffing Wheel Ventilation.  
 178 Grinding, polishing and buffing wheel operations shall  
 179 be ventilated in accordance with the effective rules

180 promulgated by the Iowa Industrial Commission and known  
181 as Part "C."

182 (h) Abrasive Blasting Rooms. Abrasive blasting rooms  
183 shall be totally enclosed, except for the air intakes,  
184 and shall be provided with downdraft ventilation of not  
185 less than an average of 80 ft. per minute over the entire  
186 projected floor area of the room. Air inlets shall be  
187 located in the ceiling and spaced to provide uniform  
188 distribution of air flow to the cross-sectional area  
189 of the room. Arrangement of the air inlets shall be  
190 such as to give an inlet velocity of not less than 300  
191 ft. per linear feet per minute. Such inlets shall be  
192 provided with baffles to prevent the escape of abrasive  
193 particles or dust.

194 The operators of the abrasive blasting room shall be  
195 provided with personal respiratory protection of the posi-  
196 tive pressure type.

197 (i) Rotary Abrasive Blasting Tables. Rotary abrasive  
198 blasting tables shall be enclosed and all openings effec-  
199 tively curtained and ventilated at a rate of not less than  
200 200 cu. ft. per minute per square foot of gross open area  
201 without the curtains in place.

202 (j) Abrasive Blasting Hand Cabinets. Abrasive blast-  
203 ing hand cabinets shall be ventilated with an air velocity  
204 of not less than five hundred (500) linear feet per minute  
205 through all operating openings.

206 The amount of air exhausted from the cabinet shall  
207 be at least twenty times the volume of the cubical con-  
208 tents of the cabinet per minute.

209 (k) Other equipment. For any machine or process  
210 not specifically listed, the rate of ventilation shall  
211 be such that an entering flow of air into the ventilating  
212 system is maintained for the operation of the machine or  
213 process of not less than the minimum velocity required to  
214 prevent the dispersion of harmful dusts, gases, fumes,  
215 or vapors.

216 Rule 8. Exhaust Piping Systems:

217 (a) Size of Pipes. The size of every branch pipe  
218 and every section of main pipe shall be determined so  
219 as to meet the following requirements:

220 (1) The minimum rate of air flow as required  
221 under Section 3, Rule 7, of this Part "E", shall  
222 be provided through each hood or enclosure.

223 (2) Air Velocities. In the case of an exhaust  
224 system collecting dust or other particulate matter,  
225 except where the collected material is conveyed by  
226 gravity or mechanical means, the air velocity in the  
227 exhaust pipes shall not be less than the minimum  
228 velocity required to transport the collected matter  
229 to the air cleaning equipment. The maximum velocity  
230 in the system shall not exceed the minimum velocity  
231 by more than 20% where higher velocity is used for the

232 specific purpose of balancing the air flow through the  
233 system; exhaust systems handling fumes or vapors or  
234 dust exhaust systems in which the collected material  
235 is conveyed by gravity or mechanical means may operate  
236 at such velocities that will maintain the degree of  
237 control required to remove any hazard to the health  
238 of the employee.

239 (3) Capacity of an Exhaust System. The capacity  
240 of an exhaust system shall be calculated on the basis  
241 of all hoods connected to the system being open.

242 (4) Piping Locations. Exhaust piping shall be lo-  
243 cated so as to require the minimum length of pipe and  
244 number of bends.

245 (5) Piping Clearance from Combustible Materials.  
246 All piping shall be kept at least 6" from the floor  
247 and from any combustible material.

248 (6) Location of Piping for Inspection and Protection  
249 Against Damage. Piping shall be located so as to be  
250 accessible for inspection and maintenance and pro-  
251 tected against external damage.

252 (7) Passage of Piping Through Fire Walls. When  
253 ventilating and exhaust piping pass through fire walls,  
254 the piping shall be provided with automatic fire doors,  
255 or fire dampers on both sides of the fire wall through  
256 which it passes.

257 The fire doors and fire dampers shall be arranged

258 to close automatically and remain tightly closed upon  
 259 the operation of a fusible link or other suitable heat  
 260 actuated device located where readily affected by an  
 261 abnormal rise of temperature in the piping. Hinged  
 262 dampers shall be equipped with spring catches and  
 263 the pins of hinges shall be of corrosion resistant  
 264 material. The fire doors shall be of metal-clad  
 265 construction and the fire dampers shall be made of  
 266 steel or heavy rigid asbestos sheets that will resist  
 267 the passage of fire through the piping at fire walls.  
 268 Compliance with this respect with the current rules  
 269 of the National Fire Prevention Association shall be  
 270 deemed compliance by the employer with this rule.

271 (8) Materials of Construction. All pipes shall  
 272 be constructed of not less than the following gauges  
 273 of metal; or other material of equivalent strength:

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274	U. S. Standard Gauge		
275	Diameter of	U. S. Standard Gauge	to be used for Non-
276	Pipe,	to be used for Abrasive	Abrasive Dusts, Fumes,
277	Inches	Dusts	Vapors
278	Up to 8" inclusive	20	24
279	Over 8" to 18" inclusive	18	22
280	Over 18" to 30" inclusive	16	20
281	Over 30"	14	18

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282 (9) Elbows and Bends. All elbows and bends shall

283 be made from material at least two gauges heavier  
284 than is required to straight piping of the same  
285 diameter, except that for No. 14 gauge and heavier,  
286 the elbows and straight pipe may be of the same  
287 gauge.

288 (10) Material. Exhaust piping shall be of gal-  
289 vanized or painted black sheet iron or other materials  
290 of required strength, corrosion and abrasion resisting  
291 properties.

292 (11) Longitudinal Joints. All longitudinal joints  
293 or seams, except of welded construction, shall be  
294 double locked or lapped one inch and riveted with  
295 rivet centers not more than three inches apart.

296 (12) Girth Joints. All girth joints of pipe,  
297 except joints of butt welded or flanged construction,  
298 shall be made so that the outlet end of one length  
299 fits into the inlet end of the next length in the  
300 direction of air flow. The minimum length of lap  
301 shall be one and one-quarter inches and rivets shall  
302 be provided at not more than four and one-half inch  
303 centers. There shall be not less than four rivets  
304 in any girth joint.

305 (13) Elbow Construction. Elbow joint construction  
306 shall conform to the above Rules 11 and 12 of this  
307 Section.

308 (14) Spot Welding. Spot welds may be used in

309 place of rivets in equal numbers provided steel to  
310 steel fusion at each weld is secured.

311 (15) Joints. All joints, other than those continu-  
312 ously welded, or flanged, shall be soldered air tight,  
313 except that field joints or connections may be closed  
314 with joint cement.

315 (16) Flanged Joints. Flanged, gasketed and bolted  
316 girth joints may be used in place of lapped and riveted  
317 joints and such joints are required where pipe sections  
318 are to be removed for inspection and cleaning.

319 (17) Telescopic Joints. Telescopic joints, employed  
320 to permit raising and lowering hoods, shall have the  
321 smaller pipe connected to the hood with a sliding fit  
322 inside the larger connecting pipe. The inside pipe  
323 shall extend into the outside pipe at least one pipe  
324 diameter, but never less than six inches when extended  
325 to maximum position. The end of the outside pipe should  
326 have a reinforcing band or bead and all parts shall be  
327 free from burrs, projections and sharp edges.

328 (18) Horizontal Pipe Supports. All horizontal  
329 runs of pipe including branch pipes extending more  
330 than three feet shall be securely supported. Such  
331 supports shall be not over twelve foot centers for  
332 pipes eight inches or smaller, and twenty foot centers  
333 for larger pipes.

334 (19) Vertical Pipe Supports. All vertical runs

335 of branch pipes subject to vibration and movement shall  
336 be securely supported laterally by band steel or rods.

337 (20) Outside Piping. All exhaust piping hung on  
338 the outside of a wall immediately adjacent to a public  
339 road or street shall be securely supported, and per-  
340 manently fastened to the structure.

341 (21) Cleanout Openings. In dust exhaust systems,  
342 cleanout openings shall be provided in all horizontal  
343 runs of pipe wherever dust settlement is likely to occur  
344 and shall always be provided near bends, pipe junctions  
345 and vertical runs of pipe. Cleanout openings shall be  
346 of a size that will permit ready access to the interior  
347 of the pipe. Removable caps shall be installed at all  
348 tail ends.

349 Where piping is constructed with flanged joints  
350 for purposes of cleaning, inspection openings shall  
351 be provided in such piping in place of regular clean-  
352 outs.

353 Wherever practical, cleanout openings should be lo-  
354 cated on under side of pipe and must offer no obstruction  
355 on the inside of the pipe.

356 (22) Branch Pipe Junctions to Main Pipe. Junctions  
357 shall be made at an angle not greater than  $45^{\circ}$ , and  
358 should for least resistance and best practice be  $30^{\circ}$   
359 or less, measured on the center line of the two pipes.

360 (23) Location of Junctions. Junctions shall be

361 made at the side or top of the larger end of a trans-  
362 formation piece, except that for specific reasons of  
363 balancing the flow, junction may be made with the main  
364 pipe section of uniform pipe diameter.

365 (24) Number of Junctions. Not more than one  
366 branch pipe shall enter the main pipe at the same  
367 point of intersection, except at a terminal end.

368 (25) Transformation Pieces. Transformation pieces  
369 shall be tapered at an included angle not greater than  
370 30°. Transformation pieces shall increase in area by  
371 an amount necessary to maintain the air velocity re-  
372 quired in the system, and shall be constructed of  
373 material equal in gauge to the material of the connect-  
374 ing pipe at the large end.

375 (26) Bends. Round elbows shall be of at least  
376 five-piece construction for pipes six inches in  
377 diameter or less, and of seven-piece construction for  
378 larger pipes, with a throat radius equal to one and  
379 one-half to two times the pipe diameter unless space  
380 prohibits the use of such radii. Elbows made of a  
381 continuous piece, or ventura shaped elbows may be  
382 substituted for the five or seven-piece rule.

383 (27) Dampers and Gates. The use of dampers or  
384 gates or orifice plates shall not be permitted in an  
385 exhaust system unless provided for the specific pur-  
386 poses of balancing the air flow in the system and then

387 they shall be riveted or permanently fastened to pre-  
388 vent any further manipulation unless minor manipulation  
389 is required for a controlled process.

390 (b) Air Cleaning Equipment.

391 (1) Air Cleaning Equipment. The capacity and op-  
392 erating characteristics and collection efficiency of  
393 the air cleaning equipment shall be such as to insure  
394 its continuous operation without loss of efficiency  
395 of the exhaust system.

396 (2) Removal of Collected Material. Means shall  
397 be provided for the removal and disposal of the collect-  
398 ed material at regular intervals so as to insure the  
399 proper functioning of the equipment. The collected  
400 material shall be confined during its removal from  
401 the air cleaning equipment to the point of disposal  
402 or otherwise controlled so as to prevent the dissemi-  
403 nation of dust in concentrations.

404 (3) Construction. The air cleaning equipment  
405 shall be constructed and supported to withstand  
406 abrasion, vibration and pressure, and if located  
407 out of doors to withstand wind pressures.

408 (4) Location of Discharge. No recirculation of  
409 the discharged air from an exhaust system shall be  
410 permitted. The point of discharge in the exhaust  
411 system shall be located above the roof of any ad-  
412 jacent buildings.

413 (c) Air Flow Producing Equipment.

414 (1) Size and Capacity. Every exhaust system shall  
415 be connected to an exhaust fan or air flow producing  
416 equipment that will maintain the required rate of air  
417 flow in all parts of the exhaust system. Every fan  
418 or air flow producing equipment shall be of a type  
419 and size suitable for handling the dusts, gases,  
420 vapors or fumes to be exhausted. Where conditions  
421 permit, the exhaust fan shall be located beyond the  
422 air cleaning equipment so as to handle clean air.

423 (2) Speed of Operation of the Air Flow  
424 Producing Equipment. The speed of the exhaust fan  
425 or air flow producing equipment shall be determined  
426 to create the required rate of air flow operating  
427 against the total resistance pressure of the exhaust  
428 system.

429 (3) Connection of Air Flow Producing Equip-  
430 ment to the Exhaust System. In all dust exhaust  
431 systems, the fan shall be connected to the inlet pipe  
432 by a split sleeve or fan drawband not less than 18"  
433 long securely fitted to prevent air leakage. This  
434 provision shall not apply when the fan or air flow  
435 producing equipment is located at the end of the  
436 system or otherwise can be readily disconnected  
437 from the system for inspection.

438 (d) Fresh Air Inlets. Fresh air inlets shall

439 be provided in every room in which an exhaust system  
440 is located for the admission of may-up air to replace  
441 that removed by the exhaust system unless other air  
442 is supplied to the room by the heating system or other  
443 means. The velocity and temperature of the incoming  
444 fresh air shall be such as not to create excessive drafts.  
445 When the capacity of the exhaust system is small, the use  
446 of windows, doors, and other building openings for the  
447 admission of fresh air shall be permissible in places of  
448 speical fresh air inlets.

449 (e) Weather Caps. A weather cap of low resistance  
450 design, or other suitable means of protecting the dis-  
451 charge pipe against the entrance of rain or snow, shall  
452 be provided on every vertical outside discharge pipe,  
453 except that no such protection shall be required when  
454 no damage to the exhaust system will result from the  
455 entrance of rain or snow.

456 (f) Workmanship. All exhaust systems shall be  
457 constructed of the materials and in the manner here-  
458 with required and set forth and also shall be installed  
459 in a permanent and workmanlike manner. Every effort  
460 shall be made to have the interior of all parts of the  
461 system smooth and free of obstructions in order to mini-  
462 mize resistance to the air flow. All parts of the system  
463 shall be as free as possible from air leakage either into  
464 or out of the system except at points where air is taken

465 into or discharged from the system by design.

466 **RULE 9. Requirements for Wet Method of Dust Control:**

467 (a) **Application of Wet Methods.** The wet method of  
468 dust control shall include an adequate and continuous  
469 supply of water delivered into the plant under proper  
470 pressure and distributed through a piping system and  
471 terminating in suitable water sprays or jets at the  
472 several points of application, or shall provide the  
473 same facilities by means of a self-contained recirculating  
474 system. The application of water must not create a  
475 slipping hazard or increase the danger of metal  
476 splattering.

477 (b) **Application of Water.** The water sprays or jets  
478 shall be designed to break the water streams into small  
479 droplets or otherwise to provide effective wetting with  
480 as little exposure of the operators to the water sprays  
481 as possible. Protective baffles shall be installed or  
482 protective covering furnished by the employer where  
483 necessary to prevent wetting the operator.

484 (c) **Potability of water.** When the water used for  
485 dust control purposes is not potable, it shall not be  
486 cross-connected with the drinking and bathing water  
487 supply, and warning signs of sufficient size against  
488 drinking the water shall be prominently displayed and  
489 maintained on every water outlet.

490 (d) **Pipe Sizes.** The rate of water flow required

491 at each point of application shall be adequate at every  
492 spray nozzle or jet when the system is in full operation.

493 (e) Drainage. Suitable drainage means shall be  
494 provided for the removal of water and sludge which drains  
495 from the operation.

496 (f) Portable Sprinklers and Hoses. Portable hand  
497 water sprinklers or hose sprinklers shall be used for  
498 damping dusty gangways and for other operations where  
499 the control of dust dissemination is not possible by  
500 other methods.

501 Rule 10. Requirements for General Ventilation:

502 (a) General Ventilation. General Ventilation shall  
503 not be employed as the principal means of control, except  
504 in the case of operations carried on over the entire floor  
505 and segregated operations which require infrequent attention.

506 (b) Location of General Ventilation Equipment.  
507 Facilities for general ventilation shall include mechanical  
508 or natural-draft ventilators of proper capacity and suit-  
509 ably located with reference to sources of contamination  
510 and fresh air inlets to insure the removal of contamina-  
511 ted air from the building without causing short-circuit-  
512 ing. The size of fresh air inlets shall be sufficient  
513 to provide make-up air for general ventilation as well  
514 as local exhaust ventilation.

515 (c) Capacity. The capacity of individual general  
516 ventilating units shall be designed to meet the varying

517 requirements throughout the foundry.

518 (d) Respirators Protective Equipment.

519 (1) Respiratory Protective Equipment. Respira-  
520 tory protective equipment shall not be depended  
521 upon to protect employees against dusts, fumes, gases,  
522 and vapors in foundries, except in cases of isolated  
523 or infrequent operations. Respiratory protective  
524 equipment may be used in connection with other methods  
525 of control only when the latter cannot be made to  
526 develop the required degree of control and cannot be  
527 replaced by other effective methods.

528 (2) Approved Respirators. All respiratory protec-  
529 tive devices shall be of a type and of such safe con-  
530 struction, protection and operation, so as to protect  
531 the employees from the hazard. Compliance with the  
532 minimum requirements of the U. S. Bureau of Mines for  
533 similar equipment for the particular hazards to be  
534 guarded against shall be prima facie evidence of  
535 conformity.

536 (3) Cleaning of Respiratory Protective Equip-  
537 ment. The employer shall provide every employee  
538 requiring personal respiratory protective equipment  
539 with at least one such device suitable identified,  
540 and the employer shall further supply and employ  
541 facilities for the inspection, cleaning, and repair  
542 at least daily of all respiratory protective equip-

543 ment when in use. All such equipment, when not in

544 use, shall be stored in closed containers.

EXPLANATION OF H. F. 518

Experience has shown that States having safety and health regulations for manufacturing, and various other industries, have reduced the accident hazard and death toll to a marked degree.

We believe the absence of such regulations in the State of Iowa is one of the major reasons that more than 14,000 workers were injured in Iowa last year, 525 of whom were permanently injured, and 93 of these Iowa workers were killed.

We believe the adoption of this bill will be a contributing factor toward reducing the accident hazards in Iowa industry.