STATE OF IOWA
1967

IOWA DEPARTMENTAL RULES

JANUARY 1967 SUPPLEMENT

Containing

The permanent rules and regulations of general application promulgated by the state departments from July 1, 1966 to January 1, 1967

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PREFACE

This volume is published in compliance with section 14.3 (7) of the Code. The rules of the various boards and departments are arranged in alphabetical order, using the names of the departments in general use.

Not all of the rules and regulations promulgated by the state departments have been included. The Act specifies "permanent" rules of "general application." Where rules have been omitted by the editor there is a notation indicating where such rules may be obtained.

January 1967 THE EDITOR.

PUBLICATION OF DEPARTMENTAL RULES

Section 14.3 of the Code, subsection 7, requires the Code Editor to:

"Prepare the manuscript copy, and cause to be printed by the state superintendent of printing in each year in which a Code is published, a volume which shall contain the permanent rules and regulations of general application, promulgated by each state board, commission, bureau, division or department, other than a court, having statewide jurisdiction and authority to make such rules. The Code Editor may omit from said volume all rules and regulations applying to professional and regulatory examining and licensing provisions and any rules and regulations of limited application. The Code Editor may make reference in the volume as to where said omitted rules and regulations may be procurred.

"This volume shall be known as the Iowa departmental rules and any rule printed therein may be cited as_____I.D.R._____giving the year of publication and the page where the particular rule, by number, may be found.

"The Code Editor may provide cumulative, semiannual supplements for insertion in the latest published volume and a place shall be provided in the binding of such volume for insertion of such supplements."

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AGRICULTURE DEPARTMENT

Pursuant to the authority of section 200.14 (2), 9A.6 (200), subsection *"b"*, appearing in 1966 I.D.R. page 39, is hereby rescinded and the following rule adopted in lieu thereof.

[Filed November 14, 1966]

CHAPTER 9A

FERTILIZERS AND SOIL CONDITIONERS

9A.6 (1) (200) (*b*). Section 2.4 [A.A.I. Standard No. M-1] is deleted and in its place insert the following:

"2.4 Location of containers and permanently installed unloading points. Containers shall be located outside of buildings other than those especially constructed for this purpose. Permanent storage and permanently installed unloading points shall be located outside of densely populated areas, and subject to the approval of the Iowa department of agriculture, which can determine whether the storage and unloading points are located a safe distance from the line of property which may be built on. However, in the absence of a specific determination, this distance shall not be less than 50 feet. In any case, the distance from a source of drinking water shall not be less than 50 feet, and the distance from any school, hospital, or any other place of public assembly shall not be less than 400 feet."

This rule shall become effective November 15, 1966 as provided in chapter 17A of the Code.

AGRICULTURE DEPARTMENT
(continued)

CHAPTER 14

WEIGHTS AND MEASURES

[Filed November 21, 1966]

[Effective November 21, 1966]

Pursuant to the authority of Section 215.18 of the Code, Permanent Rule 14.33 (215) as previously promulgated is hereby rescinded and the following Permanent Rule adopted.

14.33 (215) The specifications, tolerances, and regulations for commercial weighing and measuring devices, together with amendments thereto, as recommended by the National Bureau of Standards and published in National Bureau of Standards Handbook 44 - 3rd Edition and supplements thereto up to November 14, 1966, shall be the specifications, tolerances, and regulations for commercial weighing and measuring devices in the state of Iowa, except as modified by state statutes, or by rules, adopted and published by the Iowa Department of Agriculture, and not rescinded.

AGRICULTURE DEPARTMENT
(continued)

Pursuant to the authority of Section 159.5 of the Code, the following rule is hereby adopted.

[Filed September 13, 1966; Amended December 16, 1966.]

CHAPTER 15

HOTEL, RESTAURANT AND FOOD ESTABLISHMENTS

15.9 (170) Sanitary regulations.

15.9 (1) Insecticide vaporizers using lindane or any other insecticide that could contaminate food must not be used in rooms or areas where food is prepared or served. [§170.19(2)] [Effective September 13, 1966.]

AGRICULTURE DEPARTMENT
(continued)

CHAPTER 15

HOTEL, RESTAURANT AND FOOD ESTABLISHMENTS

[Filed December 16, 1966]
[Effective December 16, 1966]

Pursuant to the authority of Section 159.5 of the Code, the following Rule relating to insecticide vaporizers is hereby adopted:

Rule 15.9 (1) Effective September 13, 1966, is amended by adding at end thereof the following temporary amendment:

" . . . except under the supervision of a pest control operator licensed under the Iowa State Department of Agriculture."

AGRICULTURE DEPARTMENT
(continued)

Pursuant to authority of section 16, chapter 186, of the Acts of the 61st General Assembly [Ch. 189A of the Code], the following rules are adopted:

[Filed July 12, 1966; Amended November 14, 1966. See temporary rule filed August 17, 1966.]

CHAPTER 17

MEAT AND POULTRY INSPECTION

17.1 (189A) Administration of the Act. The veterinarian, employed by the secretary to administer the Act, shall be designated as the "Director, Meat and Poultry Inspection Service."

17.2 (189A) Application for inspection. Persons, whose establishments are subject to the provisions of the Act, shall apply to the Director of the Meat and Poultry Inspection Service, Iowa Department of Agriculture, Des Moines, Iowa, on forms provided by said director. Acting for the secretary, a sanitary inspection and survey of the establishment will be made by a veterinarian, or by another qualified employee of the department under supervision of a veterinarian, to determine if the establishment meets the requirements of the Act.

17.3 (189A) Licensing.

17.3 (1) If the proposed establishment meets the requirements of the Act and these regulations, it will be approved for operation and license.

17.3 (2) The owner will pay the annual license fee (as specified in section 3 of the Act) to the secretary of agriculture.

17.3 (3) Once an establishment is approved and licensed, the owner shall operate it in accordance with the provisions of the Act and these regulations. Penalties for violation of the Act will be as provided in section 17 of the Act.

17.4 (189A) Payment for inspection services. The salaries and fees of personnel, concerned with the enforcement of the Act, shall be paid from funds appropriated by the state of Iowa.

17.5 (189A) Official establishment numbers.

17.5 (1) For inspection legends of approved establishments, numbers will be assigned as follows:

a. Category A — 1 through 399: For establishments slaughtering over 200,000 lbs. of animals (live weight) per annum for sale or resale.

b. Category B — 400 through 499: For establishments slaughtering over 20,000 lbs. of poultry (live weight) per annum for sale or resale.

c. Category C — 500 through 999: For establishments slaughtering less than the quantities specified above, but processing more than 20,000 lbs. (per annum) of meat and/or poultry products for sale or resale.

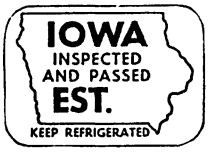
d. Category D — 1,000 and up: For establishments slaughtering or processing less than the quantities specified above for sale or resale.

17.6 (189A) Official inspection legends. The official inspection legend shall be used to identify all animal carcasses, primal cuts of carcasses and meat at each licensed establishment provided such items are fit for human food at the time of inspection. For poultry and poultry products the use of wing bands, tags or placement of the legend on an overwrap will be permitted.

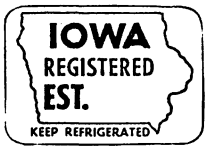
17.6 (189A) Inspection legends.

17.6 (1) There are two types of inspection legends as follows:

TYPE I



TYPE II



17.6 (2) The Type I legend shall be used by establishments in categories A, B, and C. The Type II legend shall be used by establishments classified as category D.

17.6 (3) Each inspection legend shall contain the number of the establishment which has been assigned by the director.

17.6 (4) The inspection legend, to be applied on carcasses or primal cuts from carcasses of animals, shall be on a metal hand stamp using an approved violet colored ink. For "burn branding" of such items as livers, hearts, tongues, etc., an electric or gas burning brand stamp may be used if desired. It will be equipped with an approved Type I legend.

17.6 (5) All stamp devices, branding ink and labels will be supplied by the establishment but must be approved by the director.

17.6 (6) The application and use of the official inspection legend, on stamp or labels, shall be in accordance with the USDA, "Regulations Governing the Meat Inspection of the United States Department of Agriculture," (revised edition of October 1, 1965), except the design used, shall be that as shown above. Inspection stamps will be custody of the inspector and used by him or under his supervision, unless otherwise authorized by the director. When such stamps are not in use for marking, they shall be properly safeguarded by the inspector and normally used by him so as to prevent their use or possession by unauthorized persons.

17.6 (7) The official inspection legend must appear on all labels as well as the name and address of the establishment. Upon the initiation of the inspection service, in order to preclude financial loss to licensed establishments, existing labels and packages may be used until the existing stocks are exhausted, providing:

a. A "sticker type" label bearing the inspection legend is used on packages, or

b. The packing cartons are properly identified with the inspection legend. This special waiver will terminate on June 30, 1967. Any new items or reorders of labels of existing supplies will be approved by the director and bear the appropriate inspection legend.

17.6 (8) To make sure that labels (for products containing two or more ingredients) accurately describe the product, sketches or proofs of new labels should be submitted to the director in duplicate for approval prior to printing. Each copy of any sketch, proof photostat, or finished label for a product fabricated from two or more ingredients, when submitted to the director for approval, shall be accompanied by a statement showing the kinds and percentages of the ingredients, if not shown on the proposed label. Approximate percentages may be given where the percentages of ingredients may vary from time to time if the limits of variations are stated. The list of ingredients shall appear as part of or in addition to the true name of the product and shall show the common or usual name of the ingredients, arranged in the order of their predominance.

17.6 (9) The new labels on meat and poultry products (except items commercially sterilized and hermetically sealed) shall include the statement "Keep Refrigerated" prominently displayed on the principal display panel. Existing labels, which do not contain this statement, may be used until the current supply is exhausted.

17.7 (189A) Water supply. The water supply shall be safe, ample, clean and with adequate facilities for its distribution in the establishments and its protection against contamination or pollution. The owner shall afford opportunity for the inspection and sampling of the water, including its source, storage, and distribution. Nonpotable water is permitted only in those parts of the establishment where no edible product is handled or prepared.

17.8 (189A) Handling of wastes. All waste and refuse shall be removed from the premises of the establishment, and disposed of in a sanitary manner. This should be accomplished daily, if possible. If not, then at such frequency as to pre-

vent a nuisance. The accumulation on the premises of the establishment of any material in which flies may breed, such as hog hair, bones, paunch contents or manure is forbidden.

17.8 (1) In establishments not equipped with a facility for tanking of wastes, separate inedible waste rooms or areas shall be provided for handling, storage, and disposal of waste containers, covers, offal waste materials, inedible materials, hides, and condemned products. These rooms or areas shall be so located as to insure no contamination to edible products. Facilities for cleaning the area and containers shall be provided and the areas shall be maintained in a clean and sanitary condition. Containers used to store inedible products, pending removal, shall be in good condition, free from leaks, clean and marked "inedible products". The establishment and premises shall be properly drained so as to prevent accumulations of waste materials and excess water and mud. Disposal of plant sewage shall comply with the requirements of the Iowa state department of health.

17.8 (2) Inedible fats, trimmings, bones, etc. from outside the premises of an establishment shall not be received except into a tank room provided for inedible products and then only when their receipt into the tank room produces no insanitary condition on the premises.

17.8 (3) *Tagging of insanitary equipment and facilities.* When, in the opinion of the inspector, any equipment, utensil, or room, or area at an establishment is insanitary or grossly unclean or its use would be in violation of the Act or these regulations, he will attach an "Iowa Rejected" tag to them. Such items or areas so tagged shall not be used again until the condition causing the tagging has been corrected. Such tag so placed shall not be removed by anyone other than the inspector.

17.9 (189A) Ante-mortem inspections.

17.9 (1) An ante-mortem examination and inspection shall be made of all animals and poultry (subject to inspection) about to be slaughtered in an official establishment. Normally, such ante-mortem inspections will be accomplished on the day of slaughter. However, in the case of smaller establishments where an inspector is not assigned full time, permission may be granted by the director or the inspector to perform the inspection during the afternoon of the day before slaughter providing adequate identification can be maintained. This inspection shall be made in pens on the premises of the establishment in which the animals are about to be slaughtered. A lay inspector may set aside any animals which are suspects but only a veterinarian may make the final disposition of such suspects. Establishment personnel will furnish whatever help is necessary to assist the inspector in the performance of ante-mortem inspections.

17.9 (2) Except as stipulated above, ante-mortem inspection procedures for animals outlined in the "Regulations Governing the Meat Inspection of the United States Department of Agriculture" will be used. (Revised issue of October 1, 1965). For poultry, the "Regulations Governing the Inspection of Poultry Products of the United States Department of Agriculture" will apply. (Issue of January 1, 1965).

17.10 (189A) Post-mortem inspections. A careful post-mortem examination and inspection shall be made of the carcasses and parts thereof of all animals and poultry (subject to inspection) at time of slaughter. However, in cases of emergencies wherein it is necessary for humane reasons to slaughter an injured animal during off-duty hours when the inspector cannot be located, the carcass and all parts shall be kept for inspection with the head and all viscera (except the stomachs and intestines) held by natural attachments for later inspection.

17.10 (1) Under certain circumstances in very small establishments, the rate of slaughter is limited and the assignment of a full-time inspector may be impracticable. In such cases the director may authorize a delayed post-mortem inspection, providing the carcass and the necessary parts thereof are properly identified and, further providing the inspection is completed on the day of slaughter. In such cases the head and organs removed from the carcass will be held in such a manner as to preserve their identity until the post-mortem examination has been completed. The maintenance of identity is particularly applicable in the temporary absence of the inspector. In such an event, the head and organs shall be tagged with identically

numbered tags or a similar identification system so the parts can, when the inspector arrives, be readily related to the carcass.

17.10 (2) Final disposition of retained carcasses and parts, thereof, will be made only by a veterinarian. However, in the case of bruised tissues, fractures and certain common conditions of the liver, kidneys, lungs, etc. which renders those parts obviously unfit for food, condemnation of those parts may be accomplished by the lay inspector. In case of question, such will be retained for final decision of a veterinarian.

17.10 (3) Otherwise, the general procedures for post-mortem examinations and inspections of animals will be as outlined in the USDA publication "Regulations Governing the Meat Inspection of the United States Department of Agriculture" (Revised issue of October 1, 1965). For poultry, the USDA publication "Regulations Governing the Inspection of Poultry Products" (Issue of January 1, 1965) will apply.

17.11 (189A) Products authorized to be sold. Only meat and poultry products derived from animals or poultry slaughtered in approved establishments may be sold in establishments licensed under this Act.

17.12 (189A) Construction and sanitation.

17.12 (1) The floors, walls, ceilings, partitions, posts, doors, and other parts of all establishment structures shall be of such materials, construction, and finish as will make them susceptible of being readily and thoroughly cleaned. The floors shall be water tight and of impervious materials and sloped to efficient drains where indicated. The rooms and areas used for edible products shall be separated from those used for inedible products. They shall be free from dust and from odors from dressing and toilet rooms, catchbasins, hide cellars, casing rooms, inedible tank and fertilizer rooms and livestock pens.

17.12 (2) In establishments, where poultry is processed, the eviscerating, cutting, and packaging operations shall be separated from the killing, scalding, and dressing operations by the use of separate rooms or by a thorough and complete clean up prior to the eviscerating, cutting, and packaging operations.

17.12 (3) All rooms and areas shall have ample light, both natural and artificial, of good quantity and well distributed and sufficient ventilation.

17.12 (4) There shall be an efficient drainage and plumbing system. An ample supply of water at not less than 180 degrees Fahrenheit shall be furnished and used for the cleaning of inspection equipment and other equipment, floors, and walls which are subject to contamination by the dressing and handling of carcasses, their viscera, and parts. Hot water for cleaning other areas and eqipment shall be delivered under pressure to sufficient outlets and shall be of such temperature as to accomplish a thorough clean up.

17.12 (5) Construction and equipment shall be such as to render the establishment resistant to the entrance of flies, rodents, and nonfood animals and birds.

17.12 (6) Rails shall be of sufficient height to prevent carcasses from contacting the floor.

17.12 (7) All slaughtering and processing rooms shall have sufficient hand washing facilities supplied with hot and cold running water, soap (dispensed from sanitary containers) and individual disposable towels.

17.12 (8) The outer premises of the establishment, including docks and areas where cars and vehicles are loaded and the driveways, yards, pens, and alleys shall be properly surfaced and drained and maintained in a clean and orderly condition.

17.13 (189A) Plant equipment. Equipment used for preparing, processing, and handling any products shall be of such materials and construction as will render them susceptible of being readily and thoroughly cleaned to insure strict cleanliness in the preparation and handling of all food products. So far as practicable, equipment shall be of metal or other impervious material. Chopping blocks and cutting tables must be maintained in proper repair and thoroughly cleaned at least daily.

17.14 (189A) Sanitary facilities.

17.14 (1) Adequate sanitary facilities and accomodations shall be provided. Dressing rooms, toilet rooms and toilets, and urinals shall be sufficient in number,

ample in size, and conveniently located. They shall have ample light and proper ventilation. They shall be separate from rooms and areas in which food products are prepared, stored, and handled. Normally, where both sexes are employed, separate facilities should be provided. Hand washing facilities, including hot and cold running water, soap, toilet rooms and disposable towels or hot air hand drying machines should be placed in or near the dressing or toilet rooms.

17.14 (2) Establishment toilet soil lines shall be separated from drainage lines to a point outside the building and drainage from toilet bowls and urinals shall not be discharged into grease catch basin.

17.14 (3) Receptacles used for inedible materials shall be of good construction and shall bear a distinctive mark that they are to be used for inedible products only and shall not be used for edible products. All shroud clothes shall be acceptably clean at time of use.

17.15 (189A) Inspectors.

17.15 (1) Standards for:

a. All inspectors shall wear clean clothing and present a neat appearance. They shall conduct their duties conscientiously and efficiently. They shall complete all reports promptly. They shall be courteous and fair in their dealings and conduct themselves in a manner which will reflect credit on themselves and the inspection service.

b. No inspector shall accept, from any agent or employee (of an establishment), any gift, money loan, or other thing of value.

c. Inspectors are not permitted to purchase products from an establishment except through the retail market which sells to the public when maintained. In the absence of such retail market, inspectors shall not procure products from an establishment unless such establishment sells such product direct to its own employees. In such cases, they will pay the regular price and obtain and retain receipts for payment for such product.

d. Violations of the above may be grounds for dismissal from the service.

17.15 (2) *Interference or abuse of inspectors.* No person shall resist, use violence, intimidate, delay, obstruct, hamper, abuse, use abusive language against, or interfere with any employee of the meat and poultry inspection service in the discharge or attempt to discharge any duty of his office. Any violation of the above should be reported through the area supervisor to the director, who will conduct an investigation and recommend such action as appears appropriate to the secretary of agriculture.

17.15 (3) *Overtime work of inspectors.* In order to provide inspection economically, establishments will be expected to operate during reasonable hours. However, when an establishment finds it necessary to operate for more than eight hours per working day or on holidays, the inspector shall be informed on the previous day. Each establishment shall inform the inspector when work has been concluded for the day, and the day and hour when work will be resumed.

17.16 (189A) Facilities for inspection.

17.16 (1) In establishments where full-time or part-time inspectors are assigned, the establishment shall provide suitable office space for the inspector. This will include a desk or table, chair, clothing locker, a letter file and a locked locker or box for the inspection stamps. The keys of the locked stamp containers shall not leave the custody of the inspector. In most cases, toilet and hand washing facilities should be provided. However, this may be modified if such facilities are readily available.

17.16 (2) The following minimum facilities and conditions as may be essential to efficient inspection shall be provided by the establishment:

a. Sufficient pens, equipment and assistance for conducting ante-mortem inspections.

b. Sufficient natural light and abundant artificial light at times of the day when natural light may be inadequate at places of inspection.

c. Suitable racks, receptacles, "viscera carts" or devices for retaining and inspecting such parts as the head, liver and viscera in order that they may be identified in case of condemnation of the carcass or parts.

d. Tables and other equipment on which inspection is performed of such design, material, and construction as to

enable inspectors to conduct their inspection in a clean and efficient manner.

e. Clean white coats or aprons.

f. Receptacles, for holding and handling diseased carcasses and parts, so constructed as to be free of leaks and can be readily cleaned.

g. Adequate arrangements, including liquid or powdered soap for cleaning and disinfecting hands, for cleaning instruments used in dressing diseased animals or poultry carcasses, floors and equipment.

h. In establishments where slaughtering is done, a separate rail or facility for holding suspect carcasses until final inspection is accomplished, may be required by the director.

17.17 (189A) Dead animal carcasses. With the exception of dead animals or poultry which have died enroute and are received with animals or poultry for slaughter at an establishment, no dead animals or poultry may be brought on the premises of an establishment. Exceptions to this would be in cases where it is necessary to slaughter an animal due to a fractured leg or in rare instances when a very wild animal cannot be loaded for transport to the establishment. This should be verified by the inspector. The carcasses of animals or poultry which have died, other than by slaughter, shall not be brought into any room or area in which any edible product is prepared or handled unless authorized by the director.

17.18 (189A) Infectious diseases. Any veterinary inspector, who suspects or detects an infectious disease of animals or poultry on the premises of an establishment, shall report same to the state veterinarian through the director by the most expeditious means. In order to assist in the detection and control of animal diseases, the director in co-operation with the state veterinarian, may require inspectors to collect and forward to designated laboratories, samples of blood and tissue from animals and poultry presented for slaghter at an establishment.

These rules shall become effective July 1, 1966, as provided in Chapter 17A of the Code.

EXPLANATIONS

The Purpose of the Act.

(1) To safeguard human health by insuring that only meat and poultry products, free from contamination, disease and adulteration, are sold to the consuming public and that such products are processed in establishments maintaining high sanitary standards.

(2) To safeguard the state livestock and poultry industry by the early detection and effective control of communicable diseases through ante-mortem and post-mortem inspections.

(3) To insure the free flow and sale of meat and poultry products throughout the state by eliminating local or regional trade barriers.

(4) To insure the sale of only properly and truthfully labeled meat and poultry products thus protecting the interest of the consumers, the food processors and the livestock producers.

AUDITOR OF STATE

INDUSTRIAL LOAN DIVISION

Pursuant to the general authority of section 536A.28 of the Code the following permanent rules are adopted.

[Filed December 13, 1966]

LIMITATIONS

The following rule is adopted to implement section 536A.4 of the Code.

1.20 (536A) No licensee shall maintain another place of business for taking loan applications or accepting payments unless that place also is a licensed location.

CONTINUING LICENSE - ANNUAL FEE - CHANGE OF LOCATION

The following rule is adopted to implement section 536A.12 of the Code.

1.21 (536A) The license and current license renewal card of each licensee shall be prominently displayed and available for easy reading by the public in the place of business of the licensee.

BOOKS AND RECORDS

The following rules are adopted to implement section 536A.13 of the Code.

1.22 (536A) Licensees shall be required to preserve their books, accounts, and files for a minimum period of three years following the date of final entry recorded therein.

1.23 (536A) Records for loans made under the Iowa Industrial Loan Law shall be kept separate from other types of business conducted in the office of the licensee.

1.24 (536A) Each licensee shall keep the following records in its place of business, except that combination forms and special office systems may be used in lieu thereof if approved by the Auditor of State in writing.

1.24 (1) Loan register.

a. The loan register shall contain the original entry and shall show for every loan the loan number, date of loan, name of borrower and amount of note.

b. The loan register shall be kept numerically by loan number in the order made.

1.24 (2) Account ledger cards.

a. An individual account ledger card shall be kept for each account and shall show at least the loan number, name and address of the borrower, date of loan, date of first payment, date of final payment, terms of repayment, whether the interest rate is based on a regular or irregular repayment schedule, nature of security by types, face amount of note, principal advanced to borrower, principal advanced to pay balance of previous industrial loan, interest or discount charge, service charge, appraisal fee, attorney fee, fee paid to a public official for recording or filing a mortgage or for satisfying a judgment or lien on any real or personal property securing the loan, type and cost of credit life insurance, type and cost of health and accident insurance and type and cost of other insurance; except that if only one type of credit life or health and accident insurance is being provided by the licensee only the cost for each need be shown.

b. All payments shall be credited upon the account ledger card as of the same day they are received.

c. The account ledger card shall show the amount and date of each payment applied to the note, the unpaid balance of the note after applying such payment and the date and amount of any additional charge collected for delinquency or deferment.

d. If payment is made through the proceeds of an insurance claim or the sale of security, it shall be so designated.

e. No erasures whatsoever may be made in the payment section of any account ledger card. In case of error, a line shall be drawn in ink through the improper entry and the correct entry made on the following line.

f. When a loan is prepaid in full, the account ledger card shall show the date of prepayment, the amount paid to discharge the loan, the amount of the interest or discount rebate and any deduction from the rebate for previously earned but uncollected delinquency charges.

g. When a loan is prepaid in full, any refund of the cost of credit life insurance, health and accident insurance or other insurance shall be recorded on the card.

h. Paid in full or renewed account ledger cards must be retained as a separate group until released by the Auditor of State; except that no licensee shall be required to keep a card in this group for more than two years following the date of final payment.

1.24 (3) File of original papers.

a. A separate file, envelope or folder shall be maintained for each borrower or loan account.

b. Such file shall contain all papers relating to the borrower or his loan with the exception of the promissory note which may be kept in a separate promissory note file. Exceptions to the above requirement are the note and security instrument which have so been sold, pledged or assigned as collateral security and any papers in the custody of a court or agent for collection.

c. All instruments evidencing or securing a loan must bear the loan number.

d. No instrument or part thereof shall be left blank for completion in the absence of signature by the borrower or borrowers.

e. All notes pledged as collateral security for a debt owed by the licensee shall be so marked.

f. All mortgages and security agreements shall be returned to the borrower or borrowers marked indelibly "paid in full" within sixty days following the date which said instruments cease to secure any obligation to the licensee. Any other instruments, with the exception of the financing statements that pertain to the loan transaction, including notes, pledges and salary assignments, shall be returned to the borrower or borrowers marked indelibly "paid in full" within sixty days following final payment of the loan.

1.24 (4) Alphabetical index.

a. An alphabetical index shall be maintained listing each borrower, comaker, endorser, surety or other party currently indebted to the licensee. The index shall show the name of the obligor, the loan number assigned to the obligor's indebtedness, information showing if the obligor is other than a borrower and sufficient information to locate the account ledger card.

1.24 (5) Account ledger card control.

a. A record shall be maintained in the licensee's place of business showing the total number and amount of the account ledger cards. This record shall be posted at least weekly.

1.24 (6) Promissory note file.

a. If the promissory notes are not kept in the file of original papers and have not been sold, pledged or assigned as collateral security or placed in the custody of a court or agent for collection, then they must be kept in a promissory note file.

REVOCATION OR SUSPENSION OF LICENSE

The following rule is adopted to implement section 536A.18 of the Code.

1.25 (536A) No refund of the annual license fee shall be made wherein a license is surrendered, suspended or revoked.

ADVERTISING

The following rules are adopted to implement section 536A.20 of the Code.

1.26 (536A) The words "advertise," "advertising," and "advertisement" as used in these regulations shall include all material printed, published, displayed, distributed, telecasted, broadcasted or otherwise disseminated to the public for the purpose of obtaining applications for loans or for selling thrift certificates.

1.26 (1) Each licensee shall maintain at its place of business a complete advertising scrapbook containing samples of all advertising material used, including the script of all radio and television broadcasts, except that two or more affiliated licensees may maintain, at a designated office, one scrapbook of all advertising used by them in the state of Iowa. The auditor of state must be notified in writing of the intention to maintain only one advertising scrapbook and the address where it will be located.

1.26 (2) No licensee shall advertise that loans will be made or applications accepted at any place other than that named in its license.

1.26 (3) Licensees shall not feature in any advertisement such terms as "reduced rate," "new reduced rates" or similar phrases which apply only to a specific type of loan, unless such advertisement shall clearly state the type of loan to which such advertisement shall apply.

1.26 (4) Licensees may advertise "reduced rates," "new reduced rates" or similar phrases for not more than ninety days after the effective date of such reduction in rates.

1.26 (5) Any advertisement containing a sample payment or a payment schedule must show the proceeds of the loan, exclusive of all charges, and indicate the number and amount of the monthly installments required to pay the loan contract, assuming payments are made on schedule. If credit life or health and accident insurance is offered to the borrower, such sample payment or payment schedule must also disclose whether or not the installments include the cost thereof.

POWERS OF INDUSTRIAL LOAN COMPANIES

The following rules are adopted to implement section 536A.23 of the Code.

1.27 (536A) A loan contract which is repayable in substantially equal and consecutive monthly installments of principal and charge combined shall be known as a "Regular Payment Schedule" loan contract.

1.27 (1) The maximum interest rate for any "Regular Payment Schedule" loan contract is seven percent per annum, computed on the face amount of the loan contract from date of loan to the due date of the final installment regardless of the fact that said loan is repayable in installments. The interest charge so computed may be deducted from the face amount of the loan contract at the time the loan is made.

1.27 (2) Interest on loan contracts with a first installment period of more or less than one month shall be computed at a rate not to exceed the rate specified in section 536A.23, subsection 1, Code of Iowa for the actual number of months and days contained in the term of the loan contract. One month shall be the period from a given date in one month to the corresponding date in the following month or if there is no corresponding date in the following month, to the last day of the following month. The maximum charge for one day shall be one-thirtieth of the monthly rate.

1.28 (536A) A loan contract which is repayable in other than substantially equal and consecutive monthly installments of principal and charge combined shall be known as an "Irregular Payment Schedule" loan contract.

The following rules are adopted to implement section 536A.23(3) of the Code.

1.29 (536A) If any installment is not paid in full on or before the tenth day following its scheduled due date, the licensee may charge and collect a delinquency charge of not more than five percent of the portion of such installment which remains unpaid.

1.29 (1) The charge may be collected on the eleventh day after the scheduled due date or any time thereafter, but may not be collected more than once with respect to any particular installment.

1.29 (2) Any payments made by the borrower other than delinquency charges or deferment charges shall be applied to the installments provided for in the loan contract in the order in which they are scheduled to become due.

The following rules are adopted to implement section 536A.23(4) of the Code.

1.30 (536A) Licensees may defer, for sixty days or more, all wholly unpaid installments in any contract at any time, and may contract for and receive a charge for such deferment not in excess of one percent of the unpaid balance of the loan at the time the deferment is granted.

1.30 (1) No installment on which partial payment has been received or a delinquency charge assessed shall be deferred or included in the computation of the deferment charge unless such partial payment or delinquency charge is first refunded to the borrower or credited to the amount of the deferment charge.

1.30 (2) No part of the deferment charge shall be subject to refund.

The following rules are adopted to implement section 536A.23(5) of the Code.

1.31 (536A) The refund or credit of an amount paid by the debtor for insurance, in the case of decreasing term credit life insurance or credit accident and sickness insurance on which premiums are payable other than by a single premium and of level term credit life insurance, shall be not less than the prorata unearned gross premium.

1.32 (536A) The refund or credit of an amount paid by the debtor for insurance, in the case of decreasing term credit life insurance or of credit accident and sickness insurance upon which a single premium is paid in advance, shall be not less than the amount computed by the "Direct Ratio Method," commonly known as the "Rule of 78's."

1.33 (536A) The refund or credit of an amount paid by the debtor for property insurance shall be not less than the amount required by the short rate refund table approved by and on file in the office of the Iowa commissioner of insurance.

1.34 (536A) A premium refund or credit need not be made if the amount thereof is less than one dollar per type of insurance.

The following rules are adopted to implement section 536A.23(6) of the Code.

1.35 (536A) All fees paid by a borrower to a public official for recording or filing a chattel mortgage or security agreement or for satisfying a judgment or lien on any real or personal property securing a loan, shall be evidenced by a receipt or other satisfactory evidence of payment.

1.36 (536A) All fees paid by a borrower to a licensee for actual expenses incurred by the licensee in appraising real or personal property offered by the borrower as security for a loan shall be evidenced by a written explanation of how the fee was computed. The following are acceptable as expenses incurred by a licensee in making appraisals:

1.36 (1) The actual cost of transportation or a reasonable mileage cost estimate to and from the place where the appraisal is to be made.

1.36 (2) The actual cost of the appraiser's time.

1.36 (3) Meals and, if it is necessary for the appraiser to remain out of town overnight, lodging.

1.37 (536A) The licensee may choose to have the appraisal performed by an independent appraiser. In this case, the cost of the appraisal would be the amount charged by the independent appraiser as evidenced by his statement. The appraiser's statement shall be retained.

1.38 (536A) A licensee may collect from a borrower the actual cost incurred in the continuation of an abstract and an attorney's opinion as to the title to real property securing a loan. The charge shall be evidenced by a statement rendered by the individual or firm performing the service.

The following rule is adopted to implement section 536A.23 (7) of the Code.

1.39 (536A) A licensee shall disclose in writing and deliver to the borrower, either in the contract of loan or by separate statement delivered at the time the loan is made, an itemized list of charges listing interest or discount, service charge, appraisal fee, attorney or abstracting fee, fees paid to a public official, credit life insurance, health and accident insurance and other insurance.

PREPAYMENT

The following rules are adopted to implement section 536A.26 of the Code.

1.40 (536A) Whenever a "Regular Payment Schedule" loan contract is fully prepaid one month or more prior to the maturity date, or whenever a "Regular Payment Schedule" loan contract is fully prepaid one month or more prior to the maturity date and one or more installments are prepaid thirty-one days or more prior to their scheduled due dates, the borrower must be refunded a portion of the interest charge. Refunds due as a result of prepayment of one or more installments need not be computed until the loan has been fully paid.

1.40 (1) Refunds for prepayment in full shall be computed by the "Direct Ratio Method," commonly referred to as the "Rule of 78's" method, based on the number of full months the loan is prepaid in full.

RESTRICTIONS

The following rule is adopted to implement section 536A.25 of the Code.

1.41 (536A) No person other than an actual bonafide employee of the lender or the principal borrower shall obtain the signature of one or more of the principal borrowers outside the loan office except under unusual circumstances or where the loan is made by mail.

PENALTY

The following rule is adopted to implement section 536A.28 of the Code.

1.42 (536A) It shall be the responsibility of each licensee to see that all officers, directors, agents and employees are familiar with the Iowa Industrial Loan Law and all rules and regulations promulgated thereto.

AUDITOR OF STATE
(continued)

Pursuant to authority of Section 534.8 of the Code the following rules are adopted.

[Filed September 15, 1966]

SAVINGS AND LOAN DIVISION

INCORPORATION AND ORGANIZATION

2.1 (534) Board resolution to file application. Prior to an association amending its articles of incorporation and the bylaws for the purpose of establishing a

branch office, the board of directors of the association will, by resoution, authorize the filing of an application for permission to establish a branch office along with the supporting information required by such application. The prescribed form of application and an outline of information required in support thereof may be obtained by request from the office of the Auditor of State, Supervisor of Savings and Loan Associations, State Capitol Building, Des Moines, Iowa.

2.2 (534) Eligibility. No application will be considered if, at the date on which it is filed:

2.2 (1) The location of the proposed branch office is outside the "regular lending area" as defined in section 534.5 of the Code, with the further stipulation that branch offices outside of the state of Iowa will not be considered;

2.2 (2) The association has not been in operation for at least three years;

2.2 (3) The association has on file any other application for permission to establish a branch office with respect to which action by the supervisor, auditor of state or the state executive council is pending;

2.2 (4) The association has received approval for another branch office and such office has not yet opened;

2.2 (5) The association does not submit assurance that the proposed branch office will open within eighteen months of the date of approval of amendment to the articles and bylaws by the state executive council.

2.3 (534) Application and supporting data. In support of the requirements of the Code, the association will supply such data as are outlined in the "Application for Permission to Establish a Branch Office." Particular emphasis is placed on trend data concerning the proposed branch service area. Appropriate to this are economic surveys of the area, whether compiled primarily for the applicant or for other local groups. Also required are an estimate of the annual income and expenses of the proposed branch office, the annual business to be transacted by it, and a statement of the functions to be performed at such office and of the personnel and office facilities to be provided for the operation of the office.

2.4 (534) Annual budget. The application for permission to branch must be accompanied by a proposed annual budget of the association. The budget is for the confidential use of the supervisor and the auditor of state and is not to be open to inspection by the public.

2.5 (534) Evaluation of applications. A certified copy of the association's board of directors' resolution authorizing application, the completed "Application for Permission to Establish a Branch Office" and the proposed annual budget will be submitted by the association to the office of the auditor of state, savings and loan division. The auditor of state and the supervisor are charged with the preliminary evaluation of the application and supporting data and may request further information as may be desirable in particular cases. They will have thirty days from date of receipt of all required or requested information in which to evaluate the application.

2.6 (534) Amendment of articles and bylaws. If, upon evaluation of the information presented, the auditor of state and the supervisor approve the application, they will give written notice to the association to proceed with amendment of the articles of incorporation and bylaws of the association. The articles are to be amended as provided in section 534.3, (3) "*g*", of the Code and the bylaws by resolution of the board of directors. Both amendments are subject to approval of the supervisor as to form and must be approved by the state executive council. The amendments must indicate the location for the specific branch office intended. An amendment cannot be made giving the association broad powers to branch.

Upon approval of the members of the amendment to the articles of incorporation and upon approval of the amendment to the bylaws by the board of directors, four certified copies of each of the amendments shall be filed with the supervisor.

2.7 (534) Published notice of branch. If, upon receipt of the amendments, the supervisor approves them as to form he shall give the association written notification to publish the following notice:

NOTICE OF FILING AMENDMENTS TO THE ARTICLES OF INCORPORATION AND BYLAWS

APPLICATION FOR THE PURPOSE OF ESTABLISHING A BRANCH OFFICE

Notice is hereby given that, pursuant to the provisions of chapter 534, section 3,

of the Code of Iowa and the rules of the office of Auditor of State, Savings and Loan Division, the_____

Savings and Loan Association, _____, Iowa has filed with the Auditor of State, amendments to the articles of incorporation and bylaws of the association for submission to the state executive council. Said amendments provide for the establishment of a branch office at, or in the immediate vicinity of,_____, _____, Iowa. The amendments along with a completed "Application for Permission to Establish a Branch Office" have been delivered to the office of Auditor of State, located in the State Capitol Building, Des Moines, Iowa. Any person may file communications in favor or in protest of said amendments and application at the office of auditor of state within twenty days after the date of this publication. The amendments and completed application, together with all communications received in favor or in protest thereof, are available for inspection by interested persons at the aforesaid office.

_____Savings and Loan Association

_____, Iowa.

The association shall publish the notice in a newspaper of general circulation in the community in which the branch office is to be located within fifteen days of the supervisor's notification to do so. A copy of the notice accompanied by a publisher's affidavit will be furnished the supervisor by the association immediately after publication.

2.8 (534) Submission of amendments. Upon receipt of the affidavit of publication of notice and following the twenty-day period for communications allowed in the notice, the supervisor will deliver the amendments to the auditor of state for presentation to the state executive council. Processing of the amendments will be as provided in section 534.3 of the Code. Approval by the state executive council of the amendments will constitute approval of the proposed branch office. If the state executive council disapproves the amendments, appeal may be made as provided in section 534.3, (3) "*b*", of the Code.

COMMERCE COMMISSION

Pursuant to authority of chapter 490A of the Code the following rules are adopted.

[Filed July 12, 1966]

UTILITIES DIVISION

CHAPTER 19

REGULATIONS GOVERNING SERVICE SUPPLIED BY GAS UTILITIES

19.1 (490A) General information.

19.1 (1) *Authorization of rules.* Chapter 490A, Code of Iowa, 1966, provides that the Iowa state commerce commission shall establish all needful, just and reasonable rules and regulations, not inconsistent with law, to govern the exercise of its powers and duties, the practice and procedure before it, and to govern the form, contents and filing of reports, documents and other papers necessary to carry out the provisions of this law.

Chapter 490, Code of Iowa, 1966, provides that the Iowa state commerce commission shall have full authority and power to promulgate rules and regulations as it deems proper and expedient in the supervision of the transportation or transmission and underground storage of gas within the state of Iowa.

19.1 (2) *Application of rules.* The rules shall apply to any gas utility operating within the state of Iowa as defined in chapter 490A, Code of Iowa, 1966, and shall supersede all rules on file with this commission which are in conflict with these rules. These rules are intended to promote safe and adequate service to the public, to provide standards for uniform and reasonable practices by utilities, and to establish a basis for determining the reasonableness of such demands as may be made by the public upon the utilities. If unreasonable hardship to a utility or to a customer results from the application of any rule herein prescribed, application may be made to the commission for the modification of the rule or for temporary or permanent exemption from its requirements. The adoption of these rules shall in no way preclude the commission from altering or amending them, pursuant to statute, or from making such modifications

with respect to their application as may be found necessary to meet exceptional conditions. These regulations shall in no way relieve any utility from any of its duties under the laws of this state.

19.1 (3) *Definitions.* The following words and terms, when used in these rules, shall have the meaning indicated below:

a. "Commission" means the Iowa State Commerce Commission, and sometimes hereinafter referred to as "ISCC".

b. "Utility" means any person, partnership, business association, or corporation, domestic or foreign, owning or operating any facilities for furnishing gas to the public for compensation.

c. "Customer" means any person, firm, association, or corporation, or any agency of the federal, state or local government, being supplied with gas service by a gas utility.

d. "Premises" means a piece of land or real estate, including buildings and other appurtenances or improvements thereon.

e. "Gas plant" means all facilities including all real estate, fixtures and property owned, controlled, operated or managed by a gas utility for the production, storage, transmission, and distribution of gas.

f. "Main" means a gas pipe, owned, operated, or maintained by a utility, which is used for the purpose of transmission or distribution of gas, but does not include "service pipe".

g. "Rate-regulated utility" means any utility as defined in definition "*b*" above which is subject to rate regulation provided for in chapter 490A, Code of Iowa, 1966.

h. "Service pipe" is the pipe that runs between a main or a pipeline and a regulator or meter on the customer's premises.

i. "Meter", without other qualification, shall mean any device or instrument which is used by a utility in measuring a quantity of gas.

j. "Check flow" means a flow between 20% and 50% of the rated capacity of a meter, except that with rotary displacement meters, it shall be 10% or 20% of the rated capacity of the meter.

k. "Full-rated flow" means a flow of 100% of the rated capacity of a meter.

l. "Cubic foot" of gas as used in these rules shall have the following meanings:

(1) Where gas is supplied and metered to customers at the pressure [as defined in section 19.7 (2)] normally used for domestic customers' appliances, a cubic foot of gas shall be that quantity of gas which, at the temperature and pressure existing in the meter, occupies one cubic foot, except that where a temperature compensated meter is used, the temperature shall be 60°F.

(2) When gas is supplied to customers at other than the pressure in subparagraph "1" above, the utility shall specify in its rules the base for measurement of a cubic foot of gas (see section 19.2 (5) "*c*", "6". Unless otherwise stated by the utility, such cubic foot of gas shall be that quantity of gas which, at a temperature of 60°F. and a pressure of 14.73 pounds per square inch absolute, occupies one cubic foot.

(3) The standard cubic foot of gas for testing the gas itself for heating value shall be that quantity of gas, saturated with water vapor, which at a temperature of 60°F. and a pressure of 30 inches of mercury occupies one cubic foot. (Temperature of mercury = 32°F.; acceleration due to gravity = 32.17 ft. per second; density = 13.595 grams per cubic centimeter).

m. "Interruption of service" means any disturbance of the gas supply whereby the pilot flame on the appliances of at least 50 customers in one segment or in a portion of a distribution system shall have been extinguished.

n. The abbreviations used, and their meanings, are as follows:

BTU	— British Thermal Unit
LP-Gas	— Liquefied Petroleum Gas
psig	— Pounds per Square Inch, Gauge
W.C.	— Water Column

o. "Appliance" refers to any device which utilizes gas fuel to produce light, heat or power.

p. "Tap" or "town border station" means the delivery point or measuring station at which a gas distribution utility receives gas from a natural gas transmission company.

q. "Gas" unless otherwise specifically designated, means manufactured gas, natural gas, other hydrocarbon gases, or any mixture of gases produced, transmitted, distributed or furnished by any gas utility.

r. "Pressure", unless otherwise stated, is expressed in pounds per square inch above atmospheric pressure, i.e., gauge pressure (abbreviation — psig).

s. "Complaint" as used in these rules and regulations is a statement or question by anyone, whether a utility customer or not, alleging a wrong, grievance, injury, dissatisfaction, illegal action or procedure, dangerous condition or action, or utility obligation.

t. "Heating and calorific values". The following values shall be used:

(1) "British thermal unit" (BTU) is the quantity of heat that must be added to one avoirdupois pound of pure water to raise its temperature from 58.5°F. to 59.5°F. under standard pressure.

(2) "Dry calorific value" of a gas (total or net) is the value of the total or the net calorific value of the gas divided by the volume of dry gas in a standard cubic foot. (Note: The amount of dry gas in a standard cubic foot is .9826 cu. foot).

(3) "Net calorific value" of a gas is the number of British thermal units evolved by the complete combustion, at constant pressure, of one standard cubic foot of gas with air, the temperature of the gas, air, and products of combustion being 60°F. and all water formed by the combustion reaction remaining in the vapor state. (Note: The net calorific value of a gas is its total calorific value minus the latent heat of evaporation at standard temperature of the water formed by the combustion reaction).

(4) "Therm" means 100,000 British thermal units.

(5) "Total calorific value" of a gas is the number of British thermal units evolved by the complete combustion being 60°F. and all water formed by the combustion reaction condensed to the liquid state.

u. "Tariff" refers to the entire body of rates, rentals, charges, classifications and rules adopted and filed by a public utility for a single type of service.

19.2 (490A) Records and reports.

19.2 (1) *Location of records.* All records required by these rules or necessary for the administration thereof, shall be kept within this state, unless otherwise authorized by the commission. These records shall be reasonably accessible and available for examination by the commission or its authorized representatives at all reasonable hours.

19.2 (2) *Retention of records.* Unless otherwise specified by the commission, all records required by these rules shall be preserved for the period of time specified in the revised 1963 edition of the National Association of Railroad and Utilities Commissioners' publication "Regulations to Govern the Preservation of Records of Electric, Gas and Water Utilities".

19.2 (3) *Tariffs to be filed with the commission.* The utility shall file its tariff with the commission, and shall maintain such tariff filing in a current status. The schedules of rates of rate-regulated utilities and rules of all utilities shall be filed with the commission and shall be classified, designated, arranged and submitted so as to conform to the requirements of current tariff or rate schedule circulars and special instructions which have been or may from time to time be issued by the commission. Provisions of the schedules shall be definite and so stated as to minimize ambiguity or the possibility of misinterpretation. The form identification and content of tariffs shall be in accordance with these rules.

Utilities which are not subject to the rate regulation provided for by chapter 286, Acts of the 60th General Assembly [ch. 490A of the Code], shall not be required to file schedules of rates, or contracts primarily concerned with a rate schedule, with the commission but nothing contained in these rules shall be deemed to relieve any utility of the requirement of furnishing any of these same schedules or contracts which are needed by the commission in the performance of the commission's duties upon request to do so by the commission.

19.2 (4) *Form and identification.* All tariffs shall conform to the following regulations:

a. The tariff shall be printed, typewritten or otherwise reproduced on 8½ x 11 inch sheets of white paper equal in durability to 20-pound bond paper with 25% cotton or rag content so as to result in a

clear and permanent record. The sheets of the tariff should be ruled or spaced to set off a border on the left side suitable for binding. In the case of utilities subject to regulation by any federal agency the format of sheets of tariff as filed with the commission may be the same format as is required by the federal agency provided that the rules of the commission as to title page; identity of superseding, replacing or revision sheets; identity of amending sheets; identity of the filing utility, issuing official, date of issue, effective date; and the words "ISCC Tariff" shall apply in the modification of the federal agency format for the purposes of filing with this commission.

b. The title page of every tariff and supplement shall show in the order named:

(1) The first page shall be the title page which shall show:

ISCC GAS TARIFF

(Name of Public Utility)

Filed with

Iowa State Commerce Commission_____
date

(2) When a tariff is to be superseded or replaced in its entirety, the replacing tariff shall show in its title page that it is a revision of a tariff on file and the number being superseded or replaced, for example:

ISCC TARIFF NO._____

SUPERSEDES ISCC TARIFF NO._____

(3) When a partial tariff amends or adds to an original or amended tariff already on file, the partial tariff shall show on each amending page the designation of the original tariff and the number of any preceding amendment thus amended.

AMENDS ISCC TARIFF NO._____

(Name of Public Utility)

EFFECTIVE_____

(4) When a new part of a tariff eliminates an existing part of a tariff it shall so state and clearly identify the part eliminated.

(5) Any tariff modifications as defined in "2", "3" or "4" above replacing tariff sheets shall be marked in the right margin with symbols as herein described to indicate the place, nature and extent of the change in text.

Symbol	*Meaning*
(C)	A change in regulation
(D)	A discontinued rate, treatment or regulation
(I)	An increased rate or new treatment resulting in increased rate
(N)	A new rate, treatment or regulation
(R)	A reduced rate or new treatment resulting in a reduced rate
(T)	A change in text but no change in rate, treatment or regulation

c. All sheets except the title page shall have, in addition to the above-stated requirements the following further information:

(1) Name of utility under which shall be set forth the words "ISCC Tariff". If the utility is not a corporation, and a trade name is used, the name of the individual or partners must precede the trade name.

(2) Issuing official and issue date.

(3) Effective date.

19.2 (5) *Content of tariffs.* A tariff filed with the commission shall contain:

a. A table of contents containing a list of rate schedules and other sections in the order in which they appear showing the sheet number of the first page of each section.

b. All rates of utilities subject to rate regulation for service with indication for each rate of the type of gas and the class of customers to which each rate applies. There shall also be shown the prices per unit of service, and the number of units per billing period to which the prices apply, the period of billing, the minimum bill, method of measuring demands and consumptions, including method of calculating or estimating loads or minimums, and any special terms and conditions applicable. The discount for prompt payment or penalty for late payment, if any, and the period during which the net amount may be paid shall be specified.

c. A copy of the utility's rules, or terms and conditions, describing the utility's policies and practices in rendering service shall include:

(1) A statement as to the equivalent total heating value of the gas in BTU's per cubic foot on which their

customers are billed. If necessary, this may be listed by district, division or community.

(2) The list of the items which the utility furnishes, owns, and maintains on the customer's premises, such as service pipe, meters, regulators, vents, and shut-off valves.

(3) General statement indicating the extent to which the utility will provide service in the adjustment of customer appliances at no additional customer charge over the filed commodity rates of rate-regulated utilities or commodity rates charged by nonrate-regulated utilities.

(4) General statement of the utility's policy in making adjustments for wastage of gas when such wastage occurs without the knowledge of the customer.

(5) A statement indicating the minimum number of days allowed for payment of the gross amount of the customer's bill before service will be discontinued for nonpayment.

(6) A statement indicating the volumetric measurement base to which all sales of gas at other than standard delivery pressure are corrected.

(7) Forms of standard contracts required of customers for the various types of service available.

(8) A copy of each standard and special contract for the purchase, sale or interchange of gas.

(9) A copy of each type of customer bill.

(10) The name, title, address, and telephone number of the person who is authorized to receive, act upon and respond to communications from the commission in connection with; (*a*) General management duties; (*b*) Customer relations (complaints); (*c*) Engineering operations; (*d*) Meter tests and repairs; (*e*) Emergencies during nonoffice hours; (*f*) Pipe-line permits (gas).

(11) The utility shall keep the commission informed currently by written notice of the location at which the utility keeps the various classes of records required by these rules.

(12) List of towns, cities, and unincorporated communities where urban rates are applicable, and towns in which service is furnished.

(13) Definitions of classes of customer.

(14) Extension rules for extending service to new customers indicating what portion of the extension or cost thereof will be furnished by the utility; and if the rule is based on cost, the items of cost included as required in 19.3 (10).

(15) Rules with which prospective customers must comply as a condition of receiving service, and the terms of contracts required.

(16) Rules governing the establishment of credit by customers for payment of service bills.

(17) Rules governing disconnecting and reconnecting service.

(18) Notice required from customer for having service discontinued.

(19) Rules covering temporary, emergency, auxiliary, and stand-by service.

(20) Rules shall show any limitations on loads and covering the type of equipment which may or may not be connected.

(21) The list of service areas and the rates where rate control is authorized by law shall be filed in such form as to facilitate ready determination of the rates available in each municipality and in such unincorporated communities as have service at urban rates. If the utility has various rural rates, the areas where the same are available shall be indicated.

(22) A notification to the commission shall be made of any planned change in rate of service by a utility even though the change in rate of service is provided for in its tariff filing with the commission. This information shall reflect the amount of increase or decrease and the effective date of application. An up-to-date tariff sheet shall be supplied to the Iowa state commerce commission for its copy of tariff showing the current rates.

19.2 (6) *Annual, periodic and other reports to be filed with the commission.* A utility shall file annually with the commission a verification that it has a currently correct set of utility system maps for each operating or distribution area. The maps shall show:

a. Gas production plant.

b. Principal storage holder.

c. Peak shaving facilities location.

d. Feeder and distribution mains indicating size and pressure.

e. System metering (town border stations and other supply points).

f. Regulator stations in system indicating inlet and outlet pressures.

g. Calorimeter location.

h. State boundary crossing.

i. Franchise area.

j. Names of all communities (post offices) served.

19.2 (7) *Accident reports.* Any person, company, corporation, city or town operating gas supply lines shall report in writing to the commission, all accidents to employees or other persons resulting in fatalities or burns, fractures, dislocations or internal or other injuries, which are directly traceable to the utility's operations of manufacturing or mixing gases or the transmission and distribution of gas and accidents resulting in property loss in excess of $10,000; such written report shall indicate the following information:

a. The name, address and age of the person or persons involved in the accident.

b. The time and place where the accident occurred.

c. Description of injuries including extent, severity and location on injured person(s).

d. The cause of the accident in detail.

e. The name of the individual, company, corporation, city or town operating the gas supply line.

Prompt notice, by telephone or telegraph, shall be given to the gas engineering section of the commission during office hours by the utility of any accident which has resulted in a fatality.

19.2 (8) *Construction programs.* A utility shall notify the Iowa commerce commission of all proposed important additions to plant, including main extensions, the construction of which was started by the utility during the preceding month. For the purposes of this rule, an important addition to plant shall mean a single project involving the expenditure of at least $5,000 for other than main construction, or in the case of main construction, an expenditure of $30,000.

19.2 (9) *Reports of gas service.* Each utility shall compile a monthly record of the following operations within thirty days after the end of the month covered and such record shall upon and after compilation be kept available for inspection by the commission or its staff at the principal utility's office within the state of Iowa. Such record shall contain:

a. The daily and monthly average of total heating values of gas in accordance with section 19.7 (7).

b. The monthly acquisition and disposition of gas.

c. Interruptions of service occurring during the month in accordance with section 19.7 (10). If there were no interruptions, then it should be so stated.

d. The number of customer pressure investigations made and the results.

e. The number of customer meters tested and test results tabulated as follows: The number that fall into limits 0 to +2%, +2 to +4%, −2 to −4%, over +4%, under −4%, and "Does Not Register" in accuracy.

f. Progress on leak survey program including the number of leaks found during the month classified as to nature of leaks and causes.

g. Number of district regulators checked and nature of repairs required.

h. Number of house regulators checked and nature of repairs required.

i. Description of usual types of operating difficulties.

j. Type of odorant and monthly average pounds per million cubic feet used in each individual distribution system.

A summary of the twelve monthly gas service records for each calendar year shall be attached to and submitted with the utility's annual fiscal plant and statistical report to the commission.

19.2 (10) The utility shall keep the commission informed currently by written notice as to the location at which the utility keeps the various classes of records required by these rules.

19.2 (11) A copy of the utility's current rules, if any, published or furnished by the utility for the use of engineers, architects, plumbing contractors, etc., covering meter and service installation shall be filed with the commission.

19.2 (12) A copy of each type of customer bill form in current use shall be filed with the commission.

19.2 (13) Prompt notice by telephone or telegram shall be given the gas engineering section of the commission by a utility in the event of interruption of service as defined in section 19.1 (3) "*m*" of these rules.

19.2 (14) Each utility shall file such other monthly, periodic and annual reports as are requested by the commission. Monthly and periodic reports shall be due in the commission's office within thirty days after the end of the reporting period. All annual reports shall be filed with this commission by April 1 of each year for the preceding calendar year.

19.3 (490A) General service requirements.

19.3 (1) *Disposition of gas.* All gas sold by a utility shall be on the basis of meter measurement unless otherwise authorized by the commission. Wherever practicable, consumption of gas within the utility itself, or by administrative units associated with it, shall be metered. All service on the premises of the customer (except those customers who prior to the effective date of this order have been allowed to submeter service) shall be sold directly by the utility and such a customer shall not directly sell or submeter such service to a third party except the indirect reselling of utility service by a utility customer which is included as an unidentified part of fixed rentals will not be considered submetering.

19.3 (2) *Condition of meter.* No meter shall be installed or continued in service which is known to be mechanically defective, has an incorrect correction factor or has not been tested, and adjusted, if necessary, in accordance with sections 19.6 and 19.6 (3). The capacity of the meter and the index mechanism should be consistent with the gas requirements of the customer.

19.3 (3) *Meter reading sheets or cards.* The meter reading sheets, cards or ledger sheets shall show:

a. Customer's name, address, rate schedule, or identification of rate schedule.

b. Identifying number and/or description of the meter(s).

c. Meter readings.

d. If the reading has been estimated.

e. Any applicable multiplier or constant, or reference thereto.

19.3 (4) *Meter charts.* All charts taken from recording meters shall be marked with the inital and final date and hour of the record, the meter identification, customer's name and location and the chart multiplier.

19.3 (5) *Meter multiplier.* If it is necessary to apply a multiplier to the meter readings, the multiplier must be marked on the face of the meter register or stenciled in weather resistant paint upon the front cover of the meter.

19.3 (6) *Prepayment meters.* Prepayment meters shall not be geared or set so as to result in the charge of a rate or amount higher than would be paid if a standard type meter were used, except under such special rate schedule as may be filed under section 19.2 (3).

19.3 (7) *Meter reading interval.* An effort shall be made to read meters on corresponding days of each meter-reading period. The utility may permit the customer to supply the meter readings on a form supplied by the utility. Unless the utility has a plan to test check readings, a utility representative will read the meter at least once each twelve months and when the utility is notified there is a change of customer.

19.3 (8) *Readings and estimates.* When a customer is connected or disconnected or the regular meter reading date is substantially revised causing a given billing period to be longer or shorter than usual, such bills shall be prorated on a daily basis unless other provisions are made in the utility's filed rules.

The utility may leave a meter reading form with the customer when access to meters cannot be gained. If the form is not returned in time for the billing operation, an estimated bill may be rendered. If an actual meter reading cannot be obtained, the utility may render an estimated bill without reading the meter or supplying a meter-reading form to the customer. Only in unusual cases or when approval is obtained from the customer shall more than three consecutive estimated bills be rendered.

19.3 (9) *Temporary service.* When the utility renders a temporary service to a customer it may require that the customer bear all the cost of installing and removing the service in excess of any salvage realized.

19.3 (10) *Extension plan.* Each utility shall develop a plan, acceptable to the commission, for the installation of extensions of main and service lines where such facilities are in excess of those included in the regular rates for service and for which the customer shall be required to pay all or part of the cost. No utility shall make any extension except as permitted by their rules or refuse to make extension in accordance with these rules.

19.3 (11) *Co-operation and advance notice.* In order that full benefit may be derived from these rules and in order to facilitate their proper application, all utilities shall observe the following co-operative practices:

a. Each utility shall give to other public utilities in the same general territory advance notice of any construction or change in construction or in operating conditions of its facilities concerned or likely to be concerned, in situations of proximity, provided, however, that the requirements of this rule shall not apply in case of routine extensions or minor changes in the local underground distribution facilities.

b. Each utility shall assist in promoting conformity with these rules. An arrangement should be set up between all utilities whose facilities may occupy the same general territory, providing for the interchange of pertinent data and information including that relative to proposed and existing construction and changes in operating conditions concerned or likely to be concerned in situations of proximity.

19.4 (490A) Customer relations.

19.4 (1) *Customer information.* Each utility shall:

a. Maintain up-to-date maps, plans or records of its entire transmission and distribution systems, with such other information as may be necessary to enable the utility to advise prospective customers, and others entitled to the information, as to the facilities available for serving any locality.

b. Assist the customer or prospective customer in selecting the most economical rate schedule.

c. Notify customers affected by a change in rates or schedule classification as set out in Rules of Practice and Procedure before the commission.

d. Post a notice in a conspicuous place in each office of the utility where applications for service are received, informing the public that copies of the rate schedules and rules relating to the service of the utility, as filed with the commission, are available for inspection.

e. Upon request, inform its customers as to the method of reading meters.

f. Furnish such additional information as the customer may reasonably request.

g. Make certain that employees responsible for the receiving of customer telephone calls and customer office visits shall be properly qualified and instructed in the screening and prompt handling of complaints to assure prompt reference of the complaint to the person or department capable of effective handling of the matter complained of and to obviate the necessity of the customer's preliminary recitation of the entire complaint to employees lacking in ability and authority to take appropriate action.

19.4 (2) *Customer deposits.* Each utility may require from any customer or prospective customer a deposit intended to guarantee payment of bills for service. Such deposit shall not be less than $5.00 nor more in amount than the maximum estimated charge for service for two consecutive billing periods or ninety days, whichever is less, or as may reasonably be required by the utility in cases involving service for short periods or special occasions.

19.4 (3) *Interest on deposit.* Simple interest on deposits accrued at the rate of at least five percent per annum shall be paid by the utility to each customer required to make such a deposit for the time held by the utility. Interest shall be paid from the date of deposit to the date of refund or the date upon which the customer's account becomes delinquent, whichever is earlier, unless such period be less than six months. Payment of the interest to the customer may be made

annually or at the time the deposit is returned. The deposit shall cease to draw interest on the date it is returned, on the date upon which the customer's account becomes delinquent, or on the date notice is sent to the customer's last known address that the deposit is no longer required.

19.4 (4) Each utility shall keep records to show:

a. The name and address of each depositor.

b. The amount and date of the deposit.

c. Each transaction concerning the deposit.

19.4 (5) Each utility shall issue a receipt of deposit to each customer from whom a deposit is received, and shall provide means whereby a depositor may establish his claim if his receipt is lost.

19.4 (6) The deposit may be refunded upon request of the customer after twelve consecutive months of prompt payment, and, without such request, shall be refunded by the utility after thirty-six months of prompt payment unless the utility has evidence to indicate that the deposit is necessary to insure payment of bills for service. The deposit shall be refunded when the customer has paid the final billing upon termination of his service.

19.4 (7) A record of each unclaimed deposit must be maintained for at least three years, during which time the utility shall make a reasonable effort to return the deposit. Unclaimed deposits, together with accrued interest, shall be credited to an appropriate account.

19.4 (8) A new or additional deposit may be required upon reasonable written notice of the need for such a requirement in any case where a deposit has been refunded or is found to be inadequate to cover two months' bills as above provided for in section 19.4 (2) or where a customer's credit standing is not satisfactory to the utility. The service of any customer who fails to comply with these requirements may be disconnected upon five days written notice.

19.4 (9) *Customer bill forms.* Each customer shall be informed as promptly as possible following the reading of his meter, on bill form or otherwise, the following:

a. The reading of the meter at the beginning and at the end of the period for which the bill is rendered.

b. The dates on which the meter was read at the beginning and end of the billing period.

c. The number and kind of units metered.

d. The applicable rate schedule or identification of the applicable rate schedule.

e. The gross and/or net amount of the bill. In the case of prepayment meters, the amount of money collected shall be shown.

f. The date by which the customer must pay the bill in order to benefit from any discount or to avoid any penalty.

g. A distinct marking to identify an estimated bill.

h. A distinct marking to identify a minimum bill.

19.4 (10) Any conversions from meter reading units to billing units, or any calculations to determine billing units from recording or other devices, or any other factors, such as purchased gas or fuel adjustments, used in determining the bill. In lieu of this information on the bill, a statement must be on the bill advising that such information can be obtained by contacting the utility's local office.

19.4 (11) *Customer records.* The utility shall retain customer billing records for the length of time necessary to permit the utility to comply with section 19.4 (12) but not less than three years.

19.4 (12) *Adjustment of bills.* Bills which are incorrect due to meter or billing errors are to be adjusted as follows:

a. Fast meters. Whenever a meter in service is tested and found to have over-registered more than two percent, the utility shall recalculate the bills for service, for the period as determined below:

(1) The bills for service shall be recalculated from the time at which the error first developed or occurred if that time can be definitely determined.

(2) If the time at which the error first developed or occurred cannot be definitely determined, it shall be assumed that the over-registration existed for a period equal to one-half of the time since

the meter was last tested, or July 4, 1963, whichever is later, and the bills for service shall be recalculated for that period.

(3) If the recalculated bills indicate that more than $3 is due an existing customer or $5 is due a person no longer a customer of the utility, the full amount of the calculated difference between the amount paid and the recalculated amount shall be refunded to the customer. The refund to an existing customer may be in lump sum cash or as lump sum credit on a bill. If a refund is due a person no longer a customer of the utility, a notice shall be mailed to the last known address, and the utility shall upon request made within three months thereafter refund the amount due.

b. Nonregistering meters. Whenever a meter in service is found not to register, the utility may render an estimated bill.

c. Slow meters. Whenever a meter is found to be more than two percent slow, the utility may bill the customer for the amount the test indicates he has been undercharged for the peroid of inaccuracy, which period shall not exceed the last six months the meter was in service unless otherwise ordered by the commission. No back billing will be sanctioned if the customer has called to the utility's attention his doubts as to the meter's accuracy and the utility has failed within a reasonable time to check it.

19.4 (13) Billing adjustments due to fast or slow meters shall be calculated on the basis that the meter should be 100% accurate. For the purpose of billing adjustment the meter error shall be one-half of the algebraic sum of the error at full-rated flow plus the error at check flow.

a. When a customer has been overcharged as a result of incorrect reading of the meter, incorrect application of the rate schedule, incorrect connection of the meter, or other similar reasons, the amount of the overcharge shall be adjusted, refunded, or credited to the customer.

b. When a customer has been undercharged as a result of incorrect reading of the meter, incorrect application of the rate schedule, incorrect connection of the meter, or other similar reasons, the amount of the undercharge may be billed to the customer.

19.4 (14) *Credits and explanations.* Credits due a customer because of meter inaccuracies, errors in billing, or misapplication of rates shall be separately identified.

19.4 (15) *Reasons for denying and disconnecting service.* Service may be refused or discontinued for any of the reasons listed below. Unless otherwise stated, the customer shall be allowed a reasonable time in which to comply with the rule before service is discontinued. Service may be refused or discontinued:

a. Without notice in the event of a condition determined by the utility to be hazardous.

b. Without notice in the event of customer use of equipment in such a manner as to adversely affect the utility's equipment or the utility's service to others.

c. Without notice in the event of tampering with the equipment furnished and owned by the utility.

d. Without notice in the event of unauthorized use.

e. For violation of and/or noncompliance with the utility's rules on file with the commission.

f. For failure of the customer to fulfill his contractual obligations for service and/or facilities subject to regulation by the commission.

g. For failure of the customer to permit the utility reasonable access to its equipment.

h. For nonpayment of bill provided that the utility has made a reasonable attempt to effect collection and has given the customer written notice that he has at least five days, excluding Sundays and holidays, in which to make settlement of his account or make a deposit in accordance with section 19.4 (2), or have his service disconnected.

i. For failure of the customer to provide the utility with a deposit as authorized by section 19.4 (2).

j. For failure of the customer to furnish such service equipment, permits, certificates, and/or rights of way necessary to serve said customer as shall have been specified by the utility as a condition to obtaining service, or in the event such equipment or permissions are withdrawn or terminated.

19.4 (16) *Insufficient reasons for denying service.* The following shall not consti-

tute sufficient cause for refusal of service to a present or prospective customer:

a. Delinquency in payment for service by a previous occupant of the premises to be served.

b. Failure to pay for merchandise purchased from the utility.

c. Failure to pay for a different type or class of public utility service.

d. Failure to pay the bill of another customer as guarantor thereof.

e. Failure to pay a back bill rendered in accordance with section 19.4 (12) "*c*", (Slow meters).

f. Failure to pay adjusted bills based on the undercharges set forth in section 19.4 (13) "*b*".

19.4 (17) *Change in character of service.* The following procedure shall be followed whenever there is a material change in the character of the gas service:

a. Changes under the control of the utility. The utility shall make such changes only with the approval of the commission, and after adequate notice to the customers.

b. Changes not under the control of the utility. The utility shall maintain the proper combustibility of the gas supplied at the heating value and specific gravity existing at the customers' meters by adjustment of appliances, if necessary (see section 19.7 (6) "*b*").

19.4 (18) The utility shall make any necessary adjustments to the customers' appliances without charge and shall conduct the adjustment program with a minimum of inconvenience to the customers in a change in character of service under the control of the utility.

19.4 (19) *Customer complaints.* Each utility shall investigate promptly and thoroughly and keep a record of written complaints and all other reasonable complaints received by it from its customers in regard to safety, service, or rates, and the operation of its system as will enable it to review and analyze its procedures and actions. The record shall show the name and address of the complainant, the date and nature of the complaint, and its disposition and the date thereof. All complaints caused by a major outage or interruption shall be summarized in a single report.

19.5 (490A) Engineering practice.

19.5 (1) *Requirement for good engineering practice.* The gas plant of the utility shall be constructed, installed, maintained and operated in accordance with accepted good engineering practice in the gas industry to assure, as far as reasonably possible, continuity of service, uniformity in the quality of service furnished, and the safety of persons and property.

19.5 (2) *Acceptable standards.* Unless otherwise specified by the commission, the utility shall use the applicable provision in the publications listed below as standards of accepted good practice:

a. The letters "ASA" used in these rules mean "American Standards Association", American Standard Code for "Gas Transmission and Distribution Piping Systems", ASA B31.8 - 1963.

b. The American Standard Installation of Gas Appliances and Gas Piping, ASA Z21.30 - 1964.

c. The National Fire Protection Association Standard, No. 59, June, 1962, "The Storage and Handling of Liquefied Petroleum Gases at Utility Gas Plants".

d. "Standard Methods of Gas Testing", Circular No. 48, National Bureau of Standards, 1916. (The applicable portions of this circular have been substantially reproduced in the American Meter Company Handbook E-4, covering the testing of positive displacement gas meters).

e. "Testing Large Capacity Rotary Gas Meters", Research Paper No. 1741, National Bureau of Standards Journal of Research, September, 1946.

f. "Standard Method of Test for Calorific Value of Gaseous Fuels by the Water-Flow Calorimeter", American Society for Testing Materials, Standard D 900-55, adopted, 1948; Revised, 1955.

19.5 (3) *Acceptable references.* The following publications have not been designated as standards but they may be used as guides for acceptable practice:

a. "Accuracy of the Recording Gas Calorimeter When Used with Gases of High BTU Content", by John H. Eiseman, National Bureau of Standards, and Elwin A. Patter, Gas Inspection Bureau of the District of Columbia, AGA publication No. CEP-55-13.

b. "Orifice Metering of Natural Gas", Report No. 3 of the AGA Gas Measurement Committee — April, 1955, as reprinted with revisions in January, 1956.

c. Reports prepared by the Practical Methods Committee of the Appalachian Gas Measurement Short Course, West Virginia University, as follows:

(1) Report No. 1, "Methods of Testing Large Capacity Displacement Meters" — 1960.

(2) Report No. 2, "Testing Orifice Meters" — 1940 as revised, 1958.

(3) Report No. 3, "Designing and Installing Measuring and Regulating Stations" as revised, 1956.

(4) Report No. 4, "Useful Tables for Gas Men" — 1950.

(5) Report No. 5, "Prover Room Practices" — 1954.

19.5 (4) *Adequacy of Gas Supply.* The gas supply regularly available from pipeline sources supplemented by production and/or storage capacity must be sufficiently large to meet all reasonable demands for firm gas service.

19.6 (490A) Inspections and meter tests.

19.6 (1) *Inspection of gas plant.* The utility's gas transmission and distribution facilities shall be designed, constructed and maintained as required to perform the gas delivery burden placed upon them. Each utility shall be capable of emergency repair work on a scale consistent with its scope of operation and with the physical conditions of its transmission and distribution facilities.

In appraising the reliability of the utility's transmission and distribution system, the commission will consider the condition of the physical property and the size, training, supervision, availability, equipment and mobility of the maintenance forces all as principal factors.

Each utility must adopt a program of inspection of its gas plant in order to determine the necessity for replacement and repair. The frequency of the various inspections shall be based on the utility's experience and accepted good practice. Each utility shall keep sufficient records to give evidence of compliance with its inspection program.

19.6 (2) *Referee tests.* Upon written application to the commission by a customer or a utility, a test will be made of the customer's meter as soon as practicable under the observation of a representative of the commission.

The application, when in the case of a customer, shall be transmitted by certified or registered mail, accompanied by a certified check or money order made payable to the utility in the amount of ten dollars.

On receipt of such request from a customer the commission will forward the deposit to the utility and will notify the utility of the requirement for the test and the utility shall not knowingly remove or adjust the meter until instructed by the commission. The utility shall furnish all instruments, load devices and other devices and other facilities necessary for the test and shall perform the test in the presence and under the observation of the commision's representative and shall furnish verification of the accuracy of test instruments used.

If upon test the meter is found to overregister to an extent requiring a refund under the provisions of section 19.4 (12) "*a*", the amount paid to the utility for the test shall be returned to the customer by the utility.

The utility shall notify the customer in advance of the date and time of the referee test so the customer or his representative may be present when his meter is tested. The commission will make a written report of the results of the test to the customer and to the utility.

19.6 (3) *Leak tests.* Repaired meters, and meters that have been removed from service, shall be leak tested by the utility prior to installation. New meters shall be leak tested in accordance with a sampling method acceptable to the commission. Each meter tested shall be subjected to an internal pressure of at least 20" W.C. and checked for the presence of leaks by one of the following tests:

a. Immersion test.

b. Soap test.

c. Pressure drop test of a type acceptable to the commission.

19.6 (4) *Request tests.* Upon request by a customer the utility shall make a test of the meter serving him, provided that such tests need not be made more frequently than once in eighteen months.

If the meter is found accurate under the provisions of rule 19.4 (12) the utility may charge the consumer not to exceed five dollars or the actual cost of such test, whichever is lesser. If a customer demands a meter test with less than eighteen months between tests and the utility is not willing to perform the meter test at no charge, the customer must make a request for a referee test as set out in section 19.6 (2).

The utility shall notify the customer in advance of the date and time of the requested test so the customer or his representative may be present when his meter is tested.

A report of the results of the test shall be made to the customer within a reasonable time after the completion of the test, and a record of the report, together with a complete record of each test, shall be kept on file at the office of the utility.

19.6 (5) *Periodic tests.* Unless otherwise authorized by the commission each utility shall make periodic tests of meters, associated metering devices and instruments, to assure their accuracy. Such tests shall be scheduled within the calendar year or earlier, when the interval is stated in years; or within the calendar month or earlier, when the interval is stated in months. The basic periodic test interval shall not be longer than provided for in the following schedule: (Note: Maintenance and test programs suggested by manufacturers of the following meters and devices should be carefully considered.)

a. Positive displacement meters

0 to 800 c.f./hr.
with ½ inch water column drop - 10 yrs.
801 to 2400 c.f./hr.
with ½ inch water column drop - 7 yrs.
Over 2400 c.f./hr.
with ½ inch water column drop - 2 yrs.

b. Orifice meters ------ 6 months

c. Base pressure correcting devices shall be checked on same time interval as the meters they are on.

d. Base volume correcting devices shall be checked on same time interval as the meters they are on.

e. Secondary standards.

Test bottles, one cubic foot ---- 10 years
Dead weight testers ---------- 10 years

f. Working standards.

Bell provers ---------- 5 years
Rotary displacement test meters - 5 years

(Each utility having rotary displacement meters which are too large for testing on a five cubic foot bell prover may use a properly calibrated transfer prover, low pressure flow prover, critical flow prover, or differential tests. In the latter case, an original differential test record shall be set up immediately after installation; further differential test results shall be recorded and compared with original test records.)

Flow provers ---------- 5 years
Laboratory quality indicating pressure gauges ---------- 6 months

19.6 (6) *Preinstallation inspections and tests.* Except where an acceptable statistical sampling program has been approved by the commission, every meter and/or associated device shall be inspected and tested before being placed in service. A meter manufacturer's certification approved by the commission and supplemented by an acceptable statistical sampling program shall suffice for this purpose. The accuracy of each meter shall be certified to be within the following tolerances:

a. For positive displacement meters ---------- 1.5% plus or minus

b. For orifice meters ---------- 2.0% plus or minus

19.6 (7) *As found tests.* All meters and/or associated metering devices shall be tested by the utility after they are removed from service. Such tests shall be made before the meters and/or associated devices are adjusted, repaired or retired.

19.6 (8) *Test procedures and accuracies.* Meters and/or associated metering devices shall be tested at the points and adjusted to the tolerances prescribed below. The test of any unit of metering equipment shall consist of a comparison of its accuracy with the accuracy of a standard. The commission will use the applicable provisions of the standards listed in section 19.5 (2) as criteria of accepted good practice in testing meters.

a. Positive displacement meters.

(1) *Accuracy at test points.*

FLOW	ADJUSTED TO WITHIN
Check flow ----------	1.5%
Not less than full rated flow --	1.5%

(2) *Overall accuracy.* The accuracy at check flow and the accuracy at

not less than full rated flow shall agree within one percent.

b. Orifice meters. Accuracy at test points must be within two percent, plus or minus.

c. Timing devices. All recording type meters or associated instruments which have a timing element that serves to record the time at which the measurement occurs must be adjusted so that the timing element is not in error by more than plus or minus four minutes in any twenty-four-hour period.

19.6 (9) *General.* All meters and/or associated metering devices, when tested, shall be adjusted as closely as practicable to the condition of zero error. All tolerances are to be interpreted as maximum permissible variations from the condition of zero error. In making adjustments no advantage of the prescribed tolerance limits shall be taken.

19.6 (10) *Facilities and equipment for meter testing.* Each utility shall maintain or designate a meter shop for the purpose of inspecting, testing and repairing meters. The shop shall be open for inspection by authorized representatives of the commission at all reasonable times, and the facilities and equipment, as well as the methods of measurements and testing employed, shall be subject to the approval of the commission.

The area within the meter shop used for testing of meters shall be designed so that the meters and meter testing equipment are protected from drafts and excessive changes of temperature.

The meters to be tested shall be stored in such manner that the temperature of the meters is substantially the same as the temperature of the prover.

19.6 (11) *Working standards.* Each utility shall own and maintain, or have access to, at least one approved bell type prover of not less than five cubic foot capacity, and all other equipment necessary to test meters, which shall be installed in the meter room. Means shall be provided to maintain the temperature of the liquid in the meter prover at substantially the same level as the ambient temperature in the prover room. The meter prover shall be maintained in good condition and correct adjustment so that it shall be capable of determining the accuracy of any service meter to within one-half of one percent.

Each utility having meters which are too large for testing on a five cubic foot bell prover may use a properly calibrated test meter or a properly designed flow prover for testing the large meters.

19.6 (12) Working standards must be checked periodically [see section 19.6 (5)] by comparison with a secondary standard.

Bell provers or piston type provers must be checked with a one cubic foot bottle which has been calibrated by the National Bureau of Standards.

Rotary displacement test meters must be checked with a bell prover or piston type prover of adequate capacity which has been calibrated by representatives of the National Bureau of Standards.

19.6 (13) Extreme care must be exercised in the use and handling of standards to assure that their accuracy is not disturbed. Each standard shall be accompanied at all times by a certificate or calibration card, duly signed and dated, on which are recorded the corrections required to compensate for errors found at the customary test points at the time of the last previous test.

19.6 (14) Each utility must have properly calibrated orifices, as may be necessary, to achieve the rates of flow required to test the meters on its system.

19.6 (15) *Records of meters and associated metering devices.* Each utility shall maintain records of the following data, where applicable, for each meter and/or associated metering device until three years after retirement:

a. The complete identification — manufacturer, number, type, capacity, multiplier, constants, and pressure rating.

b. The dates of installation and removal from service, together with the location.

19.6 (16) *Meter test records.* Each utility shall maintain records of at least the last two tests made of any meter. The record of the meter test made at the time of the meter's retirement shall be maintained for a minimum of three years. Test records shall include the following:

a. The date and reason for the test.

b. The reading of the meter before making any test.

c. The accuracy "as found" at check and full rated flow.

d. The accuracy "as left" at check and full rated flow.

e. In the event test of the meter is made by using a standard meter or a flow prover, the utility shall retain all data taken at the time of the test in sufficiently complete form to permit the convenient checking of the test methods and the calculations.

f. Statement of repairs made if any.

19.7 (490A) Standards of quality of service.

19.7 (1) *Purity requirements.* All gas supplied to customers shall be substantially free of impurities which may cause corrosion of mains or piping or from corrosive or harmful fumes when burned in a properly designed and adjusted burner.

19.7 (2) *Pressure limits.* The maximum allowable operating pressure for a low pressure distribution system shall not be so high as to cause the unsafe operation of any connected and properly adjusted low pressure gas burning equipment.

19.7 (3) *Pressure surveys and records.* Each utility shall make a sufficient number of pressure measurements on its mains and at the customer's meter so that it will have a substantially accurate knowledge of the pressures in the low, intermediate and high pressure systems in each district, division, or community served by its distribution mains. All pressure records obtained under this section shall be retained by the utility for at least two years and shall be available for inspection by the commission's representatives. Notations on each record shall indicate the following:

a. The location where the pressure check was made.

b. The time and date of the check.

19.7 (4) *Standards for pressure measurements.*

a. Secondary standards. Each utility shall own or have access to a dead weight tester. This instrument must be maintained in an accurate condition.

b. Working standards. Each utility must have water manometers, mercury manometers, laboratory quality indicating pressure gauges and field type dead weight pressure gauges as necessary for the proper testing of the indicating and recording pressure gauges used in determing the pressure on the utility's system. Working standards must be checked periodically [see section 19.6 (5)] by comparison with a secondary standard.

19.7 (5) Extreme care must be exercised in the handling of standards to assure that their accuracy is not disturbed. Each standard shall be accompanied at all times by a certificate or calibration card, duly signed and dated, on which are recorded the corrections required to compensate for errors found at the customary test points at the time of the last previous test.

19.7 (6) *Heating value.*

a. Manufactured and mixed gas. The heating value of manufactured gas, including LP-Gas mixed with air, and natural gas when mixed with manufactured or LP-Gas for peak shaving or emergency purposes shall be considered a mixed gas and shall be considered as being under the control of the utility. The average heating value on any one day shall not fall below the standard total heating value [see section 19.2 (5) "*c*", (1)] by more than five percent but such average heating value may exceed the standard total heating value provided the resulting mixed gas shall have a specific gravity of less than 1.000. The monthly average heating value shall be not less than the standard total heating value.

b. Natural and LP-Gas. The heating value of natural gas and undiluted, commercially pure LP-Gas shall be considered as being not under the control of the utility. The utility shall determine the allowable range of monthly average heating values within which its customers' appliances may be expected to function properly without repeated readjustment of the burners. If the monthly average heating value is above or below the limits of the allowable range for three successive months, the customers' appliances must be readjusted in accordance with section 19.4 (17).

19.7 (7) *Heating value determination and records.* Unless acceptable heating value information is available for all periods from other sources, including the pipe-line supplier, the utility shall provide and maintain a calorimeter of a type acceptable to the commission for the regular determination of the heating value of the gas sold. All companies using peak shaving equipment for auxiliary gas supply must determine heating value of mixed gas after the introduction of the peak shaving gas supply. The calorimetric equipment shall be installed in a suitably located testing station acceptable to the commission and subject to its inspection. The accuracy of all calorimeters, as well as the method of making heating value tests, shall be acceptable to the commission. Recording calorimeters shall be tested with a standard gas at least once each three years.

19.7 (8) The utility shall determine the heating value of manufactured and mixed gas at least twice each day and shall make the tests dring the period of the morning and afternoon peak demands.

19.7 (9) The utility shall determine the heating value of natural and LP-Gas at least once each month, except that utilities selling gas subject to a thermal adjustment shall determine the heating value in accordance with section 19.7 (8) above.

19.7 (10) *Interruptions of service.* Each utility shall make reasonable efforts to avoid interruptions of service but when interruptions occur, service shall be reestablished within the shortest time practicable, consistent with safety. Each utility shall keep records of interruptions of service on a major portion of its distribution system as set out in section 19.1 (3) "*m*" and shall make an analysis of the records for the purpose of determining steps to be taken to prevent recurrence of such interruptions. Such records should include the following information concerning the interruptions:

a. Cause

b. Date and time

c. Duration

19.7 (11) Planned interruptions shall be made at a time that will not cause unreasonable inconvenience to customers and shall be preceded by adequate notice to those who will be affected.

19.7 (12) Each utility shall promptly notify the gas section of the commission by telephone or telegraph of any interruption to the service of a major portion of its distribution system.

19.8 (490A) Safety.

19.8 (1) *Acceptable standards.* As criteria of accepted good safety practice the commission will use the applicable provisions of the standard listed in section 19.5 (2).

19.8 (2) *Protective measures.* Each utility shall exercise reasonable care to reduce hazards inherent in connection with utility service to which its employees, its customers, and the general public may be subjected and shall adopt and execute a safety program designed to protect the public, fitted to the size and type of its operations. The utility shall give reasonable assistance to the commission in the investigation of the cause of accidents and in the determination of suitable means of preventing accidents. Each utility shall maintain a summary of all reportable accidents arising from its operations.

19.8 (3) *Turning on gas.* Each utility upon the installation of a meter and turning on gas or the act of turning on the gas alone shall take the necessary steps to assure itself that there exists no flow of gas through the meter which is a warning that the customer's piping or appliances are not safe for gas turn on. (Ref: Sec. 2.11 ASA Z21.30, 1950 Turning on Gas.)

19.8 (4) *Gas leaks.* A report of a gas leak shall be considered as an emergency requiring immediate attention.

19.8 (5) *Odorization.* Any gas distributed to customers through gas mains or gas services or used for domestic purposes in compressor plants, which does not naturally possess a distinctive odor to the extent that its presence in the atmosphere is readily detectable at all gas concentrations of one-fifth of the lower explosive limit and above, shall have an odorant added to it to make it so detectable. Odorization is not necessary, however, for such gas as is delivered for further processing or use where the odorant would serve no useful purpose as a warning agent. Suitable tests must be made to determine whether the odor meets the aforementioned standards.

COMMERCE COMMISSION
(continued)

Pursuant to authority of chapter 490A of the Code the following rules are adopted.

[Filed July 12, 1966]

UTILITIES DIVISION

CHAPTER 20

REGULATIONS GOVERNING SERVICE SUPPLIED BY ELECTRIC UTILITIES

20.1 (490A) General information.

20.1 (1) *Authorization of rules.* Chapter 490A, Code of Iowa, provides that the Iowa state commerce commission shall establish all needful, just and reasonable rules and regulations, not inconsistent with law, to govern the exercise of its powers and duties, the practice and procedure before it, and to govern the form, content and filing of reports, documents and other papers necessary to carry out the provisions of this law.

Chapter 489, Code of Iowa, provides that the Iowa state commerce commission shall have power to make and enforce rules relating to the location, construction, operation and maintenance of certain electrical transmission lines.

20.1 (2) *Application of rules.* The rules shall apply to any electric utility operating within the state of Iowa subject to chapter 490A, Code of Iowa, and to the construction, operation and maintenance of electric transmission lines to the extent provided in chapter 489, Code of Iowa, and shall supersede all conflicting rules of any such electric utility which were in force and effect prior to the adoption of their superseding rules.

These rules are intended to promote safe and adequate service to the public, to provide standards for uniform and reasonable practices by utilities, and to establish a basis for determining the reasonableness of such demands as may be made by the public upon the utilities.

If unreasonable hardship to a utility or to a customer results from the application of any rule herein prescribed, application may be made to the commission for the modification of the rule or for temporary or permanent exemption from its requirements.

The adoption of these rules shall in no way preclude the commission from altering or amending them, pursuant to statute, or from making such modifications with respect to their application as may be found necessary to meet exceptional conditions.

These regulations shall in no way relieve any utility from any of its duties under the laws of this state.

20.1 (3) *Definitions.* The following words and terms when used in these rules, shall have the meaning indicated below:

a. "Commission" means the Iowa state commerce commission, sometimes hereafter referred to as "ISCC".

b. "Utility" means any person, partnership, business association, or corporation, domestic or foreign, owning or operating any facilities for furnishing electricity to the public for compensation.

c. "Rate-regulated utility" means any utility as defined in definiition 20.1 (3) "*b*" above which is subject to rate regulation provided for in chapter 286, Acts of the 60th General Assembly [ch. 490A of the Code].

d. "Customer" means any person, firm, association, or corporation, or any agency of the federal, state or local government, being supplied, subject to the jurisdiction of this commission with light, heat or power by an electric utility.

e. "Premises" means a piece of land or real estate, including buildings and other appurtenances or improvements thereon.

f. "Electric plant" includes all real estate, fixtures and property owned, controlled, operated or managed in connection with or to facilitate the production, generation, transmission, delivery or furnishing of light, heat or power by an electric utility.

g. "Meter" means, unless otherwise qualified, a device that measures and registers the integral of an electrical quantity with respect to time.

h. "Meter shop" is a shop where meters are inspected, repaired and tested, and may be at a fixed location or may be mobile.

i. "Tariff" The entire body of rates, tolls, rentals, charges, classifications and

rules, adopted and filed by an electric utility for heat, light or power service frnished by the electric utility.

j. "Transmission Line" Any single or multiphase electric power line operating at nominal voltages in excess of either, 26,000 volts between ungrounded conductors or 15,000 volts between grounded and ungrounded conductors, regardless of the functional service provided by the line.

k. "Distribution Line" Any single or multiphase electric power line operating at nominal voltage in either of the following ranges: 2,000 to 26,000 volts between ungrounded conductors or 1,155 to 15,000 volts between grounded and ungrounded conductors, regardless of the functional service provided by the line.

l. "Secondary Line" Any single or multiphase electric power line operating at nominal voltage less than either 2,000 volts between ungrounded conductors or 1,155 volts between grounded and ungrounded conductors, regardless of the functional service provided by the line.

m. "Complaint" as used in these rules and regulations is a statement or question by anyone, whether a utility customer or not, alleging a wrong, grievance, injury, dissatisfaction, illegal action or procedure, dangerous condition or action or utility obligation.

20.1 (4) *Abbreviations.* The following abbreviations may be used where appropriate:

a. ASA — American Standards Association, Incorporated, 10 East 40th Street, New York 16, New York.

b. FCC — Federal Communications Commission, Washington, D. C. 20554.

c. FPC — Federal Power Commission, Washington, D. C. 20426.

d. NARUC — National Association of Railroad and Utilities Commissioners, Interstate Commerce Commission Building, P. O. Box 684, Washington, D. C. 20044.

e. NFPA — National Fire Protection Association, 60 Batterymarch Street, Boston 10, Massachusetts.

20.2 (490A) Records and reports.

20.2 (1) *Location of records.* All records required by these rules or necessary for the administration thereof, shall be kept within this state unless otherwise authorized by the commission. These records shall be available for examination by the commission or its authorized representatives at all reasonable hours.

20.2 (2) *Retention of records.* Unless otherwise specified herein, all records required by these rules shall be preserved for the period of time specified in the National Association of Railroad and Utilities Commissioners' publication, "Regulations to Govern the Preservation of Records of Electric, Gas and Water Utilities — Revised 1963".

20.2 (3) *Tariffs to be filed with the commission.* The utility shall file its tariff with the commission, and shall maintain such tariff filing in a current status.

The schedules of rates of rate-regulated utilities and rules of all utilities shall be filed with the commission and shall be classified, designated, arranged and submitted so as to conform to the requirements of current tariff or rate schedule circulars and special instructions which have been or may from time to time be issued by the commission. Provisions of the schedules shall be definite and so stated as to minimize ambiguity or the possibility of misinterpretation. The form, identification and content of tariffs shall be in accordance with these rules.

Utilities which are not subject to the rate regulation provided for by chapter 286, Acts of the 60th General Assembly [ch. 490A of the Code], shall not be required to file schedules of rates, or contracts primarily concerned with a rate schedule, with the commission and shall not be subject to the provisions related to rate regulations; but nothing contained in these rules shall be deemed to relieve any utility of the requirement of furnishing any of these same schedules or contracts which are needed by the commission in the performance of the commission's duties upon request to do so by the commission.

20.2 (4) *Form and identification.* All tariffs shall conform to the following regulations:

a. The tariff shall be printed, typewritten or otherwise reproduced on 8½ x 11 inch sheets of white paper equal in durability to 20-pound bond paper with 25% cotton or rag content so as to result in a clear and permanent record. The sheets of

the tariff should be ruled or spaced to set off a border on the left side suitable for binding. In the case of utilities subject to regulation by any federal agency the format of sheets of tariff as filed with the commission may be the same format as is required by the federal agency provided that the rules of the commission as to title page; identity of superseding, replacing or revision sheets; identity of amending sheets; identity of the filing utility, issuing official, date of issue, effective date; and the words "ISCC TARIFF" shall apply in the modification of the federal agency format for the purposes of filing with this commission.

b. The title page of every tariff and supplement shall show in the order named:

(1) The first page shall be the title page which shall show:

ISCC ELECTRIC TARIFF

(Name of Public Utility)

filed with

Iowa State Commerce Commission_____
Date

(2) When a tariff is to be superseded or replaced in its entirety, the replacing tariff shall show on its title page that it supersedes a tariff on file and the number being superseded or replaced, for example:

ISCC TARIFF NO._____

SUPERSEDES ISCC TARIFF NO._____

(3) When a partial tariff amends or adds to an original or amended tariff already on file, the partial tariff shall show on each amending page the designation of the original tariff and the number of any preceding amendment thus amended, for example:

AMENDS ISCC TARIFF NO._____

(Name of Public Utility)

EFFECTIVE_____

(4) When a new part of a tariff eliminates an existing part of a tariff it shall so state and clearly indicate the part eliminated.

(5) Any tariff modifications as defined above shall be marked in the right hand margin of the replacing tariff sheet with symbols as here described to indicate the place, nature and extent of the change in text.

— Symbols —

(C) — Changed regulation

(D) — Discontinued rate or regulation

(I) — Increase in rate or new treatment resulting in increased rate

(N) — New rate, treatment or regulation

(R) — Reduction in rate or new treatment resulting in reduced rate

(T) — Change in text only

c. All sheets except the title page shall have, in addition to the above-stated requirements the following further information:

(1) Name of utility under which shall be set forth the words "ISCC TARIFF". If the utility is not a corporation, and a trade name is used, the name of the individual or partners must precede the trade name.

(2) Issuing official, title and issue date.

(3) Effective date.

20.2 (5) *Content of tariffs.*

a. A table of contents containing a list of rate schedules and other sections in the order in which they appear showing the sheet numbers of the first page of each rate schedule or other section. In the event the utility filing the tariff elects to segregate a section such as general rules and regulations from the section containing the rate schedules or other sections, it may at its option prepare a separate table of contents for each such segregated section.

b. A preliminary statement containing a brief general explanation of the utility's operations.

c. All rates for service with indication for each rate of the type and voltage of service and the class of customers to which each rate applies. There shall also be shown any limitations on loads and type of equipment which may be connected, the prices per unit of service, and the number of units per billing period to which the prices apply, the period of billing, the minimum bill, any effect of transformer capacity upon minimum bill or upon the number of KWH in any step of

the rate, method of measuring demands, method of calculating or estimating loads in cases where transformer capacity has a bearing upon minimum bill or size of rate steps, and any special terms and conditions applicable. The discount for prompt payment or penalty for late payment, if any, and the period during which the net amount may be paid shall be specified.

d. The voltage and type of service, (direct current or single or polyphase alternating current) supplied in each municipality, but without reference required to any particular part thereof.

e. Forms of standard contracts required of customers for the various types of service available.

f. If service to other utilities or municipalities is furnished at a standard filed rate, either a copy of each signed contract or a copy of the standard uniform contract form together with a summary of the provisions of each signed contract. The summary shall show the principal provisions of the contract and shall include the name and address of the customer, the points where energy is delivered, rate, term, minimum, load conditions, voltage of delivery, and any special provisions such as rentals. Standard contracts for such sales as that of energy for resale, street lighting, municipal athletic field lighting, and for water utilities may be filed in summary form as above outlined.

g. Copies of special contracts for the purchase, sale, or interchange of electrical energy.

h. List of towns, cities, and unincorporated communities where urban rates are applicable, and a list of all communities in which service is furnished at other rates.

i. The list of service areas and the rates shall be filed in such form as to facilitate ready determination of the rates available in each municipality and in such unincorporated communities as have service at urban rates. If the utility has various rural rates, the areas where the same are available shall be indicated.

j. Definitions of classes of customers.

k. Extension rules for extending service to new customers indicating what portion of the extension or cost thereof will be furnished by the utility; and if the rule is based on cost, the items of cost included.

l. Type of construction which the utility requires the customer to provide if in excess of the Iowa electric safety code or the requirements of the municipality having jurisdiction, whichever may be the most stringent in any particular.

m. Specification of such portion of service as the utility furnishes, owns, and maintains, such as service drop, service entrance cable or conductors, conduits, service entrance equipment, meter, and socket. Indication of the portions of interior wiring such as range or water heater connection, furnished in whole or in part by the utility, and statement indicating final ownership and responsibility for maintaining equipment furnished by utility.

n. Statement of the type of special construction commonly requested by customers which the utility allows to be connected, and terms upon which such construction will be permitted, with due provision for the avoidance of unjust discrimination as between customers who request special construction and those who do not. This applies, for example, to a case where a customer desires underground service in overhead territory.

o. Rules with which prospective customers must comply as a condition of receiving service, and the terms of contracts required.

p. Rules governing the establishment of credit by customers for payment of service bills.

q. Rules governing the procedure followed in disconnecting and reconnecting service.

r. Notice by customer required for having service discontinued.

s. Rules covering temporary, emergency, auxiliary, and stand-by service.

t. Rules covering the type of equipment which may or may not be connected, including rules such as those requiring demand-limiting devices or power-factor corrective equipment.

u. General statement of the method used in making adjustments for wastage of electricity when accidental grounds exist without the knowledge of the customer.

v. A statement indicating the minimum number of days allowed for payment

of the gross amount of the customer's bill before service will be discontinued for nonpayment.

w. Each utility shall develop a plan, acceptable to the commission, for the extensions of facilities, where they are in excess of those included in the regular rates for service and for which the customer shall be required to pay all or part of the cost as provided in section 20.3 (8) of these rules. The complete text of this accepted plan shall be included in the tariff as filed with the commission.

x. The name, title, address, and telephone number of the person authorized to receive, act upon and respond to communications from the commission in connection with:

(1) General management duties.

(2) Customer relations (complaints).

(3) Engineering operations.

(4) Meter tests and repairs.

(5) Emergencies during non-office hours.

(6) Franchises for electric lines.

20.2 (6) *Annual, periodic and other reports to be filed with the commission.*

a. System map verification. The utility shall file annually a verification that it has a currently correct set of utility system maps in accordance with general requirement 20.3 (10) and a statement as to the location of the utility's offices where such maps are accessible and available for examination by the commission or its agents. The verification and map location information shall also be reported to the commission upon other occasions when significant changes occur in either the maps or location of the maps.

b. Accident reports. Any person, company, corporation, city or town operating electric supply lines shall report in writing to the commission, all accidents to employees or other persons resulting in fatalities or second and/or third degree burns involving several areas or an extensive area of the body surface caused by contact with energized parts of an electric supply line, and fatal accidents and/or fractures, dislocations or internal injuries resulting from a fall or from other causes and accidents resulting in property loss in excess of $10,000; such written report shall indicate the following information:

(1) The name, address and age of the person or persons involved in the accident.

(2) The time and place where the accident occurred.

(3) Description of injuries including extent, severity and location on injured person(s).

(4) The cause of the accident in detail.

(5) The name of the individual, company, corporation, city or town operating the electric supply line.

c. Notice of accident. Prompt notice, by telephone or telegraph shall be given to the electrical engineering section of the commission during office hours by the utility of any electrical utility accident as hereinbefore defined which has resulted in a human fatality.

Prompt notice, by telephone or telegraph shall be given to the electrical engineering section of the commission during office hours by the utility in the event of an interruption of electric service, other than scheduled interruptions, for one hour or longer period of time to an important portion of the utility's electrical service customers.

d. Each utility shall compile a monthly record of electric service showing the production, acquisition and disposition of electric energy, the number of customer terminal voltage investigations made, the number of customer meters tested and such other information as may be required by the commission. The monthly "Electric Service" record shall be compiled not later than 30 days after the end of the month covered and such record shall, upon and after compilation, be kept available for inspection by the commission or its staff at the utility's principal office within the state of Iowa. A summary of the 12 monthly "Electric Service" records for each calendar year shall be attached to and submitted with the utility's annual report to the commission.

e. The utility shall keep the commission informed currently by written notice as to the location at which the utility keeps the various classes of records required by these rules.

f. A copy of the utility's current rules, if any, published or furnished by

the utility for the use of engineers, architects, electrical contractors, etc., covering meter and service installations shall be filed with the commission.

g. A copy of each type of customer bill form in current use shall be filed with the commission.

20.3 (490A) General service requirements.

20.3 (1) *Disposition of electricity.* All electricity sold by a utility shall be on the basis of meter measurement except for temporary service installations where the load is constant and the consumption may be readily computed, or as provided for in its filed rates.

Wherever practicable, consumption of electricity within the utility itself, or by administrative units associated with it, shall be metered.

No part of the electric service supplied to a customer's premises (except those premises at which submetering or resale of service was permitted prior to the first effective date of these rules) shall be resold to any third party except as an undefined part of a fixed rental without the specific written consent and agreement of the utility serving the premises and any utility operating under such an agreement or entering into such an agreement shall file a copy of each such agreement as a part of its tariff filing with the commission.

20.3 (2) *Condition of meter.* No meter shall be installed or continued in service which is known to be mechanically or electrically defective, or to have incorrect constants or which has not been tested, and adjusted if necessary, in accordance with rules herein. The capacity of the meter and the index mechanism should be consistent with the electric requirements of the customer.

20.3 (3) *Meter reading records.* The meter reading records shall show:

a. Customer's name, address, and rate schedule or identification of rate schedule.

b. Identification of the meter or meters either by permanently marked utility number or by manufacturer's name, type number and serial number.

c. Meter readings.

d. If the reading has been estimated.

e. Any applicable multiplier or constant.

20.3 (4) *Meter charts.* All charts taken from recording meters shall be marked with the initial and final date and hour of the record, the meter identification, customer's name and location and the chart multiplier.

20.3 (5) *Meter multiplier.* If it is necessary to apply a multiplier to the meter readings, the multiplier must be marked on the face of the meter register or stenciled in weather resistant paint upon the front cover of the meter in the following manner, X 100, or X 20.

20.3 (6) *Meter reading and billing periods.* Readings of all meters used for determining charges to customers shall be scheduled monthly, bimonthly, quarterly or semiannually. An effort shall be made to obtain readings of the meters on corresponding days of each meter reading period. Bills shall be prorated on a daily basis:

a. Whenever, as a result of the connection or disconnection of the customer's service or a change of meter reading dates to serve the utility's convenience, the duration of the meter reading period for any customer is less than 80% of the normal meter reading period and,

b. Whenever, due to any cause, the duration of the meter reading period for any large commercial, large industrial or wholesale customer is less than 80% of the normal meter reading period.

The utility may permit the customer to supply the meter readings on a form supplied by the utility. Unless the utility has a plan to test check meter readings a utility representative will read the meter at least once each twelve months. At the request of the customer the utility will read the meter upon the beginning or termination of service.

In the event that the utility leaves a meter reading form with the customer when access to meters cannot be gained and the form is not returned in time for the billing operation, an estimated bill may be rendered.

If an actual meter reading cannot be obtained, the utility may render an estimated bill without reading the meter or supplying a meter reading form to the customer. Only in unusual cases or when

approval is obtained from the customer shall more than three consecutive estimated bills be rendered.

20.3 (7) *Demand meter registration.* When a demand meter is used for billing, the meter installation should be designed so that the highest expected annual demand reading to be used for billing will appear in the upper half of the meter's range.

20.3 (8) *Extension plan.* Each utility shall develop a plan, acceptable to the commission, for the installation of extensions of main and service lines where such facilities are in excess of those included in the regular rates for service and for which the customer shall be required to pay all or part of the cost. No utility shall make or refuse to make any extensions except as permitted by these rules and regulations.

20.3 (9) *Co-operation and advance notice.* In order that full benefit may be derived from these rules and in order to facilitate their proper application, all utilities between whose facilities co-ordination may now or later be necessary, shall observe the following co-operative practices:

a. Each utility shall give to other utilities in the same general territory advance notice of any construction or change in construction or in operating conditions of its facilities involved or likely to be involved, in situations of proximity, provided, however, that the requirements of this rule shall not apply in case of routine extensions or minor changes in the local distribution facilities.

b. To assist in promoting conformity with these rules, an arrangement shall be established between all utilities, whose facilities may occupy the same general territory, providing for the interchange of pertinent data and information including that relative to proposed and existing construction and changes in operating conditions involved or likely to be involved in situations of proximity.

20.3 (10) *Maps.* Each utility shall maintain a currently corrected map or set of maps showing the physical location of its electric lines and stations in the area in which it supplies electric power and of the electric transmission facilities interconnecting such areas and all such maps shall be continuously accessible and available for examination by the commission or its agents at the utility's designated offices during the utility's regular office hours. The utility shall maintain maps or records showing:

a. Generating stations with capacity designation.

b. Purchased power supply points with maximum contracted capacity designation.

c. Purchased power metering points if located at other than power delivery point.

d. Transmission lines with size and type of conductor designation and operating voltage designation.

e. Transmission-to-transmission voltage transformation substations with transformer voltage and capacity designation.

f. Transmission-to-distribution voltage transformation substations with transformer voltage and capacity designation.

g. Distribution lines with size and type of conductor designation, phase designation and voltage designation.

h. Post-office names of all municipalities where retail electric service is supplied.

i. Post-office names of all municipalities to which the utility furnishes wholesale-for-resale electric power service.

j. All points at which transmission, distribution or secondary lines of the utility cross Iowa state boundaries.

k. The maps shall otherwise conform to any mapping standards presently adhered to by the reporting utility.

20.3 (11) The requirement as to accessibility and availability to the commission may be fulfilled.

a. In the case of maps showing generating and transmission features only by keeping a currently correct copy of such map or maps on file at the commission office.

b. In the case of maps showing distribution features only or in the case of maps showing all features of the utilities system, by keeping a currently correct copy of such map or maps on file at utility offices centrally located with respect to the part of the state covered by the map.

20.4 (490A) Customer relations.

20.4 (1) *Customer information.* Each utility shall:

a. Maintain up-to-date maps, plans, or records of its entire transmission and distribution systems, together with such other information as may be necessary to enable the utility to advise prospective customers, and others entitled to the information, as to the facilities available for serving prospective customers in its service area.

b. Assist the customer or prospective customer in selecting the most economical rate schedule available for his proposed type of service.

c. Notify customers affected by a change in rates or schedule classification in the manner provided in the rules of practice and procedure before the commission.

d. Post a notice in a conspicuous place in each office of the utility where applications for service are received, informing the public that copies of the rate schedules and rules relating to the service of the utility, as filed with the commission, are available for inspection.

e. Upon request, inform its customers as to the method of reading meters.

f. Furnish such additional information as the customer may reasonably request.

20.4 (2) Employees responsible for the receiving of customer telephone calls and customer office visits shall be properly qualified and instructed in the screening and prompt handling of complaints to assure prompt reference of the complaint to the person or department capable of effective handling of the matter complained of and to obviate the necessity of the customer's preliminary repetition of the entire complaint to employees lacking in ability and authority to take appropriate action.

20.4 (3) *Customer deposits.* Each utility may require from any customer or prospective customer a deposit intended to guarantee payment of bills for service. Such deposit shall not be less than $5.00 nor more in amount than the maximum estimated charge for service for two consecutive billing periods or 90 days, whichever is less, or as may reasonably be required by the utility in cases involving service for short periods or special occasions.

20.4 (4) *Interest on deposit.* Accrued simple interest on deposits at the rate of at least 5% per annum shall be paid by the utility to each customer required to make such a deposit for the time held by the utility. Interest shall be paid from the date of deposit to the date of refund or the date upon which the customer's account becomes delinquent, whichever is earlier, unless such period be less than six months. Payment of the interest to the customer may be made annually, or at the time the deposit is returned.

The deposit shall cease to draw interest on the date it is returned, on the date upon which the customer's account becomes delinquent, or on the date notice is sent to the customer's last known address that the deposit is no longer required.

20.4 (5) Each utility shall keep records to show:

a. The name and address of each depositor.

b. The amount and date of the deposit.

c. Each transaction concerning the deposit.

20.4 (6) Each utility shall issue a receipt of deposit to each customer from whom a deposit is received, and shall provide means whereby a depositor may establish his claim if his receipt is lost.

20.4 (7) The deposit may be refunded upon request of the customer after twelve consecutive months of prompt payment, and, without such request, shall be refunded by the utility after thirty-six consecutive months of prompt payment unless the utility has evidence to indicate that the deposit is necessary to insure payment of bills for service. The deposit shall be refunded when the customer has paid the final billing upon termination of his service.

20.4 (8) A record of each unclaimed deposit must be maintained for at least three years, during which time the utility shall make a reasonable effort to return the deposit. Unclaimed deposits, together with accrued interest, shall be credited to an appropriate account.

20.4 (9) A new or additional deposit may be required upon reasonable written notice of the need for such a requirement in any case where a deposit has been refunded or is found to be inadequate to cover the amount as provided for in 20.4 (3) above, or where a customer's credit standing is not satisfactory to the utility. The service of any customer who fails to comply with these requirements may be disconnected upon five days written notice.

20.4 (10) *Customer bill forms.* Each customer shall be informed as promptly as possible following the reading of his meter, on bill form or otherwise, the following:

a. The reading of the meter at the beginning and at the end of the period for which the bill is rendered.

b. The dates on which the meter was read, at the beginning and end of the billing period.

c. The number and kind of units metered.

d. The applicable rate schedule, or identification of the applicable rate schedule.

e. The gross and net amount of the bill. In the case of prepayment meters, the amount of money collected shall be shown.

f. The date by which the customer must pay the bill in order to benefit from any discount or to avoid any penalty.

g. A distinct marking to identify an estimated bill.

h. A distinct marking to identify a minimum bill.

i. Any conversions from meter reading units to billing units, or any calculations to determine billing units from recording or other devices, or any other factors, such as fuel cost and amount of sales tax adjustments used in determining the bill.

20.4 (11) *Customer billing information alternate.* In lieu of the complete display of such information on the bill, a statement shall be supplied to the customer on the bill form or otherwise advising that such information can be obtained by contacting the utility's local office.

20.4 (12) *Customer records.* The utility shall retain records as may be necessary to effectuate compliance with rules 20.4 (13) and 20.6 (6), but not less than three years. Records for customer shall show where applicable:

a. KWH meter reading
b. KWH consumption
c. KW meter reading
d. KW measured demand
e. KW billing demand
f. Total amount of bill.

20.4 (13) *Adjustment of bills.* Whenever a meter creeps or whenever a metering installation is found upon any test to have an average error of more than 2.0 percent; or a demand metering error of more than 1.5 percent in addition to the errors allowed under accuracy of demand meters; an adjustment of bills for service for the period of inaccuracy shall be made in the case of over-registration and may be made in the case of under-registration. The amount of the adjustment shall be calculated on the basis that the metering equipment should be 100% accurate with respect to the testing equipment used to make the test. For watt-hour meters, the average accuracy shall be the arithmetic average of the percent registration at light load and at heavy load, giving the heavy load registration a weight of four and the light load registration a weight of one.

20.4 (14) *Determination of adjustment.* If the date when the error in registration began can be determined, such date shall be the starting point for determination of the amount of the adjustment except that adjustments due to slow meters shall be limited to the preceding six-month period as in the paragraph below.

If the date when the error in registration began cannot be determined, it shall be assumed that the error has existed for a period equal to one-half of the time elasped since the meter was installed or one-half of the time elasped since the last previous test, or July 4, 1963, whichever is later, except as otherwise provided in the paragraph below, covering error in registration due to creep. Adjustments due to slow meter shall be limited to the preceding six months except that a longer period may be authorized by the commission.

Recalculation of bills shall be on the basis of actual monthly consumption except that if service has been measured by self-contained single-phase meters or three-wire network meters and involves no billing other than for kilowatt-hours, the re-

calculation of bills may be based on the average monthly consumption determined from the most recent thirty-six months consumption data.

The error in registration due to creep shall be calculated by timing the rate of creeping and assuming that this creeping affected the registration of the meter for 25.0% of the time since the meter was installed or since the last previous test, whichever is later.

When the average error cannot be determined by test because of failure of part or all of the metering equipment, it shall be permissible to use the registration of check metering installations, if any, or to estimate the quantity of energy consumed based on available data. The customer must be advised of the failure and of the basis for the estimate of quantity billed. The same periods of error shall be used as defined in paragraphs above.

20.4 (15) *Refunds.* If the recalculated bills indicate that more than $1.00 is due an existing customer or $2.00 is due a person no longer a customer of the utility, the full amount of the calculated difference between the amount paid and the recalculated amount shall be refunded.

Refunds shall be made to the two most recent consumers who received service through the meter found to be in error. In the case of a previous consumer who is no longer a customer of the utility, a notice of the amount due shall be mailed to such previous consumer at his last-known address, and the utility shall upon demand made within three months thereafter refund the same.

20.4 (16) *Back billing.* If the recalculation of billing indicates that an amount due the utility is equal to or in excess of amounts set forth in rule 20.4 (15) above as minimum refunds, the utility may bill the customer for the amount due.

Each utility may establish a policy whereby the minimum sum above which it will commence back billing for amounts due to under-registration is in excess of the amounts set forth in rule 20.4 (15) above as minimum refunds. In such cases the minimum sum established as the amount above which the utility will commence back billing shall determine in all cases of under-registration whether the customer will be billed for the amount due the utility because of under-registration.

a. When a customer has been overcharged as a result of incorrect reading of the meter, incorrect application of the rate schedule, incorrect connection of the meter or other similar reasons, the amount of the overcharge shall be adjusted, refunded or credited to the customer.

b. When a customer has been undercharged as a result of incorrect reading of the meter, incorrect application of the rate schedule, incorrect connection of the meter or other similar reasons, the amount of the undercharge may be billed to the customer.

20.4 (17) *Reasons for denying and discontinuing service.* Service may be refused or discontinued for any of the reasons listed below. Unless otherwise stated, the customer shall be allowed a reasonable time in which to comply with the rule before service is discontinued. No service shall be disconnected on the day preceding a day or days on which the utility's business office is closed, except as provided in the rules 20.4 (17) "*a*" and 20.4 (17) "*b*". Service may be refused or discontinued:

a. Without notice in the event of a condition on the customer's premises determined by the utility to be hazardous.

b. Without notice in the event of customer use of equipment in such a manner as to adversely affect the utility's equipment or the utility's service to others.

c. Without notice in the event of tampering with the equipment furnished and owned by the utility.

d. Without notice in the event of unauthorized use.

e. For violation of or noncompliance with the utility's rules on file with the commission.

f. For failure of the customer or prospective customer to furnish such service equipment, permits, certificates or rights of way as are specified to be furnished, in the utility's rules filed with the commission, as conditions of obtaining service, or for the withdrawal of that same equipment or for the termination of those same permissions or rights, or for the failure of the customer or prospective customer to fulfill the contractual obliga-

tions imposed upon him as conditions of obtaining service by any contract filed with and subject to the regulatory authority of the commission.

g. For failure of the customer to permit the utility reasonable access to its equipment.

h. For nonpayment of bill provided that the utility has made a reasonable attempt to effect collection and has given the customer written notice that he has at least five days, excluding Sundays and holidays, in which to make settlement on his account or have his service discontinued or denied.

i. For failure of the customer to provide the utility with a deposit as authorized by rule 20.4 (3).

20.4 (18) *Insufficient reasons for denying service.* The following shall not constitute sufficient cause for refusal of service to a present or prospective customer:

a. Delinquency in payment for service by a previous occupant of the premises to be served.

b. Failure to pay for merchandise purchased from the utility.

c. Failure to pay for a different type or class of public utility service.

d. Failure to pay the bill of another customer as guarantor thereof.

e. Failure to pay a back bill rendered in accordance with rule 20.4 (16).

f. Failure to pay a bill rendered in accordance with rule 20.4 (16) "*b*".

20.4 (19) *Estimated demand.* Upon request of the customer and provided the customer's demand is estimated for billing purposes, the utility shall measure the demand during the customer's normal operation and use the measured demand for billing.

20.4 (20) *Servicing utilization control equipment.* Each utility shall service and maintain any equipment it uses on customer's premises and shall correctly set and keep in proper adjustment any thermostats, clocks, relays, time switches or other devices which control the customer's service in accordance with the provisions in the utility's rate schedules.

20.4 (21) *Customer complaints.* Complaints concerning the charges, practices, facilities or service of the utility shall be investigated promptly and thoroughly. The utility shall keep such records of customer complaints as will enable it to review and analyze its procedures and actions.

20.4 (22) *Temporary service.* When the utility renders temporary service to a customer it may require that the customer bear all the cost of installing and removing the service facilities in excess of any salvage realized.

20.4 (23) *Change in type of service.* If a change in the type of service, such as from 25- to 60-cycle or from direct or alternating current, or a change in voltage to a customer's substation, is effected at the insistence of the utility and not solely by reason of increase in the customer's load or change in the character thereof, the utility shall share equitably in the cost of changing the equipment of the customer affected as determined by the commission in the absence of agreement between utility and customer. In general, the customer should be protected against or reimbursed for the following losses and expenses to an appropriate degree:

a. Loss of value in his electrical power utilization equipment.

b. Cost of changes in wiring, and

c. Cost of removing old and installing new utilization equipment.

20.5 (490A) Engineering practice.

20.5 (1) *Requirement for good engineering practice.* The electric plant of the utility shall be constructed, installed, maintained and operated in accordance with accepted good engineering practice in the electric industry to assure, as far as reasonably possible, continuity of service, uniformity in the quality of service furnished, and the safety of persons and property.

20.5 (2) *Acceptable standards.* The utility shall use the applicable provisions in the publications listed below as standards of accepted good practice unless otherwise ordered by the commission.

a. Iowa Electrical Safety Code.

b. National Electrical Code, NFPA No. 70, ASA C-1-7-24-62.

c. American Standard Code for Electricity Metering, ASA C-12 — 1965.

d. American Standard Requirements, Terminology and Test Code for Instrument Transformers, ASA C57.13 — 1954.

20.5 (3) *Adequacy of supply and reliability of service.* The generating capacity of the utility's plant, supplemented by the electric power regularly available from other sources, must be sufficiently large to meet all normal demands for service and provide a reasonable reserve for emergencies.

In appraising adequacy of supply the commission will segregate electric utilities into two classes, viz., those having high capacity transmission interconnections with other electrical utilities and those which lack such interconnection and are therefore completely dependent upon the firm generating capacity of the utility's own generating facilities.

a. In the case of utilities having interconnecting ties with other utilities, the commission will, upon appraising adequacy of supply, take appropriate notice of the utility's recent past record, as of the date of appraisal, of any widespread service interruptions and any capacity shortages along with the consideration of the supply regularly available from other sources, the normal demands, and the required reserve for emergencies.

b. In the case of noninterconnected utilities the commission will give attention to the maximum total coincident customer demand which could be satisfied without the use of the single element of plant equipment, the disability of which would produce the greatest reduction in total net plant productive capacity and also give attention to the normal demands for service and to the reasonable reserve for emergencies.

20.5 (4) *Electric transmission and distribution facilities.* The utility's electrical transmission and distribution facilities shall be designed, constructed, maintained and electrically re-enforced and supplemented as required to reliably perform the power delivery burden placed upon them in the storm and traffic hazard environment in which they are located. Each utility shall carry on an effective preventive maintenance program and shall be capable of emergency repair work on a scale which its storm and traffic damage record indicates as appropriate to its scope of operations and to the physical condition of its transmission and distribution facilities.

In appraising the reliability of the utility's transmission and distribution system the commission will consider the condition of the physical property and the size, training, supervision, availability, equipment and mobility of the maintenance forces all as demonstrated in actual cases of storm and traffic damage to the facilities.

20.5 (5) *Inspection of electric plant.* Each utility shall adopt a program of inspection of its electric plant in order to determine the necessity for replacement and repair. The period between inspections of various elements of the plant shall be based on the utility's experience and accepted good practice in the industry. Each utility shall keep sufficient records to give evidence of compliance with its inspection program.

20.6 (490A) Meter tests.

20.6 (1) *Request tests.* Upon request by a customer, the utility shall make a test of the meter serving him, provided that such tests need not be made more frequently than once in twelve months. The customer, or his representative, may be present when his meter is tested. If the meter is found accurate under the provisions of rule 20.4 (13) the utility may charge the consumer not to exceed five dollars or the actual cost of such test whichever is lesser.

A report of the results of the test shall be made to the customer within a reasonable time after the completion of the test, and a record of each test shall be kept on file at the office of the utility.

Any additional test of a customer meter requested to be made within the twelve months next following a request test of the same meter shall be a referee test as hereinafter provided unless the utility voluntarily agrees to make such an additional test as a request test.

20.6 (2) *Referee tests.* Upon written application transmitted by certified or registered mail to the commission by a customer or a utility, a test will be made of the customer's meter as soon as practicable under the observation of a representative of the commission.

A customer's application for a referee test shall be accompanied by a certified

check or money order made payable to the utility in the amount of ten dollars.

On receipt of such request from a customer the commission will forward the deposit to the utility and will notify the utility of the requirement for the test and the utility shall not knowingly remove or adjust the meter until instructed by the commission. The utility shall furnish all instruments, load devices and other facilities necessary for the test and shall perform the test in the presence and under the observation of the commission's representative and shall furnish verification of the accuracy of test instruments used.

If upon test the meter is found to overregister to an extent requiring a refund under the provisions of rule 20.4 (13), the amount paid to the utility for the test shall be returned to the customer by the utility. The customer, or his representative, may be present when his meter is tested. The commission will make a written report of the results of the test to the customer and to the utility.

20.6 (3) *Preinstallation inspections and tests.* Every meter and associated device shall be inspected and tested before being placed in service, and the accuracy of each meter shall be certified to be within the tolerance permitted by rule 20.6 (12). A meter manufacturer's certification approved by the commission and supplemented by an acceptable statistical sampling program shall suffice for this purpose.

If a meter is removed from a customer's premises, except for field testing, it must be inspected and tested as above, before it is again placed in service.

20.6 (4) *Postinstallation inspections.* These inspections are made to determine proper operation and wiring connections and must be made within 60 days after installation by a qualified person who, whenever possible, should be someone other than the original installer. The following equipment is subject to postinstallation inspections:

a. Meters associated with instrument transformers, excluding single-phase current transformer metering installations, or phase shifting transformers together with all such associated equipment.

b. Kilovar-hour meters.

c. Demand meters.

d. Direct current watt-hour meters.

20.6 (5) *As found tests.* All meters and all associated devices shall be tested after they are removed from service. Such tests shall be made before the meters or associated devices are adjusted, repaired, returned to active service or retired.

20.6 (6) *In-service performance tests.* In-service performance tests must be made in accordance with rules 20.6 (7), 20.6 (8), or 20.6 (9). These tests may be made on the customer's premises or in the utility's meter shop. However, it is recommended that meters associated with instrument transformers, or phase shifting transformers, or those having mechanical contact devices, be tested on the customer's premises. Tests made for other purposes, such as request or referee tests, shall not be counted as in-service performance tests.

All self-contained single-phase meters and three-wire network meters on a utility's system must be tested in accordance with a single program, which must be one of the following:

a. At a fixed periodic interval, see 20.6 (7).

b. At a variable interval, see 20.6 (8).

c. By statistical sampling, see 20.6 (9).

20.6 (7) *Periodic test schedule.* In the test intervals specified below the word "years" means calendar years and the word "month" means calendar months. The basic periodic test interval shall not be longer than provided for in the following schedule:

a. Alternating current watt-hour meters:

(1) Meters used with instrument transformers

Polyphase meters -- 4 years
Single-phase meters - 8 years

(2) Self-contained polyphase meters ---------- 6 years

(3) Self-contained single-phase meters and three-wire network meters ---------- 8 years

b. Direct current watt-hour meters:

(1) Up to and including 6 KW ---------- 42 months

(2) Over 6 KW up to and including 100 KW ------- 18 months

(3) Over 100 KW --- 12 months

c. Var-hour meters: Same as the schedule for associated watt-hour meters.

d. Demand meters:

(1) Integrated (block interval) demand meters including demand registers and associated control devices: Same as the schedule for associated watt-hour meters, but not to exceed six years.

(2) Lagged demand meters: Same as the schedule for associated watt-hour meters.

e. Secondary standards:

(1) Portable rotating standard watt-hour meters ---- 12 months

(2) Indicating voltmeters ---------- 12 months

(3) Instrument transformers ---------- 10 years

f. Working standards and instruments:

(1) Portable rotating standard watt-hour meters — induction type ---------- 2 weeks

(2) Indicating voltmeters ---------- 3 months

(3) Instrument transformers ---------- 10 years

20.6 (8) *Variable interval plan.* The variable interval plan described below may be used for testing self-contained single-phase meters and three-wire network meters.

The meters shall be divided into homogeneous groups such as by manufacturers' types, and may be further subdivided in accordance with location or other factors which may be disclosed by test records to have an effect on the percentage registration of the meters. Subsequently, groupings may be modified or combined if justified by the performance records. The meters to be tested shall be those longest in service without test.

The percentage, P, of meters to be tested in each group during the current year is dependent upon the number of meters which on in-service test during the preceding year were found to have a percentage registration of more than 102% or less than 98%.

The maximum value of P shall be 25% and the minimum value shall be not less than:

a. 5% for a group of 2,000 or more meters.

b. 100 meters or 12½%, whichever is less, for a group of fewer than 2,000 meters.

The values of P between the maximum and minimum shall be determined from the formula

$$P = K\left(\frac{100\ (F + S)}{T} - 1\right)$$

Where:

T = total number of meters tested in the group during the preceding year,

F = number of meters in this group which registered more than 102%,

S = number of meters in this group which registered less than 98%, and

K = an empirical constant selected to provide for the test of a sufficient number of meters in the group to insure that an acceptable standard of performance is being maintained. The value of K = 6.25 is recommended as an empirical constant which will accomplish this end.

The variable interval plan shall be accompanied by a liberal policy for testing meters on request and a procedure whereby unusually high or low bills for service will be detected and investigated and any utility proposing to use this plan shall submit information to the commission as to its method of detection and investigation of unusually high and low bills and obtain the commission's approval before adopting or continuing use of the variable interval plan.

20.6 (9) *Statistical sampling.* Statistical sampling for self-contained single-phase meters and three-wire network meters may be used in lieu of periodic or variable interval testing upon approval by the commission. The program used shall conform to accepted principles of statistical sampling based on either variables or attributes methods and should be evaluated by impartial mathematical statisticians.

A statistical sampling program shall include an adequate policy for testing meters on request and a procedure, approved by the commission, whereby unusually high or low bills for service would be detected and investigated. The meters shall be divided into homogeneous groups such as by manufacturer's types, and may be further subdivided in accordance with location or other factors which may be disclosed by test records to have an effect on the percentage registration of the meters.

Subsequently, groupings may be modified or combined if justified by the performance records. A sample shall be taken each year from each homogeneous group. It is extremely important that each meter in the sample be drawn at random. Every meter in the group must have an equal chance to be drawn. In order to accomplish this aim it is advisable to use a table of random numbers as an aid in assembling the sample.

The sample taken each year shall be of sufficient size to demonstrate with reasonable assurance the condition of the group from which the sample is drawn. A minimum sample size should be specified and may be expressed as a combination of a number and percentage, such as, "100 meters or 12½%, whichever is less." The sampling plan shall contain a table of mathematically calculated sample sizes and related constants for determining the characteristics of the homogeneous group, accompanied by curves for determining the risk of making an incorrect decision. An acceptable sampling plan is one in which a sample will, 95 times out of 100, correctly identify a homogeneous group of meters which has at least 97.5% of the group within the limits 98%-102% registration on in-service performance test. Plans based on the variables method shall use a sample of at least 100 meters, and plans based on the attributes method shall use a sample of at least 300 meters; however, except for corrective procedures, the sample size need not exceed 10% of the group. If a group of meters does not meet the acceptable performance criteria, then corrective action must be taken.

The corrective action shall consist of either an accelerated test program to raise the accuracy performance of the group to acceptable standards or removing the group from service. An accelerated test program shall provide for testing at rates which vary in accordance with the calculated percentage of defective meters in rejected groups. In its application to an individual group the rate of testing shall be such that the required corrective action is completed within four years unless a longer period is authorized by the commission, but not more than 25% of the meters in the group need to be tested in any one year. Accelerated testing may be discontinued when the test results indicate that the rejected group is within acceptable limits.

Records shall be maintained and tabulated to indicate the number of meters in each homogeneous group in service at the beginning of each year, the number of meters making up the sample for each homogeneous group, the test results for each group, and any necessary corrective action taken.

20.6 (10) *Instrument transformer tests.* Instrument transformers shall be tested:

a. When first received.

b. When removed from service.

c. Upon complaint.

d. When there is evidence of damage.

e. Whenever an approved check, such as the variable burden method in the case of current transformers, made whenever the meter is tested, indicates that a quantitative test is required.

20.6 (11) *Generating station meter tests.* Generator output wattmeters in the utility's generating stations shall be tested according to a suitable schedule by comparison with the utility's working standards.

20.6 (12) *Test procedures and accuracies.* Meters and/or associated devices shall be tested at the loads indicated below and, when found to exceed the tolerances prescribed below, shall be adjusted as close as practicable to zero error. The test of any unit of metering equipment shall consist of a comparison of its accuracy with the accuracy of a standard. The commission will use the applicable provisions of the American Standard Code for Electricity Metering ASA C12, as criteria of accepted good practice.

a. Alternating current watt-hour meters.

(1) Shop tests

Test Load as Approximate Percentage

OF TEST CURRENT	POWER FACTOR	TOLERANCES
100	1.0	±1.0%
10	1.0	±1.0%
100	0.5	±2.0%

(2) Field tests

Test Load as Approximate Percentage

OF TEST CURRENT	POWER FACTOR	TOLERANCES
100	1.0	±1.0%
10	1.0	±1.0%

b. Direct current watt-hour meters.

Test Load as Approximate Percentage

OF TEST CURRENT	TOLERANCES
100	±1.5%
10	±1.5%

c. Demand meters.

(1) Integrated (block interval) demand meters.

Demand meters which are direct driven shall be tested at a load point no less than 50% of full scale. Tests shall be continuous for at least one demand interval and shall be started simultaneously with the demand interval of the demand meter.

Demand meters which are actuated by impulses shall be tested by transmitting enough impulses to cause the meter to register at a load point no less than 50% of full scale. If an impulse actuated demand meter is equipped with a device which records the number of impulses received by the meter, and if there is frequent and accurate comparison of such record with the number of kilowatt hours registered on the associated watt-hour meter, then it is not necessary to make a periodic field test of the demand meter.

Demand meters shall be adjusted to indicate zero under no-load conditions, and shall be checked to ascertain that the meter resets to zero. Impulse devices associated with demand meters must be checked for proper operation. The demand meter shall have an accuracy of within 2% of full scale. The time interval must be accurate within 0.5% for synchronous motor timing elements and within 2% for mechanical clock timing elements. Meters recording demand readings on a chart which provides a record of the time at which the demand occurs shall be accurate to within plus or minus four minutes in twenty-four hours.

(2) Lagged demand meters.

Demand meters shall be tested at a load point no less than 50% of full scale.

Demand meters shall be adjusted to indicate zero under no-load conditions with potential applied.

The demand meter shall have an accuracy within 3% of full scale.

Meters recording demand readings on a chart which provides a record of the time at which the demand occurs shall be accurate to within plus or minus 4 minutes in 24 hours.

d. Instrument transformers.

All current and potential transformers shall be tested in accordance with the procedures prescribed in American Standards Association Code ASA C57.13. Any utility unable to perform the above test due to a lack of proper equipment may have its instrument transformers tested by another utility whose testing equipment conforms to the requirements of the commission. In lieu of utility testing of instrument transformers the commission will accept the certificate of test as furnished by the manufacturer.

Current or potential transformers shall not be installed in metering service if their accuracy does not fall within the 0.6 accuracy class as described in ASA C57.13.

e. Meters for measurement of purchased electricity. Utlities purchasing electricity from nonutilities or from utilities outside the state must verify that the instruments and meters which are necessary to furnish complete and accurate information as to the energy purchased are installed and tested in accordance with the requirements of the commission.

20.6 (13) *General.* All meters and associated devices, when tested, shall be adjusted as closely as practicable to the condition of zero error. All tolerances are to be interpreted as maximum permissible variations from the condition of zero error. In making adjustments, no advantage of the prescribed tolerance limits shall be taken.

Meters shall not "creep", i.e., there shall be no continuous unidirectional rotation of the moving element of a meter when the meter load wires have been removed and rated voltage is applied to the potential elements of the meter.

20.6 (14) *Facilities and equipment for meter testing.* Each utility shall maintain a meter shop for the purpose of inspecting, testing, and repairing meters. The shop shall be open for inspection by authorized representatives of the commission at all reasonable times, and the facilities and equipment, as well as the methods of measurements and testing employed, shall be subject to the approval of the commission. A utility may, however, have all or part of the required tests, repairs and adjustments made or its portable testing equipment checked by another agency having adequate and sufficient testing equipment to comply with these rules and approved by the commission.

Each meter shop at which the utility conducts tests of meters shall have a voltage supply adequate to make the appropriate tests.

20.6 (15) *Secondary standards.* Each utility shall have at least one portable rotating standard watt-hour meter with a correction of not more than 0.5% at commonly used loads. If the correction percentage varies between successive tests by more than 0.25 a complete check must be made to determine the cause of such variation. If the cause of variation cannot be removed, the use of the instrument shall be discontinued. Secondary standards must be checked periodically (see rule 20.6 (7) "*e*" at the national bureau of standards or at a laboratory acceptable to the commission.

20.6 (16) *Working standards.* Each utility shall have at least one portable rotating standard watt-hour meter with a correction of not more than 0.5% at commonly used loads. If the correction percentage varies between successive tests by more than 0.25 a complete check must be made to determine the cause of such variation. If the cause of variation cannot be removed, the use of the instrument shall be discontinued. Working standards must be checked periodically (see rule 20.6 (7) "*f*" by comparison with a secondary standard in the utility's meter shop.

20.6 (17) Extreme care must be exercised in the handling of standards to assure that their accuracy is not disturbed. Each standard shall be accompanied at all times by a certificate or calibration card, duly signed and dated, on which are recorded the corrections required to compensate for errors found at the customary test points at the time of the last previous test.

20.6 (18) *Records of meters and associated metering devices.* Each utility shall maintain records of the following data, where applicable, for each meter and together with an associated device until retirement:

a. The complete identification — number, type, voltage, amperes, number of wires, number of stators, disk constant (K_h), demand interval, and ratio.

b. The dates of installation and removal from service, together with the location.

c. Primary rating, ratio and burden data for instrument transformers.

20.6 (19) *Meter test records.* Each utility shall maintain records of the last two tests made of any meter. The record of the meter test made at the time of the meter's retirement shall be maintained for a minimum of three years. Test records shall include the following:

a. The date and reason for the test.

b. The reading of the meter before making any test.

c. The accuracy "as found" at light and heavy loads.

d. The accuracy "as left" at light and heavy loads.

e. Statements of repairs made, if any.

20.7 (490A) Standards of quality of service.

20.7 (1) *Standard frequency.* The standard frequency for alternating current distribution systems shall be 60 cycles per second. The frequency shall be maintained within limits which will permit the satisfactory operation of customer's clocks connected to the system.

20.7 (2) *Voltage limits.* Each utility shall adopt and file with the commission, standard nominal service voltages for each of the several areas into which its distribution system or systems may be divided.

20.7 (3) *Secondary voltages.* For all retail service, except power service, the variations of voltage shall be no more than 6% above or below the standard voltage at any time. For retail power service the variation of voltage shall be no more than 10% above or below the standard voltage at any time.

Where three-phase service is provided the utility shall exercise reasonable care to assure that the phase voltages are in balance.

20.7 (4) *Primary voltages.* For service rendered principally for industrial or power purposes the voltage variation shall not exceed 10% above or 10% below the standard nominal voltages as filed in the utility's rules.

For service rendered to public utilities and others for resale, the nominal voltage shall be as mutually agreed upon by the

parties concerned. The allowable variation shall not exceed 7½% above or 7½% below the agreed upon nominal voltage without the express approval of the commission.

The limitations stated in this subsection shall not apply to special contracts in which the customer specifically agrees to accept service with unregulated voltage.

20.7 (5) *Exceptions to voltage requirements.* Voltage outside the limits specified will not be considered a violation when the variations:

a. Arise from the action of the elements.

b. Are infrequent fluctuations not exceeding 5 minutes duration.

c. Arise from service interruptions.

d. Arise from temporary separation of parts of the system from the main system.

e. Are from causes beyond the control of the utility.

20.7 (6) *Voltage surveys and records.* Voltage measurements shall be made at the customer's entrance terminals. For single-phase service the measurement shall be made between the grounded conductor and the ungrounded conductors. For three-phase service the measurement shall be made between the phase wires.

20.7 (7) Each utility shall make a sufficient number of voltage measurements, using recording voltmeters, in order to determine if voltages are in compliance with the requirements as stated in rule 20.7 (2), 20.7 (3), 20.7 (4). All voltmeter records obtained under rule 20.7 (7) shall be retained by the utility for at least two years and shall be available for inspection by the commission's representatives. Notations on each chart shall indicate the following:

a. The location where the voltage was taken.

b. The time and date of the test.

c. The results of the comparison with an indicating voltmeter.

20.7 (8) *Equipment for voltage measurements.*

a. Standards. Each utility shall have available at least one indicating voltmeter with a stated accuracy within 0.25% of full scale. This instrument must be maintained within its stated accuracy.

b. Working instruments. Each utility shall have at least two indicating voltmeters with a stated accuracy within 1.0% of full scale.

c. Each utility must have readily available at least two portable recording voltmeters with a stated accuracy within 1.5% of full scale.

20.7 (9) Standards must be checked periodically (see rule 20.6 (7) "*e*" at the national bureau of standards, or at a laboratory acceptable to the commission. Working instruments must be checked periodically (see rule 20.6 (7) "*f*" by comparison with a standard in the meter shop used by the utility.

20.7 (10) Extreme care must be exercised in the handling of standards and instruments to assure that their accuracy is not disturbed. Each standard shall be accompanied at all times by a certificate or calibration card, duly signed and dated, on which are recorded the corrections required to compensate for errors found at the customary test points at the time of the last previous test.

20.7 (11) *Interruptions of service.* Each utility shall make reasonable efforts to avoid interruptions of service but when interruptions occur, service shall be reestablished within the shortest time practicable, consistent with safety.

20.7 (12) Each utility shall keep records of interruptions of service on its primary distribution system and shall make an analysis of the records for the purpose of determining steps to be taken to prevent recurrence of such interruptions. Such records should include the following information concerning the interruptions:

a. Cause.

b. Date and time.

c. Duration.

The log for each unattended substation must show interruptions which require attention to restore service, with the estimated time of interruption.

20.7 (13) Planned interruptions shall be made at a time that will not cause unreasonable inconvenience to customers and shall be preceded, if feasible, by adequate notice to those who will be affected.

20.8 (490A) Safety.

20.8 (1) *Protective measures.* Each utility shall exercise reasonable care to reduce those hazards inherent in connection with its utility service and to which its employees, its customers, and the general public may be subjected and shall adopt and execute a safety program designed to protect the public and fitted to the size and type of its operations.

20.8 (2) The utility shall give reasonable assistance to the commission in the investigation of the cause of accidents and in the determination of suitable means of preventing accidents.

20.8 (3) Each utility shall maintain a summary of all reportable accidents arising from its operations.

20.8 (4) *Grounding of secondary distribution system.* Unless otherwise specified by the commission, each utility shall comply with, and shall encourage its customers to comply with, the applicable provisions in the Iowa electrical safety code for the grounding of secondary circuits and equipment.

Ground connections should be tested for resistance at the time of installation unless multigrounding is used. The utility shall keep a record of all ground resistance measurements.

The utility shall establish a program of inspection so that all artificial grounds installed by it shall be inspected within reasonable periods of time.

COMMERCE COMMISSION
(continued)

Pursuant to authority of section 490.18, Code of Iowa, the rules and regulations that appear in 1966 I. D. R. 103, et. seq., are amended as follows:

[Filed November 14, 1966]

Rule PL-94

Line 36 – Delete "1959"
Line 37 – Delete "1958"
Line 36 – Add "1966"
Line 37 – Add "1963"

Rule PL-104

Line 7 – Delete "1959"
Line 11 – Delete "1958"
Line 7 – Add "1966"
Line 11 – Add "1963"

Rule PL-107

Line 4 – Delete "1958"
Line 4 – Add "1963"

CONSERVATION COMMISSION

Pursuant to the authority of section 106.16, Code of Iowa, 1966, the following rule is hereby adopted.

[Filed September 13, 1966]

DIVISION OF LANDS AND WATERS

ZONING OF LITTLE WALL LAKE

33.1 (106) General. No motorboat shall be operated at a speed which will create a wake within the zoned area designated by regulatory buoys on Little Wall Lake in Hamilton County, Iowa.

33.1 (1) *Zoned area.* The zoned area will not exceed approximately 18 acres in the northeast portion of the lake identified by a line from a point on the high-water mark approximately 296.6 feet west of the southeast corner of the southwest quarter of Section 10, Township 86 North, Range 24 West; thence northwest to the high-water mark which is 775 feet south and 319 feet west of the northeast corner of the northwest quarter, southwest quarter of Section 10, Township 86 North, Range 24 West.

These rules shall become effective when filed as provided in chapter 17A of the Code.

CONSERVATION COMMISSION
(continued)

Pursuant to the authority of section 109.5 and section 109.6, Code of 1966, the following rule is hereby adopted.

[Filed September 13, 1966]

DIVISION OF FISH AND GAME

Departmental rules filed October 25, 1962 and July 13, 1965, pertaining to the establishment of wildlife refuges are hereby rescinded and the following adopted in lieu thereof.

STATE GAME REFUGES

34.1 (109) Unlawful restrictions. The following list of areas under the jurisdiction of the Iowa state conservation commission are established as game refuges where posted as such. It shall be unlawful to hunt, pursue, kill, trap or take any wild animal, bird or game on these areas at any time, and no one shall carry firearms thereon.

Area	County
Sweet Marsh	Bremer
Storm Lake Island	Buena Vista
Big Marsh	Butler
South Twin Lake	Calhoun
Round Lake	Clay
Allen Green Refuge	Des Moines
Ingham Lake	Emmet
Forney Lake	Fremont
Riverton Area	Fremont
Dunbar Slough	Greene
Bays Branch	Guthrie
McCord Pond	Guthrie
California Bend	Harrison
Hawkeye Wildlife Area	Johnson
Muskrat Slough	Jones
Colyn Area	Lucas
Red Rock Area	Marion
Louisville Bend	Monona
Five Island Lake	Palo Alto
Flint Access	Polk
Gifford Sanctuary	Pottawattamie
Smith Area	Pottawattamie
Lake View Area	Sac
Otter Creek Marsh	Tama
Rice Lake Refuge	Winnebago
Snyder Bend	Woodbury
Lake Cornelia	Wright

This rule shall become effective September 1, 1966, as provided in chapter 17A of the Code.

CONSERVATION COMMISSION
(continued)

Pursuant to the authority of section 106.3, Code of Iowa, 1966, the following rules are hereby adopted.

[Filed September 13, 1966]

DIVISION OF LANDS AND WATERS

Administrative Order No. 307, is hereby amended by rescinding all of regulation one (1), regulation two (2), regulation three (3), regulation five (5), regulation nine (9), and inserting in lieu thereof:

BOAT REGISTRATION APPLICATION, CERTIFICATE, NUMBERING PATTERN, DISPLAY OF REGISTRATION NUMBER AND DISPLAY OF NUMBER DESIGNATING PASSENGER CAPACITY

36.1 (106) Procedure for application of boat registration number.

36.1 (1) *Content.* The following information shall be furnished, required, and stated in the application for number.

a. Name and address of owner.

b. Present number (if any).

c. Hull material (wood, steel, aluminum, plastic, other).

d. Type of propulsion (outboard, inboard, other).

e. Length and width of boat.

f. Make and year built (if known).

g. Statement as to use.

h. Signature.

i. Does the boat have a marine toilet (Yes_____ No_____).

j. From whom purchased (name and address).

36.2 (106) Information on certificate.

36.2 (1) *Certificate.* The certificate of number shall show the following:

a. Name and address of boat owner.

b. Number issued.

c. Expiration date.

d. Make, or model, or type of boat.

e. Hull material (wood, steel, aluminum, plastic, other).

f. Length of vessel.

g. Propulsion (inboard, outboard, other).

h. Maximum capacity rating (number of persons).

36.3 (106) Numbering pattern to be used.

36.3 (1) *Identification number.* The identification numbers awarded under the Iowa system shall consist of three parts. The first part shall consist of the letters "IA" indicating this state. The second part shall consist of not more than four Arabic numerals. The third part shall consist of not more than two letters.

36.3 (2) *Example.* The parts shall be separated by a hyphen or an equivalent space. As example:

IA-2500-C IA-9875-EA IA 7560 ZZ

36.3 (3) *Unusable letters.* Since the letters "I", "O", and "Q" may be mistaken for Arabic numerals, they shall not be used in the suffix.

36.4 (106) Display of number on vessel, as to size, block type and contrasting color.

36.4 (1) *Application of number.* The identification number awarded to any vessel under the Iowa numbering system shall be displayed thereon by being:

a. Painted on, or attached to, each side of the bow (i.e., the forward half) of the vessel; read from left to right, and in such position as to provide maximum visibility.

b. In block characters of good proportion not less than three inches in height.

c. Of a color which will contrast with the color of the background (i.e., dark numbers on a light background, or light numbers on a dark background) and so maintained as to be clearly visible and legible.

36.4 (2) *Restriction.* No other number shall be carried on the bow of the vessel.

36.4 (3) *Purchase of number.* Purchase and attachment of these letters and number is the responsibility of the boat owner.

36.5 (106) Number designating passenger capacity. The passenger capacity of boats as assigned by the commission shall be painted or attached to the starboard side (the right side while in boat and facing the bow) of boat within nine inches of transom in three-inch or larger block numbers in a color contrasting to the boat color so that the numbers ride above the water line when boat is fully loaded.

These rules shall become effective when filed as provided in chapter 17A of the Code.

CONSERVATION COMMISSION
(continued)

Pursuant to the authority of section 106.3 and 106.7, Code of Iowa, 1966, the following rules are hereby adopted.

[Filed September 13, 1966]

DIVISION OF LANDS AND WATERS

Administrative Order No. 307, dated December 6, 1961, is hereby amended by rescinding all of regulation four (4) and inserting in lieu thereof:

REPORTING OF BOATING ACCIDENTS

38.1 (106) Accident report. A written report is required when an accident occurs on board, or involving any vessel in addition to those stipulated in the law. The disappearance of any person from on board under circumstances which suggest any possibility of their death or injury.

38.2 (106) Procedure. These reports shall be filed in triplicate with the state conservation commission in writing.

38.2 (1) *Contents.* The report shall include the following information:

a. The numbers and/or names of the vessels involved.

b. The locality where the accident occurred.

c. The date and time where the accident occurred.

d. The weather and lake or river conditions at time of accident.

e. The name, address, age, and boating experience of the operator of the reporting vessel.

f. The name and address of the operator of the other vessel involved.

g. The names and addresses of the owners of vessels or other property involved.

h. The names and addresses of any person or persons involved or killed.

i. The nature and extent of injury to any person or persons.

j. A description of damage to any property (including vessels) and estimated cost of repairs.

k. A description of the accident (including opinions as to the causes).

l. The length, propulsion, horsepower, fuel, and construction of the reporting vessel.

m. Names and addresses of known witnesses.

n. The specific number of persons on board the reporting vessel at the time of the accident.

These rules shall become effective when filed as provided in chapter 17A of the Code.

HEALTH DEPARTMENT

Pursuant to the authority of section 135.11, subsections 15 and 17, section 147.36, and section 147.53, Code of Iowa, 1962, and chapter 167, section 10, Acts of the Sixty-first General Assembly, the following rules relating to the board of physical therapy examiners are hereby adopted.

[Filed July 12, 1966]

BOARD OF PHYSICAL THERAPY EXAMINERS

Section 1 (147) Definitions.

1.1 "Board" means the board of physical therapy examiners.

1.2 "Department" means the state department of health.

1.3 "Licensure by interstate endorsement" means the issuance of a license to practice physical therapy to an applicant who has been licensed in another state, to be considered on an individual basis for licensure in Iowa, if the applicant meets the qualifications required of a licensed physical therapist in Iowa.

Sec. 2 (147) General.

2.1 Licenses issued by the board shall be for licensure by examination or licensure by interstate endorsement. Each license shall be 8½ by 11 inches in size. Each license issued shall bear the signatures of all board members with their appropriate titles.

2.2 The board requires the completion of parts I, basic sciences; II, clinical sciences; and III, physical therapy, theory and procedure, of the American Physical Therapy Association approved examination prepared by the Professional Examination Service.

2.3 The board will accept the certified grades provided by the Professional Examination Service for each of the three parts of the examination. A passing grade shall be required on each part of the examination.

2.4 An examinee failing one part of the examination shall be required to repeat only the part failed.

2.5 An examinee failing two or more parts of the examination shall be required to repeat the entire examination.

Sec. 3 (147) Licensure by examination.

3.1 Applications for licensure to practice physical therapy in Iowa shall be made directly to the Iowa State Department of Health, State Office Building, Des Moines, Iowa at least fifteen days prior to a scheduled practical and/or oral examination by the board. The application form will be furnished by the department. The application shall include the following:

a. A notarized statement giving full name, current address, age, date of birth and place of birth.

b. Declaration as to licensures or registrations held and examinations taken.

c. A photograph at least 3 x 3½ inches in size taken within six months prior to the application for proper identification purposes.

d. A certified copy of the certificate or diploma awarded the applicant from a school of physical therapy accredited by the American Medical Association and the American Physical Therapy Association.

e. A certified copy of the grades achieved on parts I, basic sciences; II, clinical sciences; and III, physical therapy,

theory and practice, of the American Physical Therapy Association approved Professional Examination.

f. Fee in the amount of twenty-four dollars in the form of a check or money order made payable to the Iowa State Department of Health.

3.2 The board will conduct a practical and/or oral examination of all applicants for licensure.

3.3 The department will stamp each application with a date stamp upon its receipt at the department.

Sec. 4 (147) Licensure by interstate endorsement.

4.1 An individual from another state seeking a license to practice physical therapy in Iowa will be considered on an individual basis under the principle of interstate endorsement.

4.2 An out-of-state applicant shall complete the same application as that outlined in section 3 above, and shall in addition attach a certified copy of any and all licenses to practice physical therapy he may hold from other states.

4.3 Any applicant for interstate endorsement must have practiced physical therapy on a full-time basis for at least one of the immediately preceding three years.

4.4 An applicant for licensure under this section must include with this application a sworn statement of his previous physical therapy practice, detailing places of employment, dates of employment, and indicate whether or not he has ever had a license revoked or suspended. If his license has ever been revoked or suspended, then he must furnish a sworn statement detailing the circumstances.

4.5 The board will give a practical and/or oral examination to all applicants under this section.

4.6 The board will accept certified grades from the American Registry of Physical Therapists reflecting satisfactory passage of the American Registry Examination prior to July 4, 1965. These grades may be considered in lieu of satisfactory passage of the American Physical Therapy Association approved Professional Examination Service Examination at the discretion of the board, under this section only.

4.7 Fee in the amount of forty-four dollars in the form of a check or money order made payable to Iowa State Department of Health.

These rules are intended to implement section 135.11, subsection 15 and 17, section 147.36, and section 147.53, Code of Iowa, 1962, and Chapter 167, section 10, Acts of the Sixty-first General Assembly.

These rules shall be effective as provided in Chapter 17A of the Code after filing.

HIGHWAY COMMISSION

Pursuant to the authority of sections 307.5(14), 321.453, 321.457 and 321.467 through 321.469 of the 1962 Code of Iowa the following rules and regulations are rescinded [The last 5 lines of column 1, and lines 8 and 9 at the top of column 2 page 303 and line 25 in column 1 page 304; 1966 I.D.R.] and the following adopted in lieu thereof.

[Filed July 14, 1966]

CHAPTER 2

ISSUANCE OF PERMITS FOR THE OPERATION AND MOVEMENT OF VEHICLES OF EXCESS SIZE AND WEIGHT

2.2 (4) (*e*) *Buildings.* Loaded vehicle(s) for trips of 25 miles or less must not exceed the following dimensions and weights. Except permits will be issued for such vehicles (including mobile homes) for trips in excess of 25 miles over specified route(s) with origin or destination (or both) in Iowa where such origin or destination (or both) are located a distance greater than 25 miles from the nearest railhead. No permit issued under this section shall be for a distance in excess of 50 miles.

2.2 (4) (*e*) (2) Length — Legal except for mobile homes. The total length of the towing unit and mobile home shall not exceed 70 feet.

2.2 (5) (*e*) (2) Length — 70 feet.

INSURANCE DEPARTMENT

LIFE INSURANCE COMPANIES

[Filed December 21, 1966]
[Effective January 1, 1967]

Pursuant to authority given under section 508.25, Code of 1966, the following rules are adopted.

2.1 (508) Definition. When used in this regulation, "contracts on a variable basis" shall mean any group or individual contract issued by an insurance company providing for the dollar amount of benefits or other contractual payments or values thereunder to vary so as to reflect the investment results of any segregated portfolio of investments or of a designated account or accounts in which amounts received in connection with any such contracts shall have been placed.

2.2 (508) Company qualifications. In considering the qualifications of a company requesting authority to issue or deliver contracts on a variable basis, within the state, the commissioner will consider, among other things,

a. the history of the company.

b. the character, responsibility and general fitness of the officers and directors of the company, and

c. the regulation of a foreign company by its state of domicile.

2.3 (508) Agents qualification. Sales of contracts on a variable basis shall be made or solicited only by persons authorized under licenses issued by the insurance department to sell life insurance and only after certification by the department as having satisfactorily completed an examination given by the department relating to contracts on a variable basis.

2.4 (508) Filing, policy forms and provisions.

2.4 (1) No contract on a variable basis nor certificates evidencing variable benefits issued pursuant to any such contract on a group basis shall be issued or delivered to any person in this state until a copy of the form of the same has been filed with and approved by the commissioner.

2.4 (2) Individual contracts on a variable basis will not be approved if the benefits paid or payable upon the maturity of the contract or any benefit contained therein are payable in anything other than fixed dollar amounts.

2.4 (3) The commissioner shall disapprove or withdraw approval of any such contract form or certificate if:

a. Such contract or certificate contains provisions which are unjust, unfair, inequitable, ambiguous, misleading, likely to result in misrepresentations or contrary to law, or

b. Sales of such contracts are being solicited by any means of advertising, communication or dissemination of information which involves misleading or inadequate description of the provisions of the contract.

2.4 (4) Any contract on a variable basis delivered or issued for delivery in this state and any certificate evidencing variable benefits issued pursuant to any such contract on a group basis, shall contain a statement of the essential features of the procedures to be followed by the insurance company in determining the dollar amount of variable benefits or other contractual payments or values thereunder and shall state in clear terms that such amount may decrease or increase according to such procedure. Any such contract delivered or issued for delivery in this state, and any such certificate, shall contain on its first page, in a prominent position, a clear statement that the benefits or other contractual payments or values thereunder are on a variable basis.

2.5 (508) Administration.

2.5 (1) Except as may be otherwise specifically provided by the contract, all amounts received in connection with any contract on a variable basis shall be placed in a separate account and all liabilities on such contracts shall be set up in said account.

2.5 (2) The investments and liabilities of a separate account shall be clearly identifiable and distinguishable from the other investments and liabilities of the corporation. No sale, transfer or exchange of investments may be made between a separate account and any other investment account of the corporation. No investment of a separate account shall be pledged or transferred as collateral for a loan.

2.6 (508) Investments. Every domestic life insurance company which issues

contracts on a variable basis shall be permitted to invest and reinvest all or any of the amounts received in connection with such variable contracts and held in a separate or segregated account or accounts pursuant to section 508.32 of the Code of Iowa subject to the following limitations:

2.6 (1) All such common stock investments shall be in stock which is listed or admitted to trading on a securities exchange located in the United States of America, or which is publicly held and has been traded in the "over the counter market" and as to which stock market quotations have been readily available.

2.6 (2) No domestic life insurance company which issues contracts on a variable basis shall invest in the security of any one corporation or issurer for a separate account more than five thousand dollars or five percent of the assets of said account whichever is greater.

2.6 (3) No domestic life insurance company shall invest in the common stock of any corporation if such investment shall create for any officer or director of the insurance company a conflict of interest between the insurance company and the corporation whose stock is purchased.

2.6 (4) No domestic life insurance company which issues contracts on a variable basis shall as a result of investing any or all of the amounts received in connection with such contracts beneficially own or hold more than five percent of the outstanding securities of any one corporation or issuer.

2.6 (5) Any foreign life insurance company which issues contracts on a variable basis in this state and which invests the amounts received in connection with such contracts in accordance with the laws of its state of domicile shall be held to be in compliance with this section.

2.7 (508) Valuation.

2.7 (1) The valuation of separate account assets for all purposes, including annual reports to the commissioner of insurance, shall be determined in accordance with the market value of such assets notwithstanding the application of other valuation methods to assets of the insurer other than the assets of a separate account.

2.7 (2) The reserve liability for contracts on a variable basis shall be established by the commissioner pursuant to the requirements of section 508.36, Code of Iowa, commonly referred to as the Standard Valuation Law, in accordance with actuarial procedures that recognize the variable nature of the benefits provided.

2.8 (508) Illustration of benefits. Illustration of benefits payable under any contract on a variable basis shall not involve projections of past investment experience into the future.

2.9 (508) Annual statement. An insurer issuing contracts on a variable basis shall annually on or before March 1 submit to the commissioner an annual statement for the business of its separate account or accounts. This statement shall be on such form as may be prescribed by the National Association of Insurance Commissioner and shall include details as to all of the income, disbursements, assets, and liability items associated with the separate account or accounts, and such other information as the commissioner of insurance may reasonably require.

LABOR, BUREAU OF

Pursuant to authority of section 88A.11 of the Code, the following rules are adopted.

[Filed July 13, 1966]

EMPLOYMENT SAFETY RULES
INDUSTRIAL DIVISION
TITLE I
CHAPTER 1

FLOOR AND WALL OPENINGS, RAILINGS AND TOE BOARDS

1.1 (88A) Scope. These rules apply to to all places where there is a hazard of person or persons, material or materials falling through floor or wall openings and from stairways and runways. They apply to temporary or emergency conditions as well as permanent conditions. They do not apply to construction work to which the construction safety or safety construction rules are applicable° nor to private residences.

°NOTE: As applied to machinery, cranes, etc., the strict observances of these rules is sometimes impracticable. In such cases, individual rules will not be considered

mandatory except when unusual hazard is involved.

Wherever the words proper administrative authorities are referred to in these rules, they shall signify the labor commissioner and the Iowa employment safety commission.

1.2 (88A) Purpose. The purpose of these rules is to provide safety for life and limb. In cases of practical difficulty or unnecessary hardship, see section 1.13 of the general rules, variations from these rules.

1.3 (88A) Definitions.

1.3 (1) A Floor Opening is an opening in any floor, platform, pavement, or yard 12 inches or more in its least dimension.

EXAMPLES: Stair openings, ladder openings, hatchways, pits, and large manholes through which persons may fall.

EXCEPTIONS: Floor openings occupied by elevators, dumbwaiters, conveyers, machinery, or containers are excluded from the scope of this rule. For these, separate safety rules are applicable.

1.3 (2) A Floor Hole is an opening in any floor, platform, pavement, or yard less than 12 inches but more than 1 inch in its least dimension.

EXAMPLES: Belt holes, pipe openings, and slot openings through which materials but not persons may fall.

1.3 (3) A Wall Opening is an opening in any wall or partition having both height of at least 30 inches and width of at least 18 inches.

EXAMPLES: Yardarm doorways and chute openings through which persons may fall.

1.3 (4) A Wall Hole is an opening in any wall or partition having height of less than 30 inches but more than 1 inch and width unrestricted.

EXAMPLES: Ventilation holes, drainage scuppers.

1.3 (5) A Platform is a working space for persons, elevated above the surrounding floor or ground having both length of more than 5 feet and width of more than 2 feet.

EXAMPLES: Balconies, platforms for the operation of machinery and equipment, etc.

1.3 (6) A Runway is a passageway for persons, elevated above the surrounding floor or ground having length of more than 5 feet but width of not more than 2 feet.

EXAMPLES: Footwalks along shafting, walkways between buildings, etc.

1.3 (7) A Standard Railing is a vertical barrier erected along exposed edges of floor openings, wall openings, ramps, platforms, and runways to prevent falls of persons.

NOTE: This rule, because its scope covers only falling persons and falling materials does not cover railings used for guarding machinery or equipment. Guard railings for other hazards are treated in corresponding rules.

1.3 (8) A Stair Railing is a vertical barrier erected along exposed sides of stairways to prevent falls of persons.

1.3 (9) A Handrail is a single bar or pipe supported on brackets from a wall or partition to furnish persons with a handhold in case of tripping, as on stairways and ramps.

1.3 (10) A Toe Board is a vertical barrier at floor level erected along exposed edges of floor openings, wall openings, platforms, runways, and ramps to prevent the falling of materials, tools or equipment.

1.3 (11) Adequate* signifies any construction of railings, covers, or other guards that meets the approval of the proper administrative authority.

*NOTE: The rules permit alternate forms of guarding under certain sections where the use of standard construction is not practicable, but only when it is clearly evident that equivalent protection is thereby secured.

1.4 (88A) Standard specifications.

1.4 (1) A standard railing shall consist of top rail, intermediate rail, and posts, having a vertical height of approximately 42 inches from upper surface of top rail to floor, platform, runway, or ramp level. The top rail shall be smooth surfaced throughout the length of the railing. The intermediate rail shall be approximately halfway between the top rail and the floor, platform, runway, or ramp. The ends of the rails shall not overhang the terminal

posts except where such overhang does not constitute a projection hazard.

EXCEPTION: A minimum vertical height of 36 inches from top rail to floor, platform, runway, or ramp level shall suffice for all handrailing installations constructed prior to the adoption of this rule.

1.4 (2) A standard stair railing shall be of construction similar to a standard railing but the vertical height shall be not more than 34 inches nor less than 30 inches from upper surface of top rail to surface of the tread in line with face of the riser at forward edge of the tread.

EXCEPTION: Intermediate rails shall not be required where stairways are 22 inches or less in width.

1.4 (3) The strength of standard railings and standard stair railings under different types of construction is specified in the following paragraphs. For wood construction, nominal or rough dimensions are given, national lumber dressed sizes are acceptable as conforming with the corresponding rough dimensions required, but no rough dry sizes shall be less than will admit dressing to at least minimum dressed sizes. All stock shall be sound, well manufactured, with defects and blemishes limited to pitch pockets, slight wane, pinworm holes, seasoning checks, and sound tight knots, not exceeding in diameter one-third the width of the piece. For metal construction, dimensions are given as used in the trade; all stoock shall be free from flaws, cracks, or burrs.

a. For wood railings, the posts shall be of at least 2-inch by 4-inch stock spaced not to exceed 8 feet; the top rails shall be of at least 2-inch by 4-inch stock or of two right angle pieces of at least 1-inch by 4-inch stock and the intermediate rails shall be of at least 2-inch by 2-inch stock or of at least 1-inch by 4-inch stock.

b. For pipe railings, the posts and top rails shall be metal pipe of at least 1¼ inches inside diameter and the intermediate rails shall be metal pipe of at least 1 inch inside diameter. The spacing of posts shall not exceed 8 feet.

c. For structural metal railings, the posts and top rails shall be angle iron of at least 1½ inches by 1½ inches by 3/16-inch or other metal shapes of equivalent bending strength; and the intermediate rails shall be angle iron of at least 1¼ inches by 1¼ inches by 1/8-inch or other metal shapes of equivalent bending strength. The spacing of posts shall not exceed 8 feet.

d. The anchoring of posts and framing of members for railings of all types shall be of such construction that the completed structure shall be capable of withstanding a load of at least 200 pounds applied in any direction at any point of the top rail.

NOTE: It is recognized that the minimum value for railing strength here specified is inadequate for safety under operating conditions where railings are liable to receive heavy stresses from crowds, trucking, handling materials, etc. For such conditions, additional strength should be provided by use of heavier stock, closer spacing of posts, bracing, or otherwise.

e. Other types, sizes, and arrangements of railing construction are acceptable whenever they meet the following conditions:

(1) A smooth-surfaced top rail at a height above floor, platform, runway, or ramp level approximately 42 inches, or above surface of the tread in line with the face of the riser of not more than 34 inches nor less than 30 inches.

EXCEPTION: A minimum vertical height of 36 inches from top rail to floor, platform, runway, or ramp level shall suffice for all handrailing installations constructed prior to the adoption of this rule.

(2) A strength to withstand at least the standard requirement of 200 pounds top rail pressure.

(3) Protection between top rail and floor, platform, runway, ramp, or stair treads, equivalent to at least that afforded by a standard intermediate rail.

(4) Elimination of overhang of rail ends unless such overhang does not constitute a hazard.

EXAMPLES: Baluster railings, scroll-work railings, paneled railings.

1.4 (4) A standard toe board shall be approximately 3 inches in vertical height from its top edge to the level of the floor, platform, runway, or ramp. It shall be securely fastened in place and with not more than 1/4-inch clearance above floor

level. It may be made of any substantial material either solid or with openings not over 1 inch in length.

NOTE: It is recognized that the minimum height of toe board here specified is inadequate for safety where materials are piled. For such conditions, higher toe boards, paneling from floor to intermediate rail, or paneling from floor to top rail shall be provided when necessary for safety in the opinion of the proper administrative authority.

On elevated runways such as those connecting upper floors of detached buildings, and which are not roofed or covered, a removable section of toe board may be used to facilitate the removal of snow. It is suggested that a 1/2-inch opening be provided between the top surface of the runway and the bottom of the toe board. Such runways should preferably be covered and enclosed.

1.4 (5) A handrail shall consist of a lengthwise member mounted directly on a wall or partition by means of brackets attached to the lower side of the handrail where possible so as to offer no obstruction to a smooth surface along the top and both sides of the handrail. The handrail shall be of rounded or other section that will furnish an adequate handhold for any one grasping it to avoid falling. The ends of the handrail should be turned into the supporting wall or otherwise arranged so as not to constitute a projection hazard.

The height of handrails shall be not more than 34 inches nor less than 30 inches from the upper surface of the handrail to surface of the tread in line with the face of the riser or to the surface of the ramp.

The length of handrail brackets shall be such as will give a clearance between handrails and wall or any projection thereon of at least 1½ inches. The spacing of brackets shall not exceed 8 feet.

NOTE: Certain state regulations and the building exits code or rules base the permissible occupancy on the net width of exit stairways measured from rail to rail. It is desirable, therefore, to keep the total overhang of handrails at the minimum consistent with their function of supplying handholds for persons using stairs or ramps. The total projection into the width of stairway should not exceed 3½ inches.

The mounting and handrails shall be such that the completed structure is capable of withstanding a load of at least 200 pounds applied in any direction at any point of the top rail.

1.4 (6) Standard floor opening covers and their supports are those designed to take a live load at least as great as that for which the adjacent floor is designed.

EXCEPTION: Trench or conduit covers and their supports, when located in plant roadways, shall be designed to carry a truck rear axle load of at least 20,000 pounds.

EXCEPTION: Manhole covers and their supports, when located in plant roadways, shall comply with local standard highway requirements if any; otherwise, they shall be designed to carry a truck rear axle load of at least 20,000 pounds.

The construction of floor opening covers may be of any materials that meet the specifications on strength. They shall be of solid construction except where there is no exposure to falling materials, grill or slatted covers with openings not over 1 inch in width may be used. The tops of covers should be of nonslip surfaces and shall set flush with the adjacent floor level, except that covers projecting not more than 1 inch above the floor level may be used providing all edges are chamfered to an angle with the horizontal of not over 30 degrees. All hinges, handles, bolts, or other parts shall set flush with the floor or cover surface.

1.4 (7) Wall opening barriers (rails, rollers, picket fences, and half doors) shall be of such construction and mounting that, when in place at the openings, the barrier is capable of withstanding a load of at least 200 pounds applied in any direction (except vertically upward) at any point on the top rail or corresponding member.

1.4 (8) Wall opening grab handles shall be not less than 12 inches in length and shall be so mounted as to give 1½ inches clearance from the side framing of the wall opening. The size, material, and anchoring of the grab handle shall be such that the completed structure is capable of withstanding a load of at least 200 pounds applied in any direction at any point of the handle.

1.4 (9) Wall opening screens shall be of such construction and mounting that they are capable of withstanding a load of at least 100 pounds applied horizontally at

any point on the near side of the screen. They may be of solid construction, of grill work with openings not more than 8 inches long, or of slat work with openings not more than 4 inches wide with length unrestricted.

1.5 (88A) Guarding of floor openings and floor holes.

NOTE: Standards of size, strength, and construction for the guards specified in this section are given in 1.4 (88A) of this rule.

Floor openings occupied by elevators, dumbwaiters, conveyers, machinery, vats, or other containers are not considered in this section. For their guarding, reference should be made to the appropriate safety rule.

1.5 (1) Every stairway floor opening shall be guarded by a railing of standard strength, standard anchorage, and of any type of construction specified in 1.4 (88A), but the vertical height shall be not more than 42 inches nor less than 36 inches from upper surface of top rail to floor level. The railing shall be provided on all exposed sides (except at entrance to stairway). Standard toe boards shall be provided also, except in stair towers.

EXCEPTION: For infrequently used stairways where traffic across the opening prevents the use of permanent railings (as when located in aisle spaces, etc.) the guard shall consist of a hinged floor opening cover of standard strength and construction and adequate removable railings on all exposed sides (except at entrance to stairway). The removable railings should preferably be hinged or otherwise mounted so as to come into use automatically with the opening of the cover.

EXCEPTION: This does not preclude equal protection to a greater height.

1.5 (2) Every ladderway floor opening shall be guarded by a standard railing with standard toe board on all exposed sides (except at entrance to opening), with the passage through the railing either provided with a swinging gate or so offset that a person cannot walk directly into the opening.

1.5 (3) Every hatchway and chute floor opening shall be guarded by either:

a. Hinged floor-opening cover of standard strength and construction equipped with railings of adequate strength permanently attached thereto so as to leave only one exposed side. When the opening is not in use, the cover shall be closed or the exposed side shall be guarded at both top and intermediate positions by adequate removable rails, ropes, or chains; or

b. An adequate removable railing with toe board on not more than two sides of the opening and standard permanent railings with toe boards on all other exposed sides. The removable railings shall be kept in place when the opening is not in use and should preferably be hinged or otherwise mounted so as to be conveniently replaceable.

EXCEPTION: Where operating conditions necessitate the feeding of materials into any hatchway or chute opening from all sides, the standard guarding requirements may be waived if bars, chains, or other adequate protection is provided to prevent a person from falling through the opening.

1.5 (4) Every pit and trap-door floor opening, infrequently used, shall be guarded by a floor opening cover of standard strength and construction which should be hinged in place. While the cover is not in place, pit and trap openings shall be constantly attended by someone or shall be protected on all exposed sides by adequate removable railings that need not be of standard construction.

NOTE: This section is applicable only to floor openings used so infrequently that the hazard is slight in the opinion of the proper administrative authority. Wherever there is periodic or frequent use, the opening shall be guarded as specified in 1.5 (3).

1.5 (5) Every manhole floor opening shall be guarded by a manhole cover of sufficient strength to adequately carry any load to which the area will be subjected. While the cover is not in place, manhole openings shall be constantly attended by someone or shall be adequately protected by a portable enclosing railing that need not be of standard height and strength.

1.5 (6) Every temporary floor opening caused by minor building alterations, yard excavations, etc., shall have adequate guards provided but these need not be of standard construction.

NOTE: Where, in the opinion of the proper administrative authority, there is

any considerable exposure to this class of hazard, the requirements of the construction safety rule shall be followed.

1.5 (7) Every floor hole into which persons can accidently walk shall be guarded by either:

a. A standard railing with standard toe board on all exposed sides; or

b. A floor opening cover of standard strength and construction that should be hinged in place. While the cover is not in place, floor holes shall be constantly attended by someone or shall be protected by a portable enclosing railing that need not be of standard construction.

1.5 (8) Any floor hole into which persons cannot accidently walk (on account of fixed machinery, equipment, walls or other projections) shall be considered adequately guarded. However, when any floor hole might be so located where there is exposure below to falling materials, it must be guarded by means such as:

a. A cover that leaves no openings more than 1 inch wide. The cover shall be securely held in place but need not be of standard strength and may project above the floor surface; or

b. A standard toe board on all exposed sides of the opening.

1.6 (88A) Guarding of wall openings and holes.

NOTE: Standards of size, strength, and construction for the guards specified in this section are given in 1.4 (88A) of this rule.

The guard shall be so constructed as to permit emergency entrance in case of fire.

1.6 (1) Every yardarm doorway, from which there is a drop of more than 4 feet, shall be guarded by either:

a. A fixed or rolling barrier rail of standard strength and mounting, extending across the whole opening at a height above the floor level not less than 2 feet and not more than 4 feet. The opening should have a sill or threshold that projects above the floor level at least 1 inch. All handling of materials through the opening shall be done without removal of the barrier; or

b. A grab handle on each side frame of the opening with its center approximately 4 feet above floor level and of standard strength and mounting or a substantial (2″ x 6″ or greater) removable door opening barrier at standard height. The opening should have a sill or threshold that projects above the floor level at least 1 inch; or

c. An extension platform on to which materials can be hoisted squarely for handling. The platform and its supports shall have adequate strength for the loads to be handled and shall have side rails, side chains, or equivalent guards for persons working on the platform.

1.6 (2) Every doorway without yardarm or other hoisting equipment from which there is a drop of more than 4 feet shall be guarded by a rail, roller, picket fence, half door, or equivalent barrier. The guard may be removable but should preferably be hinged or otherwise mounted so as to be conveniently replaceable. Where there is exposure below to falling materials, a removable toe board or equivalent shall also be provided. When the opening is not in use for handling materials, the guard shall be kept in position regardless of a door on the opening.

1.6 (3) Every chute wall opening from which there is a drop of more than 4 feet shall be guarded by one or more of the barriers specified in 1.6 (1) and 1.6 (2), as required by the conditions.

1.6 (4) Every temporary wall opening, caused by minor building alterations, etc., shall have adequate guards but these need not be of standard construction.

NOTE: Where, in the opinion of the proper administrative authority, there is any considerable exposure to this class of hazard, the requirements of the construction safety rules shall be followed.

1.6 (5) Every wall hole shall be guarded if its lower edge is either: (*a*) On the near side, 3 inches or less above floor level, or (*b*) on the far side, 5 feet or more above ground (or floor) level. The guard shall be either a standard toe board across the bottom of the hole, or an enclosing screen of either solid construction or of grill or slat work with openings not over 1 inch in width.

NOTE: While the "near" side of a wall hole is usually inside the building, occasionally for basement wall holes, etc., it

is necessary to consider the hole from outside the building to determine the requirements for guarding.

EXCEPTION: The exemption from guarding may be extended to wall holes in other positions when the falling materials hazard is negligible in the opinion of the proper administrative authority.

EXCEPTION: 1.6(5) is based only on the hazard of materials moving along floor level. Wall holes above floor level shall also be adequately guarded where, in the opinion of the proper administrative authority, it is rendered necessary by the piling of materials near the holes or by the projection of materials from machinery, etc. (The latter hazard, however, should preferably be guarded at the source of projection and standards for such guarding will sometimes be found in the safety rule that deals with the type of machinery in question.)

Guarding may be waived where, in the opinion of the proper administrative authority, the hazard is adequately guarded by fixed equipment or fixed window sash.

1.7 (88A) Guarding of open-sided floors, platforms and runways.

NOTE: Standards of size, strength, and construction for the guards specified in this section are given in 1.4 (88A) of this rule.

1.7 (1) Every open-sided floor and platform shall be guarded by a standard railing [or the equivalent as specified in 1.4 (3)] on all open sides 5 feet or more above the adjacent floor (platform) or ground level, except where there is entrance to a ramp, stairway, or fixed ladder. The railing shall be provided with a toe board wherever, beneath the open sides: (*a*) Persons can pass, (*b*) there is moving machinery, or (*c*) there is equipment with which falling materials could create a hazard.

EXCEPTION: The intermediate railing and the toe board may be omitted where materials have to be regularly passed over the edge of the floor (platform) as in lumber storage.

EXCEPTION: The entire railing and toe board may be omitted from particular sections of open-sided floors and platforms where, in the opinion of the proper administrative authority special or regular operating conditions make a railing wholly impracticable.

1.7 (2) Every runway shall be guarded by a standard railing [or the equivalent as specified in 1.4 (3)] on all open sides 5 feet or more above floor or ground level. Wherever tools, machine parts or materials are likely to be used on the runway, a toe board shall also be provided on each exposed side.

EXCEPTION: Runways, used exclusively for special purposes (such as oiling, shafting, or filling tank cars), may have the railing on one side omitted where operating conditions necessitate such omission, providing the falling hazard is minimized by using a width of runway not less than 18 inches.

NOTE: Where persons entering upon runways become thereby exposed to machinery, electrical equipment, or other danger not a falling hazard, additional guarding than is here specified may be required to maintain safety. For such guarding, reference should be made to the appropriate safety rules.

1.8 (88A) Stairway railing and guards.

NOTE: Detailed specifications for strength and construction of stairways and for width of exit stairs are not within the scope of this rule. Reference therefore should be made to the building exits code or rules.

Standards of size, strength, and construction for the stair railings and handrailings specified in this section are given in 1.4 (88A) of these rules.

1.8 (1) Every flight of stairs having four or more risers shall be equipped with standard stair railings or standard handrails as specified below, the width of the stair to be measured clear of all obstructions except handrails:

a. On stairways of width less than 44 inches and having both sides enclosed, at least one handrail that should preferably be on the right side descending.

b. On stairways of width less than 44 inches and having one side open, at least one stair railing that shall be on the open side.

NOTE: Stairways of width less than 44 inches are intended to be used for a single file of persons only.

c. On stairways of width less than 44 inches and having both sides open, one stair railing on each side.

EXCEPTION: Intermediate rails shall not be required where stairways are 22 inches or less in width.

d. On stairways of width 44 inches or more but less than 88 inches, one handrail on each enclosed side and one stair railing on each open side.

e. On stairways 88 inches or more in width, one handrail on each enclosed side, one stair railing on each open side and one intermediate handrail located approximately midway of the width.

This rule is intended to implement chapter 88A of the Code of Iowa.

These rules shall become effective immediately as provided in Chapter 17A of the Code after filing.

LABOR, BUREAU OF
(continued)

Pursuant to authority of section 88A.11 of the Code, the following rules are adopted.

[Filed July 13, 1966]

EMPLOYMENT SAFETY RULES

CONSTRUCTION SAFETY RULES DIVISION

TITLE II

CHAPTER 1

DEMOLITION

1.1 (88A) General.

1.1 (1) This part on "Demolition" is intended to be complete in itself, but any device or equipment such as scaffolds, ladders, derricks, hoists, etc., used in connection with the demolition work shall be constructed, installed, inspected, maintained, and operated in accordance with the regulations governing the construction, installation, inspection, maintenance, and operation of such device or equipment as specified in other parts of these rules.

1.1 (2) Where applicable, federal, state, and local codes, rules, regulations, and ordinances governing demolition work shall be observed.

1.1 (3) No structure, or part of a structure, or any floor or temporary support or scaffold, sidewalk shed, or bridge, or any device or equipment shall be loaded in excess of the safe carrying capacity which shall never be considered more than 1/3 of its ultimate structural strength.

1.1 (4) Walkways and passageways shall be provided for the use of the workmen, who shall be instructed to use them, and all such walkways and passageways shall be kept adequately lighted and free from debris and other materials.

1.1 (5) Protruding nails in any kind of lumber shall be withdrawn, hammered in, or bent over as soon as such lumber is removed from the structure being demolished, or all nail-bearing lumber shall be placed in piles for future cleaning or burning.

1.1 (6) *Warning signs and lights.*

a. On every demolition job, danger signs shall be conspicuously posted around the property, and all doorways or thoroughfares giving access to the property shall be kept barricaded except during the actual passage of men or equipment.

b. During the hours of darkness, red lights, warning lights or flares shall be placed on or about all barricades.

1.1 (7) Workers using powered tools shall be furnished with safety goggles having strength-tested lenses and conforming to the requirements for Group A Goggles as given in American Standard Safety Code for the Protection of Heads, Eyes, and Respiratory Organs of Industrial Workers (ASA A2-1938), National Bureau of Standards Handbook H24, and, when the operations are dusty, with respirators approved by the U. S. Bureau of Mines for type A dust; and the workers shall be required to wear such protective devices.

1.2 (88A) Prepartory.

1.2 (1) If a structure to be demolished has been partially wrecked by fire, flood, explosion, or other causes, the walls shall be shored or braced in accordance with the requirements of the authorities having jurisdiction, or in the absence of such

requirements, in accordance with accepted engineering practice, before any demolition work is started.

1.2 (2) *Disconnecting utility service.*

a. The power on all electric service lines shall be shut off and all such lines cut or disconnected at or outside the demolition area before demolition work is started.* Prior to the cutting of such lines, the contractor or property owner shall notify the electric service company and, when required, obtain the approval or co-operation of the electric service company.

b. All gas, water, steam, and other service lines shall be shut off and capped or otherwise controlled at or outside the demolition area or curb before demolition work is started.* In each case, the service company involved shall be notified in advance and, when required, its approval or co-operation obtained by the contractor or property owner.

*EXCEPTION: If it is necessary to maintain any power, water, or other lines during demolition, such lines shall be temporarily relocated or protected with substantial covering to the satisfaction of the utility company and in accordance with applicable codes and legal requirements.

1.2 (3) All exterior wall openings which extend down to floor level shall be barricaded to a height not less than 3 feet above floor level. This provision shall not apply to a story after structural demolition of that story has been started, nor to the ground level floor.

1.2 (4) All floor openings and shafts not used for material chutes shall be floored over or enclosed with guardrails and toe boards.

1.2 (5) Except for the cutting of holes in floors for chutes, and holes through which to drop materials, preparation of storage space, and other necessary preparatory work, demolition of exterior walls and floor construction shall begin at the top of the structure and proceed downward, and each story of exterior wall and floor construction shall be removed and dropped into the storage space before commencing the removal of walls and floors in the story next below. This requirement shall not prohibit the demolition of a structure in sections if positive means are taken to prevent injury to persons or damage to property.

1.3 (88A) Public and other ground level protection.

1.3 (1) Before any demolition work is commenced, every sidewalk or public thoroughfare adjacent to the work site shall either be closed or protected as specified elsewhere in this section. All such thoroughfares which are open to the public shall be kept clear and unobstructed at all times. (See section on warning signs and lights.)

1.3 (2) If the structure to be demolished is more than 2 stories or 25 feet high measured from sidewalk or street level and the horizontal distance from the inside of the sidewalk to the structure is 15 feet or less, a substantial sidewalk shed shall be constructed over the entire length of the sidewalk adjacent to the structure, of sufficient width to accommodate pedestrian traffic without causing congestion. The sidewalk shed shall be lighted either by natural or artificial means sufficient to ensure safety at all times.

1.3 (3) Every sidewalk shed shall be capable of safely sustaining a load of 150 pounds per square foot, and if material is to be stored thereon, it shall be capable of sustaining a load of at least 300 pounds per square foot.

1.3 (4) The outside edge and ends of the deck of the shed shall be provided with a substantial enclosure of at least 42 inches above the deck of the shed. Such enclosures may be vertical or inclined outward at approximately 45 degrees and shall consist of boards laid close together secured to braced uprights, or toe boards and galvanized wire netting formed of not less than No. 16 U. S. gage wire and 1½-inch mesh.

1.3 (5) Sidewalk shed openings for loading purposes shall be kept closed at all times except during actual loading operations.

1.3 (6) The roof deck flooring of a sidewalk shed shall consist of planking not less than 2 inches in thickness (nominal size), closely laid. All members of the shed shall be adequately braced and connected to resist displacement of members or distortion of the framework.

1.3 (7) Unless the top deck of the sidewalk shed is built solidly against the face of the structure to be demolished, the vertical face of the shed supports next

to the building shall be solidly fenced throughout. This shall not prohibit the construction and use of solid sliding or swinging gates as may be necessary for the prosecution of the work.

1.3 (8) When the horizontal distance from the inside of the sidewalk to the structure is more than 15 feet and less than 25 feet, a sidewalk shed may be constructed over the sidewalk as described above or, in place of such a shed, a substantial fence shall be constructed along the inside edge of the sidewalk or, if permission has been granted to close the sidewalk, along the inside edge of the roadway.

1.3 (9) Every fence shall be constructed at least 6 feet high of wood or other suitable material and shall be built solid for its entire height and length except that openings necessary for the proper prosecution of the work may be provided with solid sliding or swinging gates.

1.3 (10) When the horizontal distance from the inside of the sidewalk to the structure is more than 25 feet, a shed or fence as described above may be built or, in place of such shed or fence, a substantial railing shall be constructed on the inside of the sidewalk or roadway along the entire length of the demolition site and provided with movable bars as may be necessary for the proper prosecution of the work.

1.3 (11) Where workers' entrances to buildings being demolished are not completely protected by sidewalk sheds, all such entrances shall be protected by canopies extending from the face of the building to a point not less than 8 feet from it. In each case such overhead protection shall be at least 2 feet wider than the building entrance or opening and all canopy roof deck flooring shall be at least as strong as the sidewalk shed specified above.

1.4 (88A) Removal of materials.

1.4 (1) *Through chutes.*

a. All material chutes which are at an angle of more than 45 degrees from the horizontal shall be entirely enclosed on all 4 sides except for openings at or about floor level for the receiving of materials.

b. Openings as specified in rule above shall not exceed 48 inches in height measured along the wall of the chute, and in all stories below the top floor such openings shall be kept closed when not in use.

c. Chutes at an angle of less than 45 degrees with the horizontal may be left open on the upper side, provided that at the point where such a chute discharges into a chute steeper than 45 degrees with the horizontal the top of the steeper chute shall be boarded over to prevent escape of material.

d. A designated employee shall be instructed to prevent any person from standing or passing under the discharge end of the chute.

e. When operations are not in progress, the danger area at the discharge end of each chute shall be completely and adequately guarded or otherwise made inaccessible.

f. Any opening into which workmen dump debris at the top of the chute shall be guarded by a substantial guardrail extending at least 36 inches above the level of the floor or other surface on which men stand to dump material into chutes.

g. A toe board or bumper not less than 2 inches thick and 6 inches high (nominal sizes) shall be provided at each chute opening if the material is dumped from wheelbarrows. Any space between the chute and edge of openings in the floors through which it passes shall be solidly planked over.

1.4 (2) *Through holes in the floor.*

a. If debris is dropped through holes in the floor without the use of chutes, the total area of the hole cut in any intermediate floor, one which lies between the floor that is being demolished and the storage floor, shall not exceed 25 percent of such floor area.

b. The total area of a floor shall be computed from measurements taken to the inside faces of the exterior walls, and the area of floor openings which existed before the beginning of the demolition of the structure shall not be deducted in computing the total area.

c. If the structure is demolished in sections, the total area of the holes cut in any section of the floor shall not exceed 25 percent of such sectional floor area.

d. Openings in all floors below the floor from which walls, partitions, or floor

construction is being removed shall be protected by standard railings and toe boards or preferably planked over if the holes are not being used for dumping material.

e. All intermediate floor openings for the passage of material shall be completely enclosed with barricades or substantial guardrails not less than 36 inches high and at a distance of not less than 6 feet from the edge of any opening. No barricade or guardrail shall be removed until the story immediately above has been demolished down to the floor line and all debris cleared from that floor.

f. Any opening in floors into which workmen dump debris shall be guarded by a substantial guardrail extending at least 36 inches above the level of the floor or other surface on which men stand to dump material.

g. A toe board or bumper not less than 2 inches thick and 6 inches high (nominal sizes) shall be provided at each floor opening if the material is dumped from wheelbarrows.

h. When the cutting of a hole in an intermediate floor between the storage floor and the floor which is being demolished makes the intermediate floor or any portion of it unsafe, then such intermediate floor shall be properly shored.

1.5 (88A) Stairs, passageways, and ladders.

1.5 (1) With the exception of stairways, passageways and ladders for the use of workmen, access to the building being demolished shall be entirely closed off at all times.

1.5 (2) All ladders shall meet the material and construction requirements specified in section, "Ladders," of these rules.

1.5 (3) All stairs, passageways, and ladders covered in rule above shall be maintained in a safe condition.

1.5 (4) Ladders or their side rails shall extend not less than 3 feet above the floor or platform to which such ladders give access.

1.5 (5) All ladders shall be secured against slipping out at the bottom and against movement in any direction at the top.

1.6 (88A) Removal of walls.

1.6 (1) Masonry walls or other sections of masonry shall not be permitted to fall upon the floors of the building in such masses as to exceed the safe carrying capacity of the floors.

1.6 (2) No section of wall whose height is more than 22 times its thickness shall be permitted to stand without lateral bracing unless such wall is in good condition and was originally designed to stand to a greater height without such lateral support.

1.6 (3) Workmen shall not be permitted to work on top of a wall when weather conditions constitute a hazard.

1.6 (4) Structural or load-supporting members on any floor shall not be cut or removed until all stories above that floor have been demolished and removed. This provision shall not prohibit the cutting of floor beams for the purpose of providing chutes, provided the structural strength is retained.

1.6 (5) Before demolishing any interior or exterior wall which is within 10 feet of any opening in the floor immediately below, such opening shall be substantially planked over unless all workmen are removed from all floors below and access to such floors is positively prevented.

1.6 (6) In building of "skeleton" construction, the steel framing may be left in place during the demolition of masonry work. Where this is done, all steel beams, girders, and the like, shall be cleared of all loose material as the masonry work progresses downward.

1.6 (7) Walkways shall be provided to enable workmen to reach or leave their work on any scaffold or wall. Such walkways shall be not less than 3 planks, nor less than 30 inches wide.

1.6 (8) At the completion of each day's work, all walls shall be left stable and in no danger of being overturned.

1.6 (9) Foundation walls which serve as retaining walls to support earth or adjoining structures shall not be demolished until such adjoining structures have been underpinned or braced, and earth removed or supported by sheet piling or sheathing.

1.6 (10) In the demolition of brick and masonry chimneys which cannot safely

be toppled or dropped, all materials shall be dropped down on the inside of such chimneys.

1.6 (11) The loading point at the discharge end of any chute at or near the bottom of a chimney shall be completely protected by means of an overhead timber canopy having strength equal to the sidewalk shed specified in sections on sidewalk sheds of these rules.

1.6 (12) All men on any demolition job shall be required to wear approved type "hard hats."

1.6 (13) Construction sheds and tool boxes shall be so located as to protect workers from danger of falling walls and other falling objects.

1.7(88A) Removal of floors.

1.7 (1) In the following rules the term "floor arches" shall apply to the masonry filling between the floor beams and girders irrespective of the type of floor system.

1.7 (2) In cutting holes in floor arches which span in one direction between 2 beams or supports, the section of floor arch to be removed in making such hole may be of any width and shall include the entire span of the floor arch which is between the 2 beams or supports on which it bears.

1.7 (3) When workmen are engaged in removing floors, planks of ample strength (not less than 2 inches thick by 10 inches wide, nominal sizes) shall be provided and used by workmen breaking down floor arches. The planks shall be so placed as to give the workmen firm support should the arch collapse unexpectedly and if it is necessary for a workman to straddle a space between two planks, such space shall not exceed 16 inches.

1.7 (4) Walkways not less than 30 inches wide formed of planks of ample strength (not less than 2 inches thick by 10 inches wide, nominal sizes) shall be provided and used by the workmen when necessary to enable them to reach any work place without walking on exposed beams.

1.7 (5) Stringers of ample strength shall be installed to support the planks where necessary and the ends of such stringers shall be supported by floor beams or girders and not by floor arches alone.

1.7 (6) When floor arches are being removed, no workmen shall be allowed to work in the area directly underneath and such area shall be barricaded to prevent access to it.

1.7 (7) The demolition of floor arches shall not be started until they and the surrounding floor area for a distance of 20 feet have been entirely cleared of debris and other unnecessary material.

1.7 (8) Planks used for temporary protection shall be sound and at least 2 inches thick (nominal size). They shall be laid close together with the ends overlapping at least 4 inches over solid bearings to prevent tipping under a load.

1.8 (88A) Storage space.

1.8 (1) The storage of waste material or debris on any floor of the building or structure to be demolished shall not be permitted to such an extent that the original allowable floor load is exceeded.

1.8 (2) In buildings having wooden floor construction the flooring boards may be removed from not more than 1 floor above the grade to provide storage space for debris provided falling material is not permitted to endanger the stability of the structure.

1.8 (3) If wood floor beams are required to brace interior walls or free standing exterior walls, such beams shall be left in place until some other approved support can be substituted.

1.8 (4) In buildings of fire-resistive construction, floor arches to an elevation of not more than 25 feet above the grade may be removed to provide storage for debris provided such removal does not endanger the stability of the structure.

1.8 (5) If the floor arches are removed from more than one floor for this purpose, the removal shall start at the highest floor, but not over 25 feet above the grade, and shall proceed downward subject to all requirements applying to the removal of floor arches.

1.8 (6) As an alternative method, the removal of floor arches from the storage space may start at the lowest floor and proceed upward provided that the removal of any floor arch above the lowest is

delayed until the top surface of the debris in the storage space is not more than one story below the floor arch to be removed.

1.8 (7) Intermediate steel floor beams which are not required for the stability of the structure may be removed from the storage space.

1.8 (8) The dumping of material from upper floors into the storage space shall be entirely discontinued during all periods when men are engaged in removing floor arches, floor beams, or performing any other work in the storage space.

1.8 (9) Walls shall not be subjected to lateral pressure from stored material or lateral impact from falling material.

1.8 (10) The storage space into which material is dumped shall be blocked off, except for openings necessary for the removal of material and such openings shall be closed at all times when material is not being removed.

1.9 (88A) Demolition of steel construction.

1.9 (1) When floor arches have been removed, the entire tier of beams on which any derrick is supported shall be completely planked over except for such openings as are required for handling material or equipment.

1.9 (2) In the operation of cranes and derricks, a standard signal system shall be used and all men assigned to the operation of such equipment shall be fully instructed on the signals.

1.9 (3) A tag line or guide rope shall be used on all hoisted or lowered loads.

1.9 (4) The riding of the load or load line in any lifting device shall be strictly prohibited.

1.9 (5) Whenever acetylene or oxygen cylinders are transported or lifted by crane or derrick, such cylinders shall be placed in substantial stands or cradles.

1.9 (6) No beam shall be cut until precautions have been taken to prevent it from swinging freely and possibly striking any worker or any piece of equipment or any part of the structure being demolished.

This rule is intended to implement chapter 88A of the Code of Iowa.

These rules shall become effective immediately as provided in chapter 17A of the Code.

LABOR, BUREAU OF

EMPLOYMENT SAFETY RULES

UTILITIES AND SERVICES DIVISION

TITLE III

CHAPTER 1

ELECTRICAL INSTALLATIONS IN HAZARDOUS LOCATIONS

[Filed January 4, 1967]

Pursuant to authority of section 88A.11 of the Code, the following rules are adopted.

Introduction

Purpose.

(*a*) The purpose of these Rules is the practical safeguarding of persons and of buildings and their contents from hazards arising from the use of electricity for light, heat, power, radio, signaling and for other purposes.

(*b*) These Rules contain basic minimum provisions considered necessary for safety. Compliance therewith and proper maintenance will result in an installation essentially free from hazard, but not necessarily efficient, convenient, or adequate for good service or future expansion of electrical use.

Hazards often occur because of overloading of wiring systems by methods or usage not in conformity with these Rules. This occurs because initial wiring did not provide for increases in use of electricity. For this reason it is recommended that the initial installation be adequate and that reasonable provisions for system changes be made as may be required for future increase in the use of electricity.

(*c*) These Rules are not intended as a design specification nor an instruction manual for untrained persons.

Scope.

(*a*)*Covered.* It covers the electric conductors and equipment installed within or on public and private buildings and other premises, including yards, carnival and parking lots, and industrial substations; also the conductors that connect the instal-

lations to a supply of electricity, and other outside conductors adjacent to the premises.

(*b*) *Not covered.* It does not cover installations in mines, ships, railway cars, aircraft, automotive equipment, or the installations or equipment employed by a railway, electric or communication utility in the exercise of its function as a utility, and located outdoors or in buildings used exclusively for that purpose.

1.1 (88A) Definitions.

1.1 (1) *Accessible.*

a. (As applied to wiring methods.) Not permanently closed in by the structure or finish of the building; capable of being removed without disturbing the building structure or finish. (See "Concealed" and "Exposed.")

b. (As applied to equipment.) Admitting close approach because not guarded by locked doors, elevation or other effective means. (See "Readily Accessible.")

1.1 (2) *Ampacity.* Current-carrying capacity expressed in amperes.

1.1 (3) *Anesthetizing location.* Areas in hospitals, clinics and doctors' offices in which flammable anesthetics are or may be administered to patients. Such locations will include operating rooms, delivery rooms and anesthesia rooms, and will also include any corridors, utility rooms or other areas which are or may be used for administering flammable anesthetics to patients. Recovery rooms are not classified as anesthetizing locations unless used for administering flammable anesthetics.

1.1 (4) *Appliance.* An appliance is utilization equipment, generally other than industrial, normally built in standardized sizes, or types, which is installed or connected as a unit to perform one or more functions such as clothes washing, air conditioning, food mixing, and deep frying.

a. Fixed: An appliance which is fastened or otherwise secured at a specific location.

b. Portable: An appliance which is actually moved or can easily be moved from one place to another in normal use.

c. Stationary: An appliance which is not easily moved from one place to another in normal use.

1.1 (5) *Approved.* Acceptable to the authority enforcing these rules.

1.1 (6) *Askarel.* A synthetic nonflammable insulating liquid which, when decomposed by the electric arc, evolves only nonflammable gaseous mixtures.

1.1 (7) *Attachment plug* (plug cap) (cap). An attachment plug is a device which, by insertion in a receptacle, establishes connection between the conductors of the attached flexible cord and the conductors connected permanently to the receptacle.

1.1 (8) *Automatic.* Automatic means self-acting, operating by its own mechanism when actuated by some impersonal influence, as for example, a change in current strength, pressure, temperature, or mechanical configuration.

1.1 (9) *Branch circuit.* A branch circuit is that portion of a wiring system extending beyond the final overcurrent device protecting the circuit.

A device not approved for branch circuit protection such as a thermal cutout or motor overload protective device is not considered as the overcurrent device protecting the circuit.

a. Appliance. An appliance branch circuit is a circuit supplying energy to one or more outlets to which appliances are to be connected; such circuits to have no permanently connected lighting fixtures not a part of an appliance.

b. General purpose. A branch circuit that supplies a number of outlets for lighting and appliances.

c. Individual. A branch circuit that supplies only one utilization equipment.

d. Multiwire. A multiwire branch circuit is a circuit consisting of two or more ungrounded conductors having a potential difference between them and an identified grounded conductor having equal potential difference between it and each ungrounded conductor of the circuit and which is connected to the neutral conductor of the system.

1.1 (10) *Building.* A structure which stands alone or which is cut off from adjoining structures by fire walls with all openings therein protected by approved fire doors.

1.1 (11) *Cabinet.* An enclosure designed either for surface of flush mount-

ing, and provided with a frame, mat or trim in which swinging doors are hung.

1.1 (12) *Cable.*

a. MI cable: *Mineral-insulated* metal-sheathed cable is completely noncombustible and consists of a copper tubing enclosing copper conductors insulated with a compressed magnesium oxide. Special moisture-tight terminal fittings are employed, and the completed system must be tested for insulation resistance. The cable is relatively small but somewhat more expensive than other types of wiring.

b. ALS cable: Aluminium sheathed cable.

c. MC cable:Metal clad cable.

1.1 (13) *Cell* (As applied to raceway). A cell shall be defined as a single enclosed tubular space in a cellular metal floor member, or an enclosed tubular space in a floor made of precast cellular concrete slabs, the axis of the cell being parallel to the axis of the floor member.

1.1 (14) *Circuit breaker.* A device designed to open and close a circuit by nonautomatic means and to open the circuit automatically on a predetermined overload of current, without injury to itself when properly applied within its rating.

1.1 (15) *Communication circuit.* Applies to telephone, telegraph (except radio), district messenger, fire and burglar alarms and similar central station systems and to telephone systems not connected to a central station system but using similar type of equipment, methods of installation and maintenance.

1.1 (16) *Concealed.* Rendered inaccessible by the structure or finish of the building. Wires in concealed raceways are considered concealed, even though they may become accessible by withdrawing them.

1.1 (17) *Conductor.*

a. Bare: A bare conductor is one having no covering or insulation whatsoever.

b. Covered: A covered conductor is one having one or more layers of nonconducting materials that are not recognized as insulation under these rules.

1.1 (18) *Connector, pressure (solderless).* A pressure wire conductor is a device which establishes the connection between two or more conductors or between one or more conductors and a terminal by means of mechanical pressure and without the use of solder.

1.1 (19) *Continuous load.* A load where the maximum current is expected to continue for three hours or more.

1.1 (20) *Control circuit.* The circuit which carries the electrical signals directing the performance of the controller but does not carry the main power circuit.

1.1 (21) *Controller.* A device, or group of devices, which serves to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected.

1.1 (22) *Cooking unit, counter-mounted.* An assembly of one or more domestic surface heating elements for cooking purposes designed for flush mounting, in or supported by, a counter, and which assembly is complete with inherent or separately mountable controls and internal wiring.

1.1 (23) *Cord.*

a. C — Lamp cord.
b. PD — Twisted portable cord.
c. PO — Parallel cord.

1.1 (24) *Current limiting overcurrent protective device.* Device which when interrupting a specified circuit, will consistently limit the short circuit current in that circuit to a specified magnitude substantially less than that obtainable in the same circuit if the device were replaced with a solid conductor having comparable impedance.

1.1 (25) *Cutout box.* An enclosure designed for surface mounting and having swinging doors or covers secured directly to and telescoping with the walls of the box proper.

1.1 (26) *Demand factor.* The demand factor of any system, or part of a system, is the ratio of the maximum demand of the system, or part of a system, to the total connected load of the system, or the part of the system under consideration.

1.1 (27) *Device.* A unit of an electrical system which is intended to carry but not utilize electric energy.

1.1 (28) *Disconnecting means.* A device, or group of devices, or other means

whereby the conductors of a circuit can be disconnected from their source of supply.

1.1 (29) *Dust-ignition-proof.* Enclosed in a manner which will exclude ignitible amounts of dust or amounts which might affect performance or rating and which when installation and protection are in conformance with these rules, will not permit arcs, sparks or heat otherwise generated or liberated inside of the enclosure, to cause ignition of exterior accumulations or atmospheric suspensions of a specified dust on or in the vicinity of the enclosure.

1.1 (30) *Dustproof.* So constructed or protected that dust will not interfere with its successful operation.

1.1 (31) *Dust-tight.* So constructed that dust will not enter the enclosing case.

1.1 (32) *Duty.*

a. Continuous: Continuous duty is a requirement of service that demands operation at a substantially constant load for an indefinitely long time.

b. Intermittent: Intermittent duty is a requirement of service that demands operation for alternate intervals of (1) load and no load; or (2) loads and rests; or (3) loads, no load and rest.

c. Periodic: Periodic duty is a type of intermittent duty in which the load conditions are regularly recurrent.

d. Short time: Short-time duty is a requirement of service that demands operation at a substantially constant load for a short and definitely specified time.

e. Varying: Varying duty is a requirement of service that demands operations at loads, and for intervals of time, both of which may be subject to wide variation.

1.1 (33) *Duty cycle* (Welding). The percentage of the time during which the welder is loaded.

1.1 (34) *Electric sign.* A fixed or portable, self-contained electrically illuminated appliance with words or symbols designed to convey information or attract attention.

1.1 (35) *Enclosed.* Surrounded by a case which will prevent a person from accidentally contacting live parts.

1.1 (36) *Equipment.* A general term including material, fittings, devices, appliances, fixtures, apparatus and the like used as part of, or in connection with, an electrical installation.

1.1 (37) *Explosion-proof apparatus.* Apparatus enclosed in a case which is capable of withstanding an explosion of a specified gas or vapor which may occur within it and of preventing the ignition of a specified gas or vapor surrounding the enclosure by sparks, flashes, or explosion of the gas or vapor within, and which operates at such an external temperature that a surrounding flammable atmosphere will not be ignited thereby.

1.1 (38) *Exposed.*

a. (As applied to live parts). Exposed means that a live part can be inadvertently touched or approached nearer than a safe distance by a person. It is applied to parts not suitably guarded, isolated or insulated.

b. (As applied to wiring method). Exposed means not concealed.

1.1 (39) *Externally operable.* Externally operable means capable of being operated without exposing the operator to contact with live parts.

This term is applied to equipment, such as a switch, that is enclosed in a case or cabinet.

1.1 (40) *Feeder.* A feeder is the circuit conductors between the service equipment, or the generator switchboard of an isolated plant, and the branch circuit overcurrent device.

1.1 (41) *Fitting.* An accessory such as a locknut, bushing or other part of a wiring system which is intended primarily to perform a mechanical rather than an electrical function.

1.1 (42) *Garage.* A building or portion of a building in which one or more self-propelled vehicles carrying volatile, flammable liquid for fuel or power are kept for use, sale, storage, rental, repair, exhibition or demonstrating purposes, and all that portion of building which is on or below the floor or floors in which such vehicles are kept and which is not separated therefrom by suitable cutoffs.

1.1 (43) *Ground.* A ground is a conducting connection, whether intentional or accidental, between an electrical circuit or equipment and earth, or to some conducting body which serves in place of the earth.

1.1 (44) *Grounded.* Grounded means connected to earth or to some conducting body which serves in place of the earth.

1.1 (45) *Grounded.* (Effectively grounded communication system). Effectively grounded means permanently connected to earth through a ground connection of sufficiently low impedance and having sufficient ampacity to prevent the building up of voltages which may result in undue hazard to connected equipment or to persons.

1.1 (46) *Grounded conductor.* A conductor which is intentionally grounded, either solidly or through a current-limiting device.

1.1 (47) *Grounding conductor.* A conductor used to connect an equipment, device, or wiring system with a grounding electrode or electrodes.

1.1 (48) *Guarded.* Covered, shielded, fenced, enclosed, or otherwise protected, by means of suitable covers or casings, barriers, rails or screens, mats or platforms, to remove the liability of dangerous contact or approach by persons or objects to a point of danger.

1.1 (49) *Hazardous locations.* Locations in which flammable gases, vapors or dusts are or may be present in the air in quantities sufficient to produce explosive or ignitible mixtures.

1.1 (50) *Header ducts.* Transverse metal raceways for electrical conductors, furnishing access to predetermined cells of a precast cellular concrete floor, thus providing for the installation of electrical conductors from a distribution center to the floor cells.

1.1 (51) *Hoistway.* Any shaftway, hatchway, wall hole, or other vertical opening or space in which an elevator or dumbwaiter is designed to operate.

1.1 (52) *Identified.* Identified, as used in these rules in reference to a conductor or its terminal, means that such conductor or terminal is to be recognized as grounded.

1.1 (53) *Isolated.* Isolated means that an object is not readily accessible to persons unless special means for access are used.

1.1 (54) *Lighting outlet.* An outlet intended for the direct connection of a lampholder, a lighting fixture or a pendant cord terminating in a lampholder.

1.1 (55) *Location.*

a. Damp location. A location subject to a moderate degree of moisture, such as some basements, some barns, some cold storage warehouses and some tunnels.

b. Dry location. A location not normally subject to dampness or wetness.

A location classified as dry may be temporarily subject to dampness or wetness, as in the case of a building under construction.

c. Wet location. A location subject to saturation with water or other liquids, such as locations exposed to weather, washrooms in garages, and like locations. Installations underground or in concrete slabs or masonry in direct contact with the earth shall be considered as wet locations.

1.1 (56) *Low-energy power circuit.* A circuit which is not a remote-control or signal circuit but which has the power supply limited in accordance with the requirements of Class II remote-control circuits.

Such circuits include electric door openers and circuits used in the operation of coin-operated phonographs.

1.1 (57) *Multioutlet assembly.* A type of surface or flush raceway designed to hold conductors and attachment plug receptacles, assembled in the field or at the factory.

1.1 (58) *Nonautomatic.* Nonautomatic means that the implied action requires personal intervention for its control.

As applied to an electric controller, nonautomatic control does not necessarily imply a manual controller, but only that personal intervention is necessary.

1.1 (59) *Outlet.* A point on the wiring system at which current is taken to supply utilization equipment.

1.1 (60) *Outline lighting.* An arrangement of incandescent lamps or gaseous tubes to outline and call attention to certain features such as the shape of a building or the decoration of a window.

1.1 (61) *Oven, wall-mounted.* A domestic oven for cooking purposes designed for mounting in or on a wall or other surface.

1.1 (62) *Panelboard.* A single panel or group of panel units designed for assembly in the form of a single panel; including

buses, and with or without switches or automatic overcurrent protective devices for the control of light, heat or power circuits of small individual as well as aggregate capacity; designed to be placed in a cabinet or cutout box placed in or against a wall or partition and accessible only from the front.

1.1 (63) *Qualified person.* One familiar with the construction and operation of the apparatus and the hazards involved.

1.1 (64) *Raceway.* Any channel for holding wires, cables or busbars, which is designed expressly for, and used solely for, this purpose.

Raceways may be of metal or insulating material and the term includes rigid metal conduit, rigid nonmetallic conduit, flexible metal conduit, electrical metallic tubing, underfloor raceways, cellular concrete floor raceways, cellular metal floor raceways, surface metal raceways, structural raceways, wireways and busways.

1.1 (65) *Raintight.* So constructed or protected that exposure to a beating rain will not result in the entrance of water.

1.1 (66) *Readily accessible.* Capable of being reached quickly, for operation, renewal, or inspections, without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders or chairs.

1.1 (67) *Receptacle.* (Convenience outlet). A receptacle is a contact device installed at an outlet for the connection of an attachment plug and flexible cord.

1.1 (68) *Receptacle outlet.* An outlet where one or more receptacles are installed.

1.1 (69) *Refrigeration compressor, sealed* (Hermetic type). A mechanical compressor consisting of a compressor and a motor, both of which are enclosed in the same sealed housing, with no external shaft nor shaft seals, the motor operating in the refrigerant atmosphere.

1.1 (70) *Remote-control circuit.* Any electrical circuit which controls any other circuit through a relay or an equivalent device.

1.1 (71) *Sealable equipment.* Equipment enclosed in a case or cabinet that is provided with means of sealing or locking so that live parts cannot be made accessible without opening the enclosure. The equipment may or may not be operable without opening the enclosure.

1.1 (72) *Service.* The conductors and equipment for delivering energy from the electricity supply system to the wiring system of the premises served.

1.1 (73) *Service cable.* The service cable is the service conductors made up in the form of a cable.

1.1 (74) *Service conductors.* The supply conductors which extend from the street main, or from transformers to the service equipment of the premises supplied.

1.1 (75) *Service drop.* The overhead service conductors between the last pole or other aerial support and the first point of attachment to the building or other structure.

1.1 (76) *Service-entrance conductors, overhead system.* The service conductors between the terminals of the service equipment and a point usually outside the building, clear of building walls, where joined by tap or splice to the service drop.

1.1 (77) *Service-entrance conductors, underground system.* The service conductors between the terminals of the service equipment and the point of connection to the service lateral.

Where service equipment is located outside the building walls, there may be no service-entrance conductors, or they may be entirely outside the building.

1.1 (78) *Service equipment.* The necessary equipment, usually consisting of circuit breaker or switch and fuses, and their accessories, located near point of entrance of supply conductors to a building and intended to constitute the main control and means of cutoff for the supply to that building.

1.1 (79) *Service lateral.* The underground service conductors between the street main, including any risers at a pole or other structure or from transformers, and the first point of connection to the service entrance conductors in a terminal box inside or outside the building wall. Where there is no terminal box, the point of connection shall be considered to be the point of entrance of the service conductors into the building.

1.1 (80) *Service raceway.* The rigid metal conduit, electrical metallic tubing, or other raceway, that encloses the service-entrance conductors.

1.1 (81) *Setting (of circuit breaker).* The value of the current at which it is set to trip.

1.1 (82) *Show window.* A show window is any window used or designed to be used for the display of goods or advertising material, whether it is fully or partly enclosed or entirely open at the rear, and whether or not it has a platform raised higher than the street floor level.

1.1 (83) *Signal circuit.* Any electrical circuit which supplies energy to an appliance which gives a recognizable signal.

Such circuits include circuits for door bells, buzzers, code-calling systems and signal lights.

1.1 (84) *Special permission.* The written consent of the authority enforcing these rules.

1.1 (85) *Switches.*

a. General use switch. A general use switch is a switch intended for use in general distribution and branch circuits. It is rated in amperes, and it is capable of interrupting its rated current at its rated voltage.

b. General use snap switch. A form of general use switch so constructed that it can be installed in flush device boxes, or on outlet box covers, or otherwise used in conjunction with wiring systems recognized by these rules.

c. AC general use snap switch. A form of general use snap switch suitable only for use on alternating current circuits for controlling the following:

(1) Resistive and inductive loads (including electric discharge lamps) not exceeding the ampere rating at the voltage involved.

(2) Tungsten filament lamp loads not exceeding the ampere rating at 120 volts.

(3) Motor loads not exceeding 80 percent of the ampere rating of the switches at the rated voltage.

All AC general use snap switches are marked "AC" in addition to their electrical rating.

d. AC-DC general use snap switch. A form of general use snap switch suitable for use on either direct or alternating current circuits for controlling the following:

(1) Resistive loads not exceeding the ampere rating at the voltage involved.

(2) Inductive loads not exceeding one-half the ampere rating at the voltage involved, except that switches having a marked horsepower rating are suitable for controlling motors not exceeding the horsepower rating of the switch at the voltage involved.

(3) Tungsten filament lamp loads not exceeding the ampere rating at 125 volts, when marked with the letter "T".

AC-DC general use snap switches are not generally marked AC-DC, but are always marked with their electrical rating.

e. Isolating switch. An isolating switch is a switch intended for isolating an electric circuit from the source of power. It has no interrupting rating, and it is intended to be operated only after the circuit has been opened by some other means.

f. Motor circuit switch. A switch, rated in horsepower, capable of interrupting the maximum operating overload current of a motor of the same horsepower rating as the switch at the rated voltage.

1.1 (86) *Switchboard.* A large single panel, frame, or assembly of panels, on which are mounted, on the face or back or both, switches, overcurrent and other protective devices, buses and usually instruments. Switchboards are generally accessible from the rear as well as from the front and are not intended to be installed in cabinets.

1.1 (87) *Thermal cutout.* An overcurrent protective device which contains a heater element in addition to and affecting a renewable fusible member which opens the circuit. It is not designed to interrupt short circuit currents.

1.1 (88) *Thermal protection.* (As applied to motors). The words, "Thermal Protection," appearing on the nameplate of a motor indicate that the motor is provided with a thermal protector.

1.1 (89) *Thermal protector.* (As applied to motors). An inherent overheating protective device which is responsive to motor current and temperature and which,

when properly applied to a motor, protects the motor against dangerous overheating due to overload or failure to start.

1.1 (90) *Threaded bosses or hubs.* A raised portion which is thicker than the box or conduit which can be drilled, tapped or threaded to allow conduit to be attached so the box is explosion-proof.

1.1 (91) *Utilization equipment.* Equipment which utilizes electric energy for mechanical, chemical, heating, lighting or similar useful purposes.

1.1 (92) *Ventilated.* Provided with a means to permit circulation of air sufficient to remove an excess of heat, fumes, or vapors.

1.1 (93) *Volatile flammable liquid.* A flammable liquid having a flash point below 100 degrees F. or whose temperature is above its flash point.

1.1 (94) *Voltage* (of a circuit). Voltage is the greatest root-mean-square (effective) difference of potential between any two conductors of the circuit concerned.

On various systems such as 3-phase 4-wire, single-phase 3-wire and 3-wire direct current, there may be various circuits of various voltages.

1.1 (95) *Voltage to ground.* In grounded circuits the voltage between the given conductor and that point or conductor of the circuit which is grounded; in ungrounded circuits, the greatest voltage between the given conductor and any other conductor of the circuit.

1.1 (96) *Watertight.* So constructed that moisture will not enter the enclosing case.

1.1 (97) *Weatherproof.* Weatherproof means so constructed or protected that exposure to the weather will not interfere with successful operation.

Raintight or watertight equipment may fulfill the requirements for "weatherproof."

However, weather conditions vary and consideration should be given to conditions resulting from snow, ice, dust, or temperature extremes.

1.2 (88A) Special occupancies.

1.2 (1) *Scope.* The provisions of 1.2(5) apply to locations in which the authority enforcing these rules judges the apparatus and wiring to be subject to the conditions indicated by the following classifications. It is intended that each room, section or area (including motor and generator rooms, and rooms for the enclosure of control equipment) shall be considered individually in determining its classification. Except as modified in 1.2(5) all other applicable rules contained in these rules shall apply to electrical apparatus and wiring installed in hazardous locations.

Equipment and associated wiring approved as intrinsically safe may be installed in any hazardous location for which is approved, and the provisions of 1.2(3) through 1.2 (12) need not apply to such installation. Intrinsically safe equipment and wiring are incapable of releasing sufficient electrical energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture. Abnormal conditions will include accidental damage to any part of the equipment or wiring, insulation or other failure of electrical components, application of overvoltage, adjustment and maintenance operations, and other similar conditions.

All conduit referred to herein shall be threaded with standard conduit cutting die which provides 3/4″ taper per foot. Such conduit shall be made up wrench tight to minimize sparking when fault current flows through the conduit system. Where it is impractical to make a threaded joint tight, a bonding jumper shall be utilized.

1.2 (2) The intent of 1.2(88A) through 1.4(88A) is to require a form of construction of equipment, and of installation that will insure safe performance under conditions of proper use and maintenance. It, therefore, is assumed that inspection authorities and users will exercise more than ordinary care with regard to installation and maintenance.

The characteristics of various atmospheric mixtures of hazardous gases, vapors and dusts depend on the specific hazardous material involved. It is necessary therefore that equipment be approved not only for the class of location but also for the specific gas, vapor or dust that will be present.

For the purposes of testing and approval, various atmospheric mixtures have been grouped on the basis of their hazardous characteristics, and facilities have been

made available for testing and approval of equipment for use in the following atmospheric groups:

a. Group A. Atmospheres containing acetylene;

b. Group B. Atmospheres containing hydrogen, or gases or vapors of equivalent hazard such as manufactured gas;

c. Group C. Atmospheres containing ethyl ether vapors, ethylene, or cyclopropane;

d. Group D. Atmospheres containing gasoline, hexane, naphtha, benzene, butane, propane, alcohol, acetone, benzol, lacquer solvent vapors, or natural gas;

e. Group E. Atmospheres containing metal dust, including aluminum, magnesium, and their commercial alloys, and other metals of similarly hazardous characteristics.

f. Group F. Atmospheres containing carbon black, coal or coke dust;

g. Group G. Atmospheres containing flour, starch, or grain dusts.

1.2 (3) *Class I locations.* Class I locations are those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitible mixtures. Class I locations shall include the following:

a. Class I, Division 1. Locations (1) in which hazardous concentrations of flammable gases or vapors exist continuously, intermittently, or periodically under normal operating conditions, (2) in which hazardous concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage, or (3) in which breakdown or faulty operation of equipment or processes which might release hazardous concentrations of flammable gases or vapors, might also cause simultaneous failure of electrical equipment.

This classification usually includes locations where volatile flammable liquids or liquefied flammable gases are transferred from one container to another; interiors of spray booths and areas in the vicinity of spraying and painting operations where volatile flammable solvents are used; locations containing open tanks or vats of volatile flammable liquids; drying rooms or compartments for the evaporation of flammable solvents; locations containing fat and oil extraction apparatus using volatile flammable solvents; portions of cleaning and dyeing plants where hazardous liquids are used; gas generator rooms and other portions of gas manufacturing plants where flammable gas may escape; inadequately ventilated pump rooms for flammable gas or for volatile flammable liquids; the interiors of refrigerators and freezers in which volatile, flammable materials are stored in open, lightly stoppered, or easily ruptured containers, and all other locations where hazardous concentrations of flammable vapors or gases are likely to occur in the course of normal operations.

b. Class I, Division 2. Locations (1) in which volatile flammable liquids or flammable gases are handled, processed or used, but in which the hazardous liquids, vapors or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems, or in case of abnormal operation of equipment, (2) in which hazardous concentrations of gases or vapors are normally prevented by positive mechanical ventilation, but which might become hazardous through failure or abnormal operation of the ventilating equipment, or (3) which are adjacent to Class I, Division 1 locations, and to which hazardous concentrations of gases or vapors might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air, and effective safeguards against ventilation failure are provided.

This classification usually includes locations where volatile flammable liquids or flammable gases or vapors are used, but which, in the judgment of the rule enforcing authority, would become hazardous only in case of an accident or of some unusual operating condition. The quantity of hazardous material that might escape in case of accident, the adequacy of ventilating equipment, the total area involved, and the record of the industry or business with respect to explosions or fires are all factors that should receive consideration in determining the classification and extent of each hazardous area.

Piping without valves, checks, meters and similar devices would not ordinarily be deemed to introduce a hazardous condi-

tion even though used for hazardous liquids or gases. Locations used for the storage of hazardous liquids or of liquefied or compressed gases in sealed containers would not normally be considered hazardous unless subject to other hazardous conditions also.

Electrical conduits and their associated enclosures separated from process fluids by a single seal or barrier shall be classed as Division 2 locations if the outside of the conduit and enclosures is a nonhazardous area.

1.2 (4) *Class II locations.* Class II locations are those which are hazardous because of the presence of combustible dust. Class II locations shall include the following:

a. Class II, Division 1. Location (1) in which combustible dust is or may be in suspension in the air continuously, intermittently, or periodically under normal operating conditions, in quantities sufficient to produce explosive or ignitible mixtures, (2) where mechanical failure or abnormal operation of machinery or equipment might cause such mixtures to be produced, and might also provide a source of ignition through simultaneous failure of electrical equipment, operation or protection devices, or from other causes, or (3) in which dusts of an electrically conducting nature may be present.

This classification usually includes the working areas of grain handling and storage plants; rooms containing grinders or pulverizers, cleaners, graders, scalpers, open conveyors or spouts, open bins or hoppers, mixers, or blenders, automatic or hopper scales, packing machinery, elevator heads and boots, stock distributors, dust and stock collectors (except all-metal collectors vented to the outside), and all similar dust producing machinery and equipment in grain processing plants, starch plants, sugar pulverizing plants, malting plants, hay grinding plants, and other occupancies of similar nature; coal pulverizing plants (except where the pulverizing equipment is essentially dust-tight); all working areas where metal dusts and powders are produced, processed, handled, packed or stored (except in tight containers); and all other similar locations where combustible dust may, under normal operating conditions, be present in the air in quantities sufficient to produce explosive or ignitible mixtures.

Combustible dusts which are electrically nonconducting include dusts produced in the handling and processing of grain and grain products, pulverized sugar and cocoa, dried egg and milk powders, pulverized spices, starch and pastes, potato and wood flour, oil meal from beans and seed, dried hay, and other organic materials which may produce combustible dusts when processed or handled. Electrically conducting nonmetallic dusts containing magnesium or aluminum are particularly hazardous and every precaution must be taken to avoid ignition and explosion.

b. Class II, Division 2. Locations in which combustible dust will not normally be in suspension in the air, or will not be likely to be thrown into suspension by normal operation of equipment or apparatus, in quantities sufficient to produce explosive or ignitible mixtures, but (1) where deposits or accumulations of such dust may be sufficient to interfere with the safe dissipation of heat from electrical equipment or apparatus, or (2) where such deposits or accumulations of dust on, in, or in the vicinity of electrical equipment might be ignited by arcs, sparks or burning material from such equipment.

Locations where dangerous concentrations of suspended dust would not be likely, but where dust accumulations might form on, or in the vicinity of electrical equipment, would include rooms and areas containing only closed spouting and conveyors, closed bins or hoppers or machines and equipment from which appreciable quantities of dust would escape only under abnormal operating conditions; rooms or areas adjacent to locations described in 1.2 (4) "*a*" and into which explosive or ignitible concentrations of suspended dust might be communicated only under abnormal operating conditions; rooms or areas where the formation of explosive or ignitible concentrations of suspended dust is prevented by the operation of effective dust control equipment; warehouses and shipping rooms where dust producing materials are stored or handled only in bags or containers; and other similar locations.

1.2 (5) *Class III locations.* Class III locations are those which are hazardous because of the presence of easily ignitible fibers or flyings, but in which such fibers or flyings are not likely to be in suspension

in the air in quantities sufficient to produce ignitible mixtures. Class III locations shall include the following:

a. Class III, Division 1. Locations in which easily ignitible fibers or materials producing combustible flyings are handled, manufactured or used.

Such locations usually include some parts of rayon, cotton and other textile mills; combustible fiber manufacturing and processing plants; cotton gins and cotton-seed mills; flax processing plants; clothing manufacturing plants; woodworking plants; and establishments and industries involving similar hazardous processes or conditions.

Easily ignitible fibers and flyings include rayon, cotton (including cotton linters and cotton waste), sisal or henequen, istle, jute, hemp, tow, cocoa fiber, oakum, baled waste kapok, Spanish moss, excelsior and other materials of similar nature.

b. Class III, Division 2. Locations in which easily ignitible fibers are stored or handled except in process of manufacture.

1.3 (88A) Class I installations.

1.3 (1) *General.* This rule shall apply to the installation of electrical wiring and equipment in locations classified as Class I under 1.2(3) except as modified by this section.

1.3 (2) *Transformers and capacitors.* The installation of transformers and capacitors shall conform to the following:

Class I, Division 1. In Class I, Division 1 locations, transformers and capacitors shall conform to the following:

a. Containing a liquid that will burn. Transformers and capacitors containing a liquid that will burn shall be installed only in approved vaults, which shall conform to the following:

(1) *Location.* Vaults shall be located where they can be ventilated to the outside air without using flues or ducts wherever such arrangement is practicable.

(2) *Walls, roof, and floor.* The walls and roofs of vaults shall be constructed of reinforced concrete, brick, load-bearing tile, concrete block, or other fire resistive constructions which have adequate structural strength for the conditions, and a minimum fire resistance of 2½ hours. The floors of vaults in contact with the earth shall be of concrete not less than 4 inches thick but when the vault is constructed with a vacant space or other stories below it, the floor shall have adequate structural strength for the load imposed thereon and a minimum fire resistance of 2½ hours.

(3) *Doorways.* Vault doorways shall be protected as follows:

Type of door. Each doorway leading into a building shall be provided with a tight-fitting door of a type approved for openings in Class A situations. The authority enforcing these rules may require such a door for an exterior wall opening or on each side of an interior wall opening where conditions warrant.

Sills. A door sill or curb of sufficient height to confine within the vault the oil from the largest transformer shall be provided and in no case shall the height be less than 4 inches.

Locks. Entrance doors shall be equipped with locks, and doors shall be kept locked, access being allowed only to qualified persons. Locks and latches shall be so arranged that the door may be readily and quickly opened from the inside.

(4) *Ventilation.* The ventilation shall be adequate to prevent a transformer temperature in excess of the manufacturer's recommendations.

(5) *Ventilation openings.* When required by section 1.3(2)"*a*"(4), openings for ventilation shall be provided in accordance with the following:

Location. Ventilation openings shall be located as far away as possible from doors, windows, fire escapes, and combustible material.

Arrangement. Vaults ventilated by natural circulation of air may have roughly half of the total area of openings required for ventilation in one or more openings near the floor and the remainder in one or more openings in the roof or in the sidewalls near the roof, or all of the area required for ventilation may be provided in one or more openings in or near the roof.

Size. In the case of vaults ventilated to an outdoor area without using ducts or flues the combined net area of all ventilating openings after deducting the area occupied by screens, gratings, or louvers, shall be not less than 3 square inches per kva of transformer capacity in

service, except that the net area shall be not less than 1 square foot for any capacity under 50 kva.

Covering. Ventilation openings shall be covered with durable gratings, screens, or louvers, according to the treatment required in order to avoid unsafe conditions.

Dampers. Where automatic dampers are used in the ventilation openings of vaults containing oil-insulated transformers, the actuating device should be made to function at a temperature resulting from fire and not at a temperature which might prevail as a result of an overheated transformer or bank of transformers. Automatic dampers should be so designed and constructed to minimize the possibility of accidental closing.

Ducts. Ventilating ducts shall be constructed of fire-resistant material.

Drainage. Where practicable, vaults containing more than 100 kva transformer capacity shall be provided with a drain or other means which will carry off any accumulation of oil or water in the vault unless local conditions make this impracticable. The floor shall be pitched to the drain when provided.

Water pipes and accessories. Any pipe or duct systems foreign to the electrical installation should not enter or pass through a transformer vault. Where the presence of such foreign systems cannot be avoided, appurtenances thereto which require maintenance at regular intervals shall not be located inside the vault. Arrangements shall be made where necessary to avoid possible trouble from condensation, leaks and breaks in such foreign systems. Piping or other facilities provided for fire protection or for water-cooled transformers are not deemed to be foreign to the electrical installation.

Storage in vaults. Materials shall not be stored in transformer vaults. And in addition, (1) there shall be no door or other communicating opening between the vault and the hazardous area, (2) ample ventilation shall be provided for the continuous removal of hazardous gases or vapor, (3) vent openings or ducts shall lead to a safe location outside of buildings, and (4) vent ducts and openings shall be of sufficient area to relieve explosion pressures within the vault, and all portions of vent ducts within the buildings shall be of reinforced concrete construction.

b. Not containing a liquid that will burn. Transformers and capacitors which do not contain a liquid that will burn shall (1) be installed in vaults conforming to the requirements of section 1.3 (2) "*a*" or "*b*", or (2) be approved for Class I locations (explosion-proof).

Class I. Division 2. In Class I, Division 2 locations, transformers and capacitors shall conform to the following:

a. Dry-type transformers installed indoors. Transformers rated 112½ kva or less shall have a separation of at least 12 inches from combustible material unless separated therefrom by a fire-resistant heat-insulating barrier, or unless of a rating not exceeding 600 volts and completely enclosed except for ventilating openings.

Transformers of more than 112½ kva rating shall be installed in a transformer room of fire-resistant construction unless they are constructed with 80°C. rise (Class B) or 150°C. rise (Class H) insulation, and are separated from combustible material not less than 6 feet horizontally and 12 feet vertically or are separated therefrom by a fire-resistant heat-insulating barrier.

Transformers rated more than 35,000 volts shall be installed in a vault. See 1.3 (2) "*a*".

b. Askarel-insulated transformers installed indoors. Askarel insulated transformers rated in excess of 25 kva shall be furnished with a pressure-relief vent. Where installed in a poorly ventilated place they shall be furnished with a means for absorbing any gases generated by arcing inside the case, or the pressure relief vent shall be connected to a chimney or flue which will carry such gases outside the building. Askarel-insulated transformers rated more than 35,000 volts shall be installed in a vault.

c. Oil-insulated transformers installed indoors. Oil-insulated transformers shall be installed in a vault constructed as specified in this section except as follows:

(1) *Not over 112½ kva total capacity.* The provisions for transformer vaults specified in 1.3(2) apply except that the vault may be constructed of reinforced concrete not less than 4 inches thick.

(2) *Not over 600 volts.* A vault is not required provided suitable arrangements are made where necessary to prevent

a transformer oil fire igniting other materials, and the total transformer capacity in one location does not exceed 10 kva in a section of the building classified as combustible, or 75 kva where the surrounding structure is classified as fire-resistant construction.

(3) *Furnace transformers.* Electric furnace transformers of a total rating not exceeding 75 kva may be installed without a vault in a building or room of fire-resistant construction provided suitable arrangements are made to prevent a transformer oil fire spreading to other combustible material.

(4) *Detached buildings.* Transformers may be installed in a building which does not conform with the provisions specified in these rules for transformer vaults provided neither the building nor its contents present a fire hazard to any other building or property, and provided the building is used only in supplying electric service and the interior is accessible only to qualified persons.

d. Oil-insulated transformers installed outdoors. Combustible material, combustible buildings and parts of buildings, fire escapes, door and window openings shall be safeguarded from fires originating in oil-insulated transformers installed on, attached to, or adjacent to a building or combustible material. Space separations, fire-resistant barriers, automatic water spray systems and enclosures which confine the oil of a ruptured transformer tank are recognized safeguards. One or more of these safeguards shall be applied according to the degree of hazard involved in cases where the transformer installation presents a fire hazard. Oil enclosures may consist of fire-resistant dikes, curbed areas or basins, or trenches filled with coarse crushed stone. Oil enclosures shall be provided with trapped drains in cases where the exposure and the quantity of oil involved are such that removal of oil is important.

1.3 (3) *Meters, instruments and relays.* The installation of meters, instruments and relays shall conform to the following:

Class I, Division 1. In Class I, Division 1 location, meters, instruments and relays, including kilowatt-hour meters, instrument transformers and resistors, rectifiers and thermionic tubes, shall be provided with enclosures approved for Class I locations.

Class I, Division 2. In Class I, Division 2 locations, meters, instruments and relays shall conform to the following:

a. Contacts. Switches and circuit breakers, and make-and-break contacts of push buttons, relays, and alarm bells or horns, shall have enclosures approved for Class I locations, unless general purpose enclosures are provided, and current interrupting contacts are (1) immersed in oil, (2) enclosed within a chamber hermetically sealed against the entrance of gases or vapors, or (3) in circuits which under normal conditions do not release sufficient energy to ignite a specific hazardous atmospheric mixture.

b. Resistors and similar equipment. Resistors, resistance devices, thermionic tubes, and rectifiers, which are used in or in connection with meters, instruments and relays, shall conform to 1.3(3) Class I, Division 1, except that enclosures may be of general purpose type when such equipment is without make-and-break or sliding contacts (other than as provided in 1.3 (3) "*a*" above) and when the maximum operating temperature of any exposed surface will not exceed eighty percent of the ignition temperature in degrees centigrade of the gas or vapor involved.

c. Without make-and-break contacts. Transformer windings, impedance coils, solenoids, and other windings which do not incorporate sliding or make-and-break contacts shall be provided with enclosures which may be of general purpose type where vents adequate to permit prompt escape of any gases or vapors are provided.

d. General purpose assemblies. Where an assembly is made up of components for which general purpose enclosures are acceptable under 1.3 (3) "*a*", "*b*", and "*c*", a single general purpose enclosure is acceptable for the assembly. Where such an assembly includes any of the equipment described in 1.3 (3) "*b*", the maximum obtainable surface temperature of any component of the assembly shall be clearly and permanently indicated on the outside of the enclosure.

e. Fuses. Where general purpose enclosures are permitted under 1.3(3)"*a*", "*b*", "*c*", and "*d*", fuses for overcurrent protection of the instrument circuits may be mounted in general purpose enclosures provided such fuses do not exceed 3 ampere rating at 120 volts and provided each such fuse is preceded by a switch conforming to 1.3 (3) "*a*".

1.3 (4) *Wiring methods.* Wiring methods shall conform to the following:

Class I, Division 1. In Class I, Division 1 locations, threaded rigid metal conduit or Type MI cable with termination fittings approved for the location shall be the wiring method employed. All boxes, fittings, and joints shall be threaded for connection to conduit or cable terminations, and shall be explosion-proof. Threaded joints shall be made up with at least five threads fully engaged. Type MI cable shall be installed and supported in a manner to avoid tensile stress at the termination fittings. Where necessary to employ flexible connections, as at motor terminals, flexible fittings approved for Class I locations (explosion-proof) shall be used.

Class I, Division 2. In Class I, Division 2 locations, threaded rigid metal conduit or Type MI cable with termination fittings approved for Class I locations, or approved Type MC or ALS cable with termination fittings approved for Class I locations shall be the wiring method employed. Type MI, MC or ALS cable shall be installed in a manner to avoid tensile stress at the termination fittings. Boxes, fittings and joints need not be explosion-proof except as required by 1.3(5)"*a*" and "*b*". Where provision must be made for limited flexibility, as at motor terminals, flexible metal fittings, flexible metal conduit with approved fittings, or flexible cord approved for extra hard usage and provided with approved bushed fittings shall be used. An additional conductor for grounding shall be included in the flexible cord unless other acceptable means of grounding are provided.

1.3 (5) *Sealing and drainage.* Seals are provided in conduit and cable systems to prevent the passage of gases, vapors or flames from one portion of the electrical installation to another through the conduit. Such communications through Type MI cable is inherently prevented by construction of the cable, but sealing compound is used in cable termination fittings to exclude moisture and other fluids from the cable insulations, and shall be of a type approved for the conditions of use. Seals in conduit and cable systems shall conform to the following:

Class I, Division 1. In Class I, Division 1 locations, seals shall be located as follows:

a. In each conduit run entering an enclosure for switches, circuit breakers, fuses, relays, resistors or other apparatus which may produce arcs, sparks or high temperatures. Seals shall be placed as close as practicable and in no case more than 18 inches from such enclosures.

b. In each conduit run of 2-inch size or larger entering the enclosure or fitting housing terminals, splices or taps, and within 18 inches of such enclosure or fitting.

Where two or more enclosures for which seals are required under 1.3(5)"*a*" and "*b*", are connected by nipples or by runs of conduit not more than 36 inches long, a single seal in each such nipple connection or run of conduit would be sufficient if located not more than 18 inches from either enclosure. Ordinary conduit fittings of the "L," "T" or "Cross" type would not usually be classed as enclosures when not larger than the trade size of the conduit.

c. In each conduit run leaving the Class I, Division 1 hazardous area. The sealing fitting may be located on either side of the boundary of such hazardous area, but shall be so designed and installed that any gases or vapors which may enter the conduit system, within the Division 1 hazardous area, will not enter or be communicated to the conduit beyond the seal. There shall be no union, coupling, box or fitting in the conduit between the sealing fitting and the point at which the conduit leaves the Division 1 hazardous area.

Class I, Division 2. In Class I, Division 2 locations, seals shall be located as follows:

a. For conduit connections to enclosures which are required to be approved for Class I locations, seals shall be provided in conformance to 1.3(5)"*a*" and "*b*". All portions of the conduit run or nipple between the seal and such enclosure shall conform to 1.3(4) Class I, Division 1.

b. In each conduit run passing from the Class I, Division 2 hazardous area into a nonhazardous area. The sealing fitting may be located on either side of the boundary of such hazardous area, but shall be so designed and installed that any gases or vapors which may enter the conduit system, within the Division 2 hazardous area, will not enter or be communicated to the conduit beyond the seal. Rigid conduit shall be used between the sealing fitting and the point at which the conduit leaves the hazardous area, and a threaded connection shall be used at the

sealing fitting. There shall be no union, coupling, box or fitting in the conduit between the sealing fitting and the point at which the conduit leaves the hazardous area.

Class I, Divisions 1 and 2. Where seals are required, they shall conform to the following:

a. Fittings. Enclosures for connections or for equipment shall be provided with approved integral means for sealing, or sealing fittings approved for Class I locations shall be used. Sealing fittings shall be accessible.

b. Compound. Sealing compound shall be approved for the purpose, shall not be affected by the surrounding atmosphere or liquids, and shall not have a melting point of less than 93° C. (200° F.)

c. Thickness of compound. In the completed seal, the minimum thickness of the sealing compound shall be not less than the trade size of the conduit and in no case less than 5/8 inch.

d. Splices and taps. Splices and taps shall not be made in fittings intended only for sealing with compound, nor shall other fittings in which splices or taps are made, be filled with compound.

e. Assemblies. In an assembly where equipment which may produce arcs, sparks or high temperatures is located in a compartment separate from the compartment containing splices or taps, and an integral seal in provided where conductors pass from one compartment to the other, the entire assembly shall be approved for Class I locations. Seals in conduit connections to the compartment containing splices or taps shall be provided in Class I, Division 1 locations where required by 1.3(5) "*b*".

f. Drainage.

(1) *Control equipment.* Where there is probability that liquid or other condensed vapor may be trapped within enclosures for control equipment or at any point in the raceway system, approved means shall be provided to prevent accumulation or to permit periodic draining of such liquid or condensed vapor.

(2) *Motor and generators.* Where the authority enforcing these rules judges that there is probability that liquid or condensed vapor may accumulate within motors or generators, joints and conduit systems shall be arranged to minimize entrance of liquid. If means to prevent accumulation or to permit periodic draining are judged necessary, such means shall be provided at the time of manufacture, and shall be deemed an integral part of the machine.

(3) Canned pumps, process connections for flow, pressure or analysis measurement, frequently depend upon a single seal diaphragm or tube to prevent process fluids from entering the electrical conduit system. An additional approved seal or barrier shall be provided with an adequate drain between the seals in such a manner that leaks would be obvious.

See also the third paragraph in 1.2(3)"*b*".

1.3 (6) *Switches, circuit breakers, motor controllers and fuses.* Switches, circuit breakers, motor controllers and fuses shall conform to the following:

Class I, Division 1. In Class I, Division 1 locations, switches, circuit breakers, motor controllers and fuses, including push buttons, relays and similar devices, shall be provided with enclosures, and the enclosure in each case together with the enclosed apparatus shall be approved as a complete assembly for use in Class I locations.

Class I, Division 2. Switches, circuit breakers, motor controllers and fuses in Class I, Division 2 locations shall conform to the following:

a. Type required. Circuit breakers, motor controllers and switches intended to interrupt current in the normal performance of the function for which they are installed shall be provided with enclosures approved for Class I locations, unless general purpose enclosures are provided and (1) the interruption of current occurs within a chamber hermetically sealed against the entrance of gases and vapors, or (2) the current interrupting contacts are oil-immersed and the device is approved for locations of this class and division.

This includes service and branch circuit switches and circuit breakers; motor controllers, including push buttons, pilot switches, relays and motor-overload protective devices; and switches and circuit breakers for the control of lighting and appliance circuits. Oil-immersed circuit breakers and controllers of ordinary general use type may not confine completely the arc produced in the interruption of heavy

overloads, and specific approval for locations of this class and division is therefore necessary.

b. Isolating switches. Enclosures for disconnecting and isolating switches without fuses and which are not intended to interrupt current may be of general purpose type.

c. Fuses. For the protection of motors, appliances and lamps, except as provided in 1.3(6)"*d*", (1) standard plug or cartridge fuses may be used provided they are placed within enclosures approved for the purpose and for the location, or (2) fuses of a type in which the operating element is immersed in oil or other approved liquid, or is enclosed within a chamber hermetically sealed against the entrance of gases and vapors may be used provided they are approved for the purpose and are placed within general purpose enclosures.

d. Fuses or circuit breakers for overcurrent protection. When not more than 10 sets of approved enclosed fuses, or not more than 10 circuit breakers which are not intended to be used as switches for the interruption of current, are installed for branch or feeder circuit protection in any one room, area or section of this class and division, the enclosures for such fuses or circuit breakers may be of general purpose type, provided the fuses or circuit breakers are for the protection of circuits or feeders supplying lamps in fixed positions only.

A set of fuses is construed to mean a group containing as many fuses as are required to perform a single protective function in a circuit. For example, a group of 3 fuses protecting an ungrounded three-phase circuit, and a single fuse protecting the ungrounded conductor of an identified two-wire single-phase circuit, would each be considered as a set of fuses. Fuses conforming to 1.3(6)"*c*" need not be included in counting the 10 sets of fuses permitted in general purpose enclosures.

1.3 (7) *Control transformers and resistors.* Transformers, impedance coils and resistors used as or in conjunction with control equipment for motors, generators and appliances shall conform to the following:

Class I, Division 1. In Class I, Division 1 locations, transformers, impedance coils and resistors, together with any switching mechanism associated with them, shall be provided with enclosures approved for Class I locations. (explosion-proof)

Class I, Division 2. In Class I, Division 2 locations, control transformers and resistors shall conform to the following:

a. Switching mechanisms. Switching mechanisms used in conjunction with transformers, impedance coils and resistors shall conform to 1.3(6) Class I, Division 2.

b. Coils and windings. Enclosures for windings of transformers, solenoids, or impedance coils may be of general purpose type, but shall be provided with vents adequate to permit prompt escape of gases or vapors that may enter the enclosure.

c. Resistors. Resistors shall be provided with enclosures and the assembly shall be approved for Class I locations, unless resistance is nonvariable and maximum operating temperature, in degrees centigrade, will not exceed eighty percent of the ignition temperature of the gas or vapor involved.

1.3 (8) *Motors and generators.* Motors and generators shall conform to the following:

Class I, Division 1. In Class 1, Division 1 locations, motors, generators and other rotating electrical machinery shall be (1) approved for Class 1 locations (explosion-proof), or (2) of the totally enclosed type supplied with positive-pressure ventilation from a source of clean air with discharge to a safe area, so arranged to prevent energizing of the machine until ventilation has been established and the enclosure has been purged with at least ten volumes of air, and also arranged to automatically de-energize the equipment when the air supply fails, or (3) of the totally enclosed inert-gas-filled type supplied with a suitable reliable source of inert gas for pressuring the enclosure and arranged to automatically de-energize the equipment when the gas supply fails. Totally enclosed motors of types "2" or "3" shall have no external surface with an operating temperature in degrees centigrade in excess of eighty percent of the ignition temperature of the gas or vapor involved. Appropriate devices shall also be provided to detect any increase in temperature of the motor beyond design limits and automatically de-energize the equipment. Auxiliary equipment shall be of a type approved for the location in which it is installed.

Class I, Division 2. In Class I, Division 2 locations, motors, generators and other rotating electrical machinery in which are employed sliding contacts, centrifugal or other types of switching mechanism (including motor overcurrent devices), or integral resistance devices, either while starting or while running, shall be approved for Class I locations (explosion-proof), unless such sliding contacts, switching mechanisms and resistance devices are provided with enclosures approved for such locations.

This rule does not prohibit installation of open or nonexplosion-proof enclosed motors, such as squirrel cage induction motors, without brushes and switching mechanisms, in Class I, Division 2 locations.

1.3 (9) *Lighting fixtures.* Lamps shall be installed in fixtures which shall conform to the following:

Class I, Division 1. In Class I, Division 1 locations, lighting fixtures shall conform to the following:

a. Approved fixtures. Each fixture shall be approved as a complete assembly for locations of this class, and shall be clearly marked to indicate the maximum wattage of lamps for which it is approved. Fixtures intended for portable use shall be specifically approved as a complete assembly for that use.

b. Physical damage. Each fixture shall be protected against physical damage by a suitable guard or by location.

c. Pendant fixtures. Pendant fixtures shall be suspended by and supplied through threaded rigid conduit stems and threaded joints shall be provided with setscrews or other effective means to prevent loosening. For stems longer than 12 inches, permanent and effective bracing against lateral displacement shall be provided at a level not more than 12 inches above the lower end of the stem, or flexibility in the form of a fitting of flexible connector approved for the purpose and for the location shall be provided not more than 12 inches from the point of attachment to the supporting box or fitting.

d. Supports. Boxes, box assemblies or fittings used for the support of lighting fixtures shall be approved for the purpose and for Class I locations.

Class I, Division 2. In Class I, Division 2 locations lighting fixtures shall conform to the following:

a. Portable lamps. Portable lamps shall conform to 1.3(9)"*a*".

b. Fixed lighting. Lighting fixtures for fixed lighting shall be protected from physical damage by suitable guards or by location. Where there is danger that falling sparks or hot metal from lamps or fixtures might ignite localized concentrations of flammable vapors or gases, suitable enclosures or other effective protective means shall be provided. Where lamps are of a size or type which may, under normal operating conditions, reach surface temperatures exceeding eighty percent of the ignition temperature in degrees centigrade of the gas or vapor involved, fixtures shall conform to 1.3(9)"*a*".

c. Pendant fixtures. Pendant fixtures shall be suspended by threaded rigid conduit stems or by other approved means. For rigid stems longer than 12 inches, permanent and effective bracing against lateral displacement shall be provided at a level not more than 12 inches above the lower end of the stem, or flexibility in the form of a fitting or flexible connector approved for the purpose shall be provided not more than 12 inches from the point of attachment to the supporting box or fitting.

d. Supports. Boxes, box assemblies, or fittings used for the support of lighting fixtures shall be approved for the purpose.

e. Switches. Switches which are a part of an assembled fixture or of an individual lampholder shall conform to the requirements of 1.3(6)"*a*".

f. Starting equipment. Starting and control equipment for mercury-vapor and fluorescent lamps shall conform to the requirements of 1.3(7) Class I, Division 2.

1.3 (10) *Utilization equipment, fixed and portable.* Utilization equipment, fixed and portable, shall conform to the following:

Class I, Division 1. In Class I, Division 1 locations, utilization equipment including electrically-heated and motor-driven equipment shall be approved for Class I locations.

Class I, Division 2. In Class I, Division 2 locations, utilization equipment, fixed and portable, shall conform to the following:

a. Heaters. Electrically-heated utilization equipment shall be approved for Class I locations.

b. Motors. Motors of motor-driven utilization equipment shall conform to 1.3(8) Class I, Division 2.

c. Switches, circuit breakers, and fuses. Switches, circuit breakers and fuses shall conform to 1.3(6) Class I, Division 2.

1.3 (11) *Flexible cords, Class I, Divisions 1 and 2.* A flexible cord may be used only for connection between a portable lamp or other portable utilization equipment and the fixed portion of its supply circuit and where used shall (*a*) be of a type approved for extra hard usage, (*b*) contain, in addition to the conductors of the circuit, a grounding conductor conforming to the following:

Grounded conductor identification. One conductor of flexible cords shall have a continuous marker readily distinguishing it from the other conductor or conductors. The identification shall consist of one of the following:

Colored braid. A braid finished to show a white or natural gray color and the braid on the other conductor or conductors finished to show a readily distinguishable solid color or colors.

Tracer in braid. A tracer in a braid of any color contrasting with that of the braid and no tracer in the braid of the other conductor or conductors. No tracer shall be used in the braid of any conductor of a flexible cord which contains a conductor having a braid finished to show white or natural gray, except in the case of Types C, PD, and PO cords having the braids on the individual conductors finished to show white or natural gray. In such C, PD, and PO cords the identifying marker may consist of the solid white or natural gray finish on one conductor provided there is a colored tracer in the braid of each other conductor.

Colored insulation. A white or natural gray insulation on one conductor and insulation of a readily distinguishable color or colors on the other conductor or conductors for cords having no braids on the individual conductors (except cords which have insulation on the individual conductors integral with the jacket). The insulation may be covered with an outer finish to provide the desired color.

Colored separator. A white or natural gray separator on one conductor and a separator of a readily distinguishable solid color on the other conductor or conductors of cords having insulation on the individual conductors integral with the jacket.

Tinned conductors. One conductor having the individual strands tinned and the other conductor or conductors having the individual strands untinned for cords having insulation on the individual conductors integral with the jacket.

Surface marking. A stripe, ridge or groove so located on the exterior of the cord as to identify one conductor for cords having insulation on the individual conductors integral with the jacket.

(*c*) be connected to terminals or to supply conductors in an approved manner, (*d*) be supported by clamps or by other suitable means in such a manner that there will be no tension on the terminal connections, and (*e*) suitable seals shall be provided where the flexible cord enters boxes, fittings or enclosures of explosion-proof type.

Refer to section 1.3(13) when flexible cords are exposed to liquids having a deleterious effect on the conductor insulation.

1.3 (12) *Receptacles and attachment plugs, Class I, Divisions 1 and 2.* Receptacles and attachment plugs shall be of the type providing for connection to the grounding conductor of the flexible cord, and shall be approved for Class I locations.

1.3 (13) *Conductor insulation, Class I, Divisions 1 and 2.* Where condensed vapors or liquids may collect on or come in contact with the insulation on conductors, such insulation shall be of a type approved for use under such conditions or the insulation shall be protected by a sheath of lead or by other approved means.

1.3 (14) *Signal, alarm, remote-control and communication systems.* Signal, alarm, remote-control, and communication systems shall conform to the following:

Class I, Division 1. In Class I, Division 1 locations, all apparatus and equipment of signalling, alarm, remote-control and communication systems, irrespective of voltage, shall be approved for Class I locations, and all wiring shall conform to 1.3(4) Class I, Division 1 and 1.3(5) Class I, Division 1, and Class I, Divisions 1 and 2.

Class I, Division 2. In Class I, Division 2

locations, signal, alarm, remote-control and communication systems shall conform to the following:

a. Contacts. Switches and circuit breakers, and make-and-break contacts of push buttons, relays, and alarm bells or horns, shall have enclosures approved for Class I locations, unless general purpose enclosures are provided and current interrupting contacts are (1) immersed in oil, or (2) enclosed within a chamber hermetically sealed against the entrance of gases or vapors, or (3) in circuits which under normal conditions do not release sufficient energy to ignite a specific hazardous atmospheric mixture.

b. Resistors and similar equipment. Resistors, resistance devices, thermionic tubes and rectifiers shall conform to 1.3(3)*"b"*.

c. Protectors. Enclosures which may be of general purpose type shall be provided for lightning protective devices and for fuses.

d. All wiring shall conform to 1.3(4) Class I, Division 2; 1.3(5) Class I, Division 2 and Class I, Divisions 1 and 2.

1.3 (15) *Live parts, Class I, Divisions 1 and 2.* There shall be no exposed live parts.

1.3 (16) *Grounding, Class I, Divisions 1 and 2.* Wiring and equipment shall be grounded in conformity with the following:

a. Exposed parts. The exposed non-current-carrying metal parts of equipment such as the frames or metal exteriors of motors, fixed or portable lamps or other utilization equipment, lighting fixtures, cabinets, cases, and conduit, shall be grounded to prevent a potential above ground on the equipment.

b. Bonding. The locknut-bushing and double-locknut types of contacts shall not be depended upon for bonding purposes, but bonding jumpers with proper fittings or other approved means shall be used. Such means of bonding shall apply to all intervening raceways, fittings, boxes, and enclosures, between hazardous areas and the point of grounding for service equipment. Where flexible conduit is used as permitted in 1.3(4) Class I, Division 2 bonding jumpers with proper fitting shall be provided around such conduit.

c. Lightning protection. Each ungrounded service conductor of a wiring system in a Class I location, when supplied from an overhead line in an area where lightning disturbances are prevalent, shall be protected by a lightning protective device of proper type. Lightning protective devices shall be connected to the service conductors on the supply side of the service disconnecting means, and shall be bonded to the raceway system at the service entrance.

Also refer to 1.4(3).

d. Grounded service conductor bonded to raceway. Wiring in a Class I location when supplied from a grounded alternating current supply system in which a grounded conductor is a part of the service, shall have the grounded service conductor bonded to the raceway system and to the grounding conductor for the raceway system. The bonding connection to the grounded service conductor shall be made on the supply side of the service disconnecting means.

e. Transformer ground bonded to raceway. Wiring in a Class I location, when supplied from a grounded alternating current supply system in which no grounded conductor is a part of the service, shall be provided with a metallic connection between the supply system ground and the raceway system at the service entrance. The metallic connection shall have an ampacity not less than 1/5 that of the service conductors, and shall in no case be smaller than No. 10 when of soft copper, or No. 12 when of medium or hard-drawn copper.

f. Multiple grounds. Where it is necessary to abandon one or more grounding connections to avoid objectionable passage of current over the grounding conductors, the connection required in 1.3(16)*"d"* and *"e"* shall not be abandoned while any other grounding connection remains connected to the supply system.

1.4 (88A) Class II installations.

1.4 (1) *General.* This rule shall apply to the installation of electrical wiring and apparatus in locations classified as Class II under 1.2(88A), except as modified by this section.

Equipment installed in Class II locations shall be able to function at full rating without developing surface temperatures high enough to cause excessive dehydration or gradual carbonization of any organic dust deposits that may occur. Dust which

is carbonized or is excessively dry is highly susceptible to spontaneous ignition. In general, maximum surface temperatures under actual operating conditions shall not exceed 165°C. (329°F.) for equipment which is not subject to overloading, and 120°C. (248°F.) for equipment such as motors, power transformers, which may be overloaded.

Equipment and wiring of the type defined in 1.1(88A) as explosion-proof is not required in Class II locations, and may not be acceptable unless approved for such locations.

1.4 (2) *Transformers and capacitors.* The installation of transformers and capacitors shall conform to the following:

a. Class II, Division 1. In Class II, Division 1 locations, transformers and capacitors shall conform to the following:

(1) *Containing a liquid that will burn.* Transformers and capacitors containing a liquid that will burn shall be installed only in approved vaults conforming to sections 1.3(2)"*a*", (1) to (5) inclusive, and in addition (*a*) door or other openings communicating with the hazardous area shall have self-closing fire doors on both sides of the wall, and the doors shall be carefully fitted and provided with suitable seals (such as weather stripping) to minimize the entrance of dust into the vault, (*b*) vent openings and ducts shall communicate only with the outside air, and (*c*) suitable pressure-relief openings communicating with the outside air shall be provided.

(2) *Not containing a liquid that will burn.* Transformers and capacitors which do not contain a liquid that will burn shall (*a*) be installed in vaults conforming to 1.3(2)"*a*", (1) to (5) inclusive, or (*b*) be approved as a complete assembly including terminal connections for Class II locations.

(3) *Metal dusts.* No transformer or capacitor shall be installed in a location where dust from magnesium, aluminum, aluminum bronze powders, or other metals of similarly hazardous characteristics may be present.

b. Class II, Division 2. In Class II, Division 2 locations, transformers and capacitors shall conform to the following:

(1) *Containing a liquid that will burn.* Transformers and capacitors containing a liquid that will burn shall be installed in vaults conforming to 1.3(2)"*a*", (1) to (5) inclusive.

(2) *Containing askarel.* Transformers containing askarel and rated in excess of 25 kva shall (*a*) be provided with pressure-relief vents, (*b*) be provided with means for absorbing any gases generated by arcing inside the case, or the pressure-relief vents shall be connected to a chimney or flue which will carry such gases outside the building and (*c*) have an air space of not less than 6 inches between the transformer cases and any adjacent combustible material.

(3) *Dry-type transformers.* Dry-type transformers shall be installed in vaults or shall (*a*) have their windings and terminal connections enclosed in tight metal housings without ventilating or other openings, and (*b*) operate at voltages not exceeding 600 volts.

1.4 (3) *Surge protection, Class II, Divisions 1 and 2.* In geographical locations where lightning disturbances are prevalent, wiring systems in Class II locations shall, when supplied from overhead lines, be suitably protected against high-voltage surges. This protection shall include suitable lightning protective devices, interconnection of all grounds, and surge-protective capacitors.

Interconnection of all grounds shall include grounds for primary and secondary lightning protective devices, secondary system grounds if any, and grounds of conduit and equipment of the interior wiring system. For ungrounded secondary systems, secondary lightning protective devices may be provided both at the service and at the point where the secondary system receives its supply, and the intervening secondary conductors may be accepted as the metallic connection between the secondary protective devices, provided grounds for the primary and secondary devices are metallically interconnected at the supply end of the secondary system and the secondary devices are grounded to the raceway system at the load end of the secondary system.

Surge protective capacitors shall be of a type especially designed for the duty, shall be connected to each ungrounded service conductor, and shall be grounded to the interior conduit system. Capacitors shall be protected by 30-ampere fuses of suitable type and voltage rating, or by automatic

circuit breakers of suitable type and rating and shall be connected to the supply conductors on the supply side of the service disconnecting means.

1.4 (4) *Wiring methods.* Wiring methods shall conform to the following:

a. Class II, Division 1. In Class II, Division I locations, threaded rigid metal conduit or Type MI cable with termination fittings approved for the location shall be the wiring method employed. Type MI cable shall be installed and supported in a manner to avoid tensile stress at the termination fittings.

(1) *Fittings and boxes.* Fittings and boxes shall be provided with threaded bosses or hubs for connection to conduit or cable terminations, shall have close fitting covers, and shall have no openings (such as holes for attachment screws) through which dust might enter, or through which sparks or burning material might escape. Fittings and boxes in which taps, joints or terminal connections are made, or which are used in locations where dusts are of an electrically conducting nature shall be dust-ignition-proof and approved for Class II locations.

(2) *Flexible connections.* Where necessary to employ flexible connections, dust-tight flexible connectors, flexible metal conduit with approved fittings, or flexible cord approved for extra-hard usage and provided with bushed fitting shall be used, except that where dusts are of an electrically conducting nature, flexible metal conduit shall not be used, and flexible cords shall be provided with dust-tight seals at both ends. An additional conductor for grounding shall be provided in the flexible cord unless other acceptable means of grounding is provided. Where flexible connections are subject to oil or other corrosive conditions, the insulation of the conductors shall be of a type approved for the condition or shall be protected by means of a suitable sheath.

b. Class II, Division 2. In Class II, Division 2 locations, rigid metal conduit, electrical metallic tubing, Type MI cable with approved termination fittings, or approved Type MC or ALS cable with approved termination fittings for Class II locations shall be the wiring method employed.

(1) *Fittings and boxes.* Fittings and boxes in which taps, joints or terminal connections are made shall be designed to minimize the entrance of dust, and (*a*) shall be provided with telescoping or close fitting covers, or other effective means to prevent the escape of sparks or burning material, and (*b*) shall have no openings (such as holes for attachment screws) through which, after installation, sparks or burning material might escape, or through which adjacent combustible material might be ignited.

(2) *Flexible connections.* Where flexible connections are necessary the provisions of 1.4(4)"*a*"(2) shall apply.

1.4 (5) *Sealing, Class II, Divisions 1 and 2.* Where a raceway provides communication between an enclosure which is required to be dust-ignition-proof and one which is not, suitable means shall be provided to prevent the entrance of dust into the dust-ignition-proof enclosure through the raceway. This means may be (*a*) a permanent and effective seal, (*b*) a horizontal section not less than 10 feet long in the raceway, or (*c*) a vertical section of raceway not less than 5 feet long and extending downward from the dust-ignition-proof enclosure. Sealing fittings shall be accessible.

1.4 (6) *Switches, circuit breakers, motor controllers, and fuses.* Switches, circuit breakers, motor controllers and fuses shall conform to the following:

a. Class II, Division 1. In Class II, Division 1 locations, switches, circuit breakers, motor controllers and fuses shall conform to the following:

(1) *Type required.* Switches, circuit breakers, motor controllers, and fuses, including push buttons, relays and similar devices, which are intended to interrupt current in the normal performance of the function for which they are installed, or which are installed where dusts of an electrically conducting nature may be present, shall be provided with dust-ignition-proof enclosures which, together with the enclosed apparatus in each case, shall be approved as a complete assembly for Class II locations.

This includes service and branch circuit fuses, switches and circuit breakers, motor controllers (including push buttons, pilot switches, relays, and motor overload protective devices), and switches, fuses and circuit breakers for the control and protection of lighting and appliance circuits.

(2) *Isolating switches.* Disconnecting and isolating switches containing

no fuses and not intended to interrupt current, and which are not installed where dusts may be of an electrically conducting nature, shall be provided with tight metal enclosures which shall be designed to minimize the entrance of dust, and which shall be equipped with telescoping or close fitting covers, or with other effective means to prevent the escape of sparks or burning material, and have no openings (such as holes for attachment screws) through which, after installation, sparks or burning material might escape, or through which exterior accumulations of dust or adjacent combustible material might be ignited.

(3) *Metal dusts.* In locations where dust from magnesium, aluminum, aluminum bronze powders, or other metals of similarly hazardous characteristics may be present, fuses, switches, motor controllers and circuit breakers shall have enclosures specifically approved for such locations.

b. Class II, Division 2. In Class II, Division 2 locations, enclosures for fuses, switches, circuit breakers and motor controllers including push buttons, relays and similar devices, shall conform to the requirements of 1.4(6)"*a*"(2).

1.4 (7) *Control transformers and resistors.* Transformers, solenoids, impedance coils and resistors used as or in conjunction with control equipment for motors, generators and appliances shall conform to the following:

a. Class II, Division 1. In Class II, Division 1 locations, control transformers, solenoids, impedance coils and resistors, and any overcurrent devices or switching mechanisms associated with them shall have dust-ignition-proof enclosures approved for Class II locations. No control transformer, impedance coil or resistor shall be installed in a location where dust from magnesium, aluminum, aluminum bronze powders, or other metals of similarly hazardous characteristics may be present unless provided with an enclosure specifically approved for such locations.

b. Class II, Division 2. In Class II, Division 2 locations, transformers and resistors shall conform to the following:

(1) *Switching mechanisms.* Switching mechanisms (including overcurrent devices) associated with control transformers, solenoids, impedance coils and resistors,, shall be provided with enclosures conforming to 1.4(6)"*a*"(2).

(2) *Coils and windings.* Where not located in the same enclosure with switching mechanisms, control transformers, solenoids and impedance coils shall be provided with tight metal housings without ventilating openings.

(3) *Resistors.* Resistors and resistance devices shall have dust-ignition-proof enclosures approved for Class II locations, except that where the maximum normal operating temperature of the resistor will not exceed 120°C. (248°F.) nonadjustable resistors and resistors which are part of an automatically timed starting sequence may have enclosures conforming to 1.4"*b*"(2).

1.4 (8) *Motors and generators.* Motors and generators shall conform to the following:

a. Class II, Division 1. In Class II, Division 1 locations, motors, generators, and other rotating electrical machinery shall be totally enclosed not ventilated, totally enclosed pipe-ventilated, or totally enclosed fan-cooled, and shall be approved as dust-ignition-proof for Class II locations. Motors, generators or other rotating electrical machinery shall not be installed in locations where dust from magnesium, aluminum, aluminum bronze powders, or other metals of similarly hazardous characteristics may be present unless such machines are totally enclosed, or totally enclosed fan-cooled, and specifically approved for such locations.

b. Class II, Division 2. In Class II, Division 2 locations, motors, generators and other rotating electrical machinery shall be totally enclosed not ventilated, totally enclosed pipe-ventilated, or totally enclosed fan-cooled, except that in locations where, in the judgment of the rule enforcing authority, only moderate accumulations of nonconducting, nonabrasive dust are likely to occur, and where the equipment is readily accessible for routine cleaning and maintenance self-cleaning textile motors of the squirrel-cage type, standard open type machines without sliding contacts, centrifugal or other types of switching mechanism (including motor overcurrent devices), or integral resistance devices, or standard open type machines having such contacts, switching mechanisms or resistance devices enclosed within tight metal housings with-

out ventilating or other openings, may be installed. Motors, generators or other rotating electrical machinery of partially enclosed or splash proof type shall not be installed in such locations.

1.4 (9) *Ventilating piping.* Vent pipes for motors, generators or other rotating electrical machinery, or for enclosures for electrical apparatus or equipment, shall be of metal not lighter than No. 24 USS gage, or of equally substantial noncumbustible material, and shall lead directly to a source of clean air outside of buildings; be screened at the outer ends to prevent the entrance of small animals or birds; be protected against physical damage and against rusting or other corrosive influences. In addition, vent pipes shall conform to the following:

a. Class II, Division 1. In Class II, Division I locations, vent pipes, including their connections to motors or to the dust-ignition-proof enclosures for other equipment or apparatus, shall be dust-tight throughout their length. For metal pipes, seams and joints shall be (1) riveted (or bolted) and soldered, (2) welded, or (3) rendered dust-tight by some other equally effective means.

b. Class II, Division 2. In Class II, Division 2 locations, vent pipes and their connections shall be sufficiently tight to prevent the entrance of appreciable quantities of dust into the ventilated equipment or enclosure, and to prevent the escape of sparks, flame or burning material which might ignite dust accumulations or combustible material in the vicinity. For metal pipes, lock seams and riveted or welded joints may be used, and tight-fitting slip joints may be used where some flexibility is necessary as at connections to motors.

1.4 (10) *Utilization equipment, fixed and portable.* Utilization equipment, fixed and portable, shall conform to the following:

a. Class II, Division 1. In Class II, Division 1 locations, utilization equipment, including electrically heated and motor-driven equipment, shall be dust-ignition-proof approved for Class II locations. Where dust from magnesium, aluminum, aluminum bronze powders, or other metals of similarly hazardous characteristics may be present, such equipment shall be specifically approved for such locations.

b. Class II, Division 2. In Class II, Division 2 locations, utilization equipment, fixed and portable, shall conform to the following:

(1) *Heaters.* Electrically heated utilization equipment shall be dust-ignition-proof approved for Class II locations.

(2) *Motors.* Motors of motor-driven utilization equipment shall conform to 1.4(8)*"b"*.

(3) *Switches, circuit breakers and fuses.* Enclosures for switches, circuit breakers, and fuses shall conform to 1.4(6)*"a"*(2).

(4) *Transformers, impedance coils and resistors.* Transformers, solenoids, impedance coils and resistors shall conform to 1.4(7)*"b"*.

1.4 (11) *Ligting fixtures.* Lamps shall be installed in fixtures which shall conform to the following:

a. Class II, Division 1. In Class II, Division 1 locations, lighting fixtures for fixed and portable lighting shall conform to the following:

(1) *Approved fixtures.* Each fixture shall be dust-ignition-proof and approved for Class II locations, and shall be clearly marked to indicate the maximum wattage of the lamp for which it is approved. In locations where dust from magnesium, aluminum, aluminum bronze powders, or other metals of similarly hazardous characteristics may be present, fixtures for fixed or portable lighting, and all auxiliary equipment, shall be specifically approved for such locations.

(2) *Physical damage.* Each fixture shall be protected against physical damage by a suitable guard or by location.

(3) *Pendant fixtures.* Pendant fixtures shall be suspended by threaded rigid conduit stems or chains with approved fittings, or by other approved means. For rigid stems longer than 12 inches permanent and effective bracing against lateral displacement shall be provided at a level not more than 12 inches above the lower end of the stem, or flexibility in the form of a fitting or a flexible connector approved for the purpose and for the location shall be provided not more than 12 inches from the point of attachment to the supporting box or fitting. Threaded joints shall be provided with setscrews or other effective means to prevent loosening. Where wiring

between an outlet box or fitting and a pendant fixture is not enclosed in conduit, flexible cord approved for hard usage shall be used, and suitable seals shall be provided where the cord enters the fixture and the outlet box or fitting. Flexible cord shall not serve as the supporting means for a fixture.

(4) *Supports.* Boxes, box assemblies, or fittings used for the support of lighting fixtures shall be approved for the purpose and for Class II locations.

b. Class II, Division 2. In Class II, Division 2 locations, lighting fixtures shall conform to the following:

(1) *Portable lamps.* Portable lamps shall be dust-ignition-proof and approved for Class II locations. They shall be clearly marked to indicate the maximum wattage of lamps for which they are approved.

(2) *Fixed lighting.* Lighting fixtures for fixed lighting, when not of a type approved for Class II locations, shall provide enclosures for lamps and lampholders which shall be designed to minimize the deposit of dust on lamps and to prevent the escape of sparks, burning material or hot metal. Each fixture shall be clearly marked to indicate the maximum wattage of lamp which may be used without exceeding a maximum exposed surface temperature of 165°C. (329°F.) under normal conditions of use.

(3) *Physical damage.* Lighting fixtures for fixed lighting shall be protected from physical damage by suitable guards or by location.

(4) *Pendant fixtures.* Pendant fixtures shall be suspended by threaded rigid conduit stems or chains with approved fittings, or by other approved means. For rigid stems longer than 12 inches permanent and effective bracing against lateral displacement shall be provided at a level not more than 12 inches above the lower end of the stem, or flexibility in the form of a fitting or a flexible connector approved for the purpose shall be provided not more than 12 inches from the point of attachment to the supporting box or fitting. When wiring between an outlet box or fitting and a pendant fixture is not enclosed in conduit, flexible cord approved for hard usage shall be used. Flexible cord shall not serve as the supporting means for a fixture.

(5) *Supports.* Boxes, box assemblies and fittings used for the support of lighting fixtures shall be approved for that purpose.

(6) *Electric discharge lamps.* Starting and control equipment for mercury vapor and fluorescent lamps shall conform to the requirement of 1.4(7)"*b*".

1.4 (12) *Flexible cords, Class II, Divisions 1 and 2.* Flexible cords used in Class II locations shall (*a*) be of a type approved for extra hard usage, (*b*) contain, in addition to the conductors of the circuit, a grounding conductor conforming to section 1.3(11), (*c*) be connected to terminals or to supply conductors in an approved manner, (*d*) be supported by clamps or by other suitable means in such a manner that there will be no tension on the terminal connections, and (*e*) be provided with suitable seals to prevent the entrance of dust where the flexible cord enters boxes or fittings which are required to be dust-ignition-proof.

1.4 (13) *Receptacles and attachment plugs.*

a. Class II, Division 1. In Class II, Division 1 locations, receptacles and attachment plugs shall be of the type provided for connection to the grounding conductor of the flexible cord, and shall be dust-ignition-proof approved for Class II locations.

b. Class II, Division 2. In Class II, Division 2 locations, receptacles and attachment plugs shall be of the type providing for connection to the grounding conductor of the flexible cord and shall be so designed that connection to the supply circuit cannot be made or broken while live parts are exposed.

1.4 (14) *Signal, alarm, remote-control, and local loud-speaker intercommunication systems.* Signal, alarm, remote-control and local loud-speaker intercommunication systems shall conform to the following:

a. Class II, Division 1. In Class II, Division 1 locations, signal, alarm, remote-control and local loud-speaker intercommunication systems shall conform to the following:

(1) *Wiring method.* Where accidental damage or breakdown of insulation might cause arcs, sparks or high temperatures, rigid metal conduit, electri-

cal metallic tubing, or Type MI cable with approved termination fittings shall be the wiring method employed. For conduit or electrical metallic tubing, the number of conductors shall be limited only by the requirement that the cross-sectional area of all conductors shall not exceed 40 percent of the area of the raceway. Where limited flexibility is desirable or where exposure to physical damage is not severe, flexible cord approved for extra hard usage may be used.

(2) *Contacts.* Switches, circuit breakers, relays, contactors and fuses which may interrupt other than voice currents, and current-breaking contacts for bells, horns, howlers, sirens and other devices in which sparks or arcs may be produced, shall be provided with enclosures approved for the location, unless current-breaking contacts are immersed in oil, or unless the interruption of current occurs within a chamber sealed against the entrance of dust, in which case enclosures may be of general purpose type.

(3) *Resistors and similar equipment.* Resistors, transformers and choke coils which may carry other than voice currents, and rectifiers, thermionic tubes, and other heat generating equipment or apparatus shall be provided with dust-ignition-proof enclosures approved for Class II locations.

(4) *Rotating machinery.* Motors, generators and other rotating electrical machinery shall conform to 1.4(8)*"a"*.

(5) *Electrical conducting dusts.* Where dusts are of an electrically conducting nature, all wiring and equipment shall be approved for Class II locations.

(6) *Metal dusts.* Where dust from magnesium, aluminum, aluminum bronze powders, or other metals of similarly hazardous characteristics may be present, all apparatus and equipment shall be specifically approved for such conditions.

b. Class II, Division 2. In Class II, Division 2 locations, signal, alarm, remote-control and local loud-speaker intercommunication systems shall conform to the following:

(1) *Contacts.* Enclosures shall conform to 1.4(14)*"a"*(2) or contacts shall have tight metal enclosures designed to minimize the entrance of dust, and shall have telescoping or tight fitting covers and no openings through which, after installation, sparks or burning material might escape.

(2) *Transformers and similar equipment.* The windings and terminal connections of transformers and choke coils shall be provided with tight metal enclosures without ventilating openings.

(3) *Resistors and similar equipment.* Resistors, resistance devices, thermionic tubes, and rectifiers shall conform to 1.4(14)*"a"*(3) except that enclosures for thermionic tubes, nonadjustible resistors or rectifiers for which maximum operating temperature will not exceed 120°C. (248°F.) may be of general purpose type.

(4) *Rotating machinery.* Motors, generators and other rotating electrical machinery shall conform to 1.4(8)*"b"*.

1.4 (15) *Live parts, Class II, Divisions 1 and 2.* There shall be no exposed live parts.

1.4 (16) *Grounding, Class II, Divisions 1 and 2.* Wiring and equipment shall be grounded in conformity with the following:

a. Exposed parts. See 1.3(16)*"a"*.

b. Bonding. The locknut-bushing and double-locknut types of contact shall not be depended upon for bonding purposes, but bonding jumpers with proper fittings, or other approved means shall be used. Such means of bonding shall apply to all intervening raceways, fittings, boxes, and enclosures, between hazardous areas and the point of grounding for service equipment. Where flexible conduit is used as permitted in 1.4(4), bonding jumpers with proper fittings shall be provided around such conduit.

c. Lightning protection. Each ungrounded service conductor of a wiring system in a Class II location, when supplied from an ungrounded overhead electrical supply system in an area where lightning disturbances are prevalent, shall be protected by a lightning protective device of proper type. Lightning protective devices shall be connected to the service conductors on the supply side of the service disconnecting means, and shall be bonded to the raceway system at the service entrance.

d. Grounded service conductor bonded to raceway. Wiring in a Class II location, when supplied from a grounded

alternating-current supply system in which a grounded conductor is a part of the service, shall have the grounded service conductor bonded to the raceway system and to the grounding conductor for the raceway system. The bonding connection to the grounded service conductor shall be made on the supply side of the service disconnecting means.

e. Transformer ground bonded to raceway. Wiring in a Class II location, where supplied from a grounded alternating-current supply system in which no grounded conductor is a part of the service, shall be provided with a metallic connection between the supply system ground and the raceway system at the service entrance. The metallic connection shall have an ampacity not less than 1/5 that of the service conductors, and shall in no case be smaller than No. 10 when of soft copper, or No. 12 when of medium or hard-drawn copper.

f. Multiple grounds. Where it is necessary to abandon one or more grounding connections to avoid objectionable passage of current over the grounding conductors, the connection required in 1.4(16) "*d*" or "*e*" shall not be abandoned while any other grounding connection remains connected to the supply system.

1.5(88A) Class III installations.

1.5 (1) *General.* This rule shall apply to the installation of electrical wiring and apparatus in locations classified as Class III under section 1.2(5) except as modified by this section.

Equipment installed in Class III locations shall be able to function at full rating without developing surface temperatures high enough to cause excessive dehydration or gradual carbonization of accumulated fibers or flyings. Organic material which is carbonized or is excessively dry is highly susceptible to spontaneous ignition. In general, maximum surface temperatures under operating conditions shall not exceed 165°C. (329°F.) for equipment which is not subject to overloading, and 120°C. (248°F.) for equipment such as motors, and power transformers, which may be overloaded.

1.5 (2) *Transformers and capacitors, Class III, Divisions 1 and 2.* Transformers and capacitors shall conform to 1.4(2)"*b*".

1.5 (3) *Wiring methods.* Wiring methods shall conform to the following:

a. Class III, Division 1. In Class III, Division 1 locations, rigid metal conduit or Type MI cable shall be the wiring method employed.

(1) *Boxes and fittings.* Fittings and boxes in which taps, joints or terminal connections are made shall be provided with telescoping or close fitting covers, or other effective means to prevent the escape of sparks or burning material, and shall have no openings (such as holes for attachment screws) through which, after installation, sparks or burning material might escape, or through which adjacent combustible material might be ignited.

(2) *Flexible connections.* Where flexible connections are necessary the provisions of 1.4(4)"*a*"(2) shall apply.

b. Class III, Division 2. In Class III, Division 2 locations, the wiring method shall conform to 1.5(3)"*a*", except that in sections, compartments or areas used solely for storage and containing no machinery, open wiring on insulators may be employed when installed to conform to the following:

DEFINITION. Open wiring is a wiring method using cleats, knobs, tubes and flexible tubing for the protection and support of insulated conductors run in or on buildings, and not concealed by the building structure.

USE. Open wiring on insulators may be used for exposed work, either inside or outside building; in dry or wet locations; where subject to corrosive vapors such as covered by 1.7(7)"*a*" through "*g*"; for services provided the requirements of this section are satisfied.

Open wiring on insulators shall not be used (1) in commercial garages (2) in theaters, (3) in motion-picture studios, (4) in hoistways, and (5) in hazardous locations, except in storage compartments of Class III locations as provided in 1.5(3)"*b*".

Conductors. Only single conductors shall be used.

The allowable ampacities of insulated conductors (per manufacturer's specifications) shall apply to open wiring on insulators.

Supports. Conductors shall not be in contact with any object other than their insulating supports. They shall be rigidly sup-

ported on noncombustible, nonabsorptive insulating material as follows:

(1) Under ordinary circumstances, supports for wiring over flat surfaces shall be not more than 4½ feet apart. Where the conductors are likely to be disturbed, the distance between supports shall be shortened sufficiently to provide adequate support for conductors;

(2) Conductors shall be supported within 6 inches of a tap;

(3) Conductors shall not be dead ended at a rosette, lampholder, or receptacle unless the last support is within 12 inches of the device.

The following exceptions to the provisions of 1.5(3)"*b*", Supports, may be permitted:

EXCEPTION No. 1. For use of nonmetallic flexible tubing, see 1.5(3)"*b*", Flexible Nonmetallic Tubing.

EXCEPTION No. 2. Conductors of No. 8 or larger installed in the open across open spaces where not likely to be disturbed, may be supported at distances not greater than 15 feet provided that approved noncumbustible, nonabsorptive insulating separators assuring not less than 2½-inch separation between conductors, are installed at intervals of not over 4½ feet.

EXCEPTION No. 3. In buildings of mill construction where not likely to be disturbed, feeders in the open, not smaller than No. 8, may be separated about six inches and installed direct from timber to timber, being supported from each timber only.

When nails are used to mount knobs, they shall be not smaller than tenpenny. When screws are used to mount knobs, or when nails or screws are used to mount cleats, they shall be of a length sufficient to penetrate the wood to a depth equal to at least one-half the height of the knob and fully the thickness of the cleat. Cushion washers shall be used with nails.

Conductor separation. Open conductors shall be separated as follows:

For voltage not exceeding 300 volts between conductors, 2½ inches from each other and shall be separated from the surface wired over at least 1/2 inch in dry locations.

For voltages of 301 to 600 volts between conductors, 4 inches from each other and shall be separated from surface wired over at least 1 inch.

In damp or wet locations, a separation of at least 1 inch from the surface wired over shall be maintained for all voltages.

Flexible nonmetallic tubing. In dry locations, when not exposed to severe physical damage, conductors may be separately encased in flexible tubing. Tubing shall be in continuous length not exceeding 15 feet, and secured to the surface wired over by straps spaced not exceeding 4½ feet apart.

Tie wires. No. 8 or larger conductors supported on solid knobs shall be securely tied thereto. Tie wires shall have a covering equivalent to conductors which they confine.

Passing through walls and floors. Open conductors shall be separated from contact with walls, floors, timbers or partitions through which they pass by tubes or bushings of noncumbustible, nonabsorptive insulating material. Where the bushing is shorter than the hole, a waterproof sleeve of noninductive material shall be inserted in the hole and an insulating bushing slipped into the sleeve at either end in such a manner as to keep the conductors absolutely out of contact with the sleeeve. Each conductor must be carried through a separate tube or sleeve.

Separation from metal work. Open conductors shall be separated at least 2 inches from metallic conduit, piping, or other conducting material and from any exposed lighting, power or signal conductor, or shall be separated therefrom by a continuous and firmly fixed nonconductor additional to the insulation of the conductor. Where any insulating tube is used, it shall be secured at the ends. Deviation from this requirement may, when necessary, be allowed by the authority enforcing these rules.

Separation from piping in damp locations. Open conductors located close to water pipes or tanks, or in other damp locations, shall be so placed that an air space will be permanently maintained between them and pipes, which they cross. Where practicable, conductors shall be installed over, rather than under, pipes upon which moisture is likely to gather or which may leak.

Protection from physical damage. Where open conductors cross ceiling joists and wall studs, and are exposed to physical

damage, they shall be protected by one of the following methods. Conductors within 7 feet from the floor shall be considered exposed to physical damage.

By guard strips not less than 7/8 inch in thickness and at least as high as the insulating supports, placed on each side of and close to the wiring.

By a substantial running board at least 1/2 inch thick back of the conductors with side protections. Running boards shall extend at least 1 inch outside the conductors, but not more than 2 inches and the protecting sides shall be at least 2 inches high and at least 7/8 inch thick.

By boxing made as above and furnished with cover kept at least 1 inch away from the conductors within. Where protecting vertical conductors on side walls the boxing shall be closed at the top and the holes through which the conductors pass shall be bushed.

By rigid metal conduit, electrical metallic tubing, or by metal piping, in which case the conductors shall be encased in continuous lengths of approved flexible tubing. The conductors passing through metal enclosures shall be so grouped that current in both directions is approximately equal.

In accessible attics. Conductors in unfinished attics or roof spaces shall be installed in accordance with the following:

Conductors in unfinished attics and roof spaces shall be run through or on the sides of joists, studs and rafters, except in attics and roof spaces having head room at all points of less than 3 feet in buildings completed before the wiring is installed.

Where conductors in accessible unfinished attics or roof spaces reached by stairway or permanent ladder are run through bored holes in floor joinsts or through bored holes in studs or rafters within 7 feet of the floor or floor joists, such conductors shall be protected by substantial running boards extending at least 1 inch on each side of the conductors and securely fastened in place.

Where carried along the sides of rafters, studs or floor joists, neither running boards nor guard strips will be required.

Entering spaces subject to dampness, wetness or corrosive vapors. Conductors entering or leaving locations subject to dampness, wetness or corrosive vapors shall have drip loops formed on them and shall then pass upward and inward from the outside of buildings, or from the damp, wet or corrosive location, through noncombustible, nonabsorptive insulating tubes.

Switches. Surface-type snap switches shall be mounted in accordance with the following:

Snap switches used with open wiring on insulators shall be mounted on subbases of insulating material which will separate the conductors at least 1/2 inch from the surface wired over. Metal boxes are not required.

Other types of switches shall be installed in accordance with the following:

Switches and circuit breakers shall be of the externally operable type enclosed in metal boxes or cabinets, except pendant and surface-type snap switches and knife switches mounted on an open-face switchboard or panelboard, but only on condition that protection as required by 1.5(3)*"b"*, Protection from Physical Damage, be provided where conductors are not run in roof spaces, and well out of reach of sources of physical damage.

1.5 (4) *Switches, circuit breakers, motor controllers and fuses, Class III, Divisions 1 and 2.* Switches, circuit breakers, motor controllers and fuses, including push buttons, relays and similar devices, shall be provided with tight metal enclosures designed to minimize entrance of fibers and flyings, and which shall (*a*) be equipped with telescoping or close fitting covers, or with other effective means to prevent escape of sparks or burning material, and (*b*) have no openings (such as holes for attachment screws) through which, after installation, sparks or burning material might escape, or through which exterior accumulations of fibers or flyings or adjacent combustible material might be ignited.

1.5 (5) *Control transformers and resistors, Class III, Divisions 1 and 2.* Transformers, impedance coils and resistors used as or in conjunction with control equipment for motors, generators and appliances, shall conform to 1.4(7)*"b"*, with the exception that, in Class III, Division 1 locations, when these devices are in the same enclosure with switching devices of such control equipment, and are used only for starting or short-time duty, the enclosure shall conform to the requirements of 1.5(4).

1.5 (6) *Motors and generators.* Motors and generators shall conform to the following:

a. Class III, Division 1. In Class III, Division 1 locations, motors, generators, and other rotating electrical machinery shall be totally enclosed not ventilated, totally enclosed pipe-ventilated, or totally enclosed fan-cooled, except that in locations where, in the judgment of the rule enforcing authority, only moderate accumulations of lint and flyings will be likely to collect on, in or in the vicinity of a rotating electrical machine, and where such machine is readily accessible for routine cleaning and maintenance, self-cleaning textile motors of the squirrel cage type, standard open type machines without sliding contacts, centrifugal or other types of switching mechanism (including motor overload devices), or standard open type machines having such contacts, switching mechanisms or resistance devices enclosed within tight metal housings without ventilating or other openings, may be installed.

b. Class III, Division 2. In Class III, Division 2 locations, motors, generators, and other rotating electrical machinery shall be totally enclosed not ventilated, totally enclosed pipe-ventilated, or totally enclosed fan-cooled.

c. Partially enclosed type, Class III, Divisions 1 and 2. Motors, generators or other rotating electrical machinery of the partially enclosed or splash-proof type shall not be installed in Class III locations.

1.5 (7) *Ventilating piping, Class III, Divisions 1 and 2.* Vent pipes for motors, generators or other rotating electrical machinery, or for enclosures for electrical apparatus or equipment, shall be of metal not lighter than No. 24 USS gage, or of equally substantial noncombustible material, and shall (*a*) lead directly to a source of clean air outside of buildings, (*b*) be screened at the outer ends to prevent the entrance of small animals or birds, (*c*) be protected against physical damage and against rusting or other corrosive influences, and (*d*) vent pipes and their connections shall be sufficiently tight to prevent the entrance of appreciable quantities of fibers or flyings into the ventilated equipment or enclosure, and to prevent the escape of sparks, flame or burning material which might ignite accumulations of fibers or flyings or combustible material in the vicinity. For metal pipes, lock seams and riveted or welded joints may be used, and tight fitting slip joints may be used where some flexibility is necessary as at connections to motors.

1.5 (8) *Utilization equipment, fixed and portable, Class III, Divisions 1 and 2.* Utilization equipment shall conform to the following:

a. Heaters. Electrically heated utilization equipment shall be approved for Class III locations.

b. Motors. Motors of motor-driven utilization equipment shall conform to 1.5(6)"*b*". Utilization equipment which may be readily moved from one location to another should conform to requirements for the most hazardous location.

c. Switches, circuit breakers, motor controllers and fuses. Switches, circuit breakers, motor controllers and fuses shall conform to 1.5(4).

1.5 (9) *Lighting fixtures, Class III, Divisions 1 and 2.* Lamps shall be installed in fixtures which shall conform to the following:

a. Fixed lighting. Lighting fixtures for fixed lighting shall provide enclosures for lamps and lampholders which shall be designed to minimize entrance of fibers and flyings, and to prevent the escape of sparks, burning material or hot metal. Each fixture shall be clearly marked to show wattage of lamp which may be used without exceeding a maximum exposed surface temperature of 165°C. (329°F.) under operating conditions of use.

b. Physical damage. A fixture which may be exposed to physical damage shall be protected by a suitable guard.

c. Pendant fixtures. Pendant fixtures shall be suspended by stems of threaded rigid conduit or threaded metal tubing of equivalent thickness. For stems longer than 12 inches, permanent and effective bracing against lateral displacement shall be provided at a level not more than 12 inches above the lower end of the stem, or flexibility in the form of a fitting or a flexible connector approved for the purpose shall be provided not more than 12 inches from the point of attachment to the supporting box or fitting.

d. Supports. Boxes, box assemblies or fittings used for the support of lighting fixtures shall be of a type approved for the purpose.

e. Portable lamps. Portable lamps shall be equipped with handles and protected with substantial guards, and lampholders shall be of unswitched type with no exposed metal parts and without provision for receiving attachment plugs. In all other respects, portable lamps shall conform to 1.5(9)"*a*".

1.5 (10) *Flexible cords, Class III, Divisions 1 and 2.* Flexible cords shall conform to 1.4(12).

1.5 (11) *Receptacles and attachment plugs, Class III, Divisions 1 and 2.* Receptacles and attachment plugs shall conform to 1.4(13)"*b*".

1.5 (12) *Signal, alarm, remote-control and local loud-speaker intercommunication systems, Class III, Divisions 1 and 2.* Signal, alarm, remote-control and local loud-speaker intercommunication systems shall conform to 1.4(14)"*a*".

1.5 (13) *Electric cranes and hoists, and similar equipment, Class III, Divisions 1 and 2.* Where installed for operation over combustible fibers or accumulations of flyings, traveling cranes and hoists for material handling, traveling cleaners for textile machinery, and similar equipment shall conform to the following:

a. Power supply to contact conductors shall be isolated from all other systems and shall be ungrounded, and shall be equipped with an acceptable recording ground detector which will give an alarm and will automatically de-energize the contact conductors in case of a fault to ground, or with an acceptable ground fault indicator which will give a visual and audible alarm and maintain the alarm as long as power is supplied to the system and the ground fault remains.

b. Contact conductors shall be so located or guarded as to be inaccessible to other than authorized persons, and shall be protected against accidental contact with foreign objects.

c. Current collectors shall be arranged or guarded to confine normal sparking and to prevent escape of sparks or hot particles. To reduce sparking, two or more separate surfaces of contact shall be provided for each contact conductor. Reliable means shall be provided to keep contact conductors and current collectors free of accumulations of lint or flyings.

d. Control equipment shall conform to 1.5(4) and 1.5(5).

It is recommended that where the distance of travel permits, current to the crane be supplied through flexible cord approved for extra hard usage and equipped with approved type of reel or takeup device.

1.5 (14) *Electric trucks.* Electric trucks shall be used, maintained and operated according to the manufacturer's instructions.

1.5 (15) *Storage battery charging equipment, Class III, Divisions 1 and 2.* Storage battery charging equipment shall be located in separate rooms built or lined with substantial noncumbustible materials so constructed as to adequately exclude flyings or lint, and shall be well ventilated.

1.5 (16) *Live parts, Class III, Divisions 1 and 2.* There shall be no exposed live parts except as provided in 1.5(13).

1.5 (17) *Grounding, Class III, Divisions 1 and 2.* Wiring and equipment shall be grounded in conformity with 1.4(16).

1.6 (88A) Hazardous locations—specific.

1.6 (1) *Scope.* The provisions of 1.7(88A), 1.8(88A), 1.9(88A), 1.10(88A), 1.11(88A), and 1.12(88A), inclusive, shall apply to occupancies or parts of occupancies which are or may be hazardous because of atmospheric concentrations of hazardous gases or vapors, or because of deposits or accumulations of materials which may be readily ignitible. It is the intent to assist rule enforcing authorities in the classification of areas with respect to hazardous conditions which may or may not require construction and equipment conforming to 1.3(88A) through 1.5(88A) of Hazardous Locations, and to set forth such additional special requirements as are applicable to the specific occupancy.

1.6 (2) *General.* These rules shall apply to the installation of electrical wiring and equipment in occupancies within the scope of 1.7(88A), 1.8(88A), 1.9(88A), 1.10(88A), 1.11(88A), and 1.12(88A), inclusive, except as such rules are modified in those sections. Where unusual conditions exist in a specific occupancy, the authority enforcing these rules shall judge with respect to the application of specific rules.

1.7 (88A) Commercial garages, repair and storage.

1.7 (1) *Scope.* These occupancies shall include locations used for service and repair operations in connection with self-propelled vehicles (including passenger automobiles, buses, trucks, and tractors) in which volatile flammable liquids or flammable gases are used for fuel or power, and locations in which more than three such vehicles are or may be stored at one time.

1.7 (2) *Hazardous areas.* Classification under 1.2(88A).

a. For each floor at or above grade, the entire area up to a level 18 inches above the floor shall be considered to be a Class I, Division 2 location.

b. For each floor below grade, the entire area up to a level 18 inches above the bottom of outside doors or other openings which are at or above grade level shall be considered to be Class I, Division 2 location. Where adequate positive pressure ventilation is provided, the authority enforcing these rules may judge that the hazardous location extends up to a level of only 18 inches above each such floor.

c. Any pit or depression below floor level shall be considered to be a Class I, Division 2 location which shall extend up to said floor level, except that any unventilated pit or depression may be judged by the authority enforcing these rules to be a Class I, Division 1 location.

d. Adjacent areas in which hazardous vapors are not likely to be released such as stock rooms, switchboard rooms and other similar locations, having floors elevated at least 18 inches above adjacent garage floor, or separated therefrom by tight curbs or partitions at least 18 inches high, shall not be classed as hazardous.

1.7 (3) *Wiring and equipment in hazardous areas.* Within hazardous areas as defined in 1.7(2), wiring and equipment shall conform to applicable provisions of 1.3(88A), Hazardous Locations.

1.7 (4) *Sealing.* Approved seals conforming to the requirements of 1.3(5) shall be provided, and 1.3(5) Class I, Division 2 "*b*", shall apply to horizontal as well as to vertical boundaries of the defined hazardous areas. Raceways embedded in a masonry floor or buried beneath a floor shall be considered to be within the hazardous area above the floor if any connections or extensions lead into or through such area.

1.7 (5) *Wiring in spaces above hazardous areas.*

a. All fixed wiring shall be in metallic raceways or shall be Type MI or Type ALS cable. Cellular metal floor raceways may be used only for supplying ceiling outlets or extensions to the area below the floor, but such raceways shall have no connections leading into or through any hazardous area above the floor. No electrical conductor shall be installed in any cell, header or duct which contains a pipe for steam, water, air, gas, drainage, or other service except electrical.

b. For pendants, flexible cord suitable for the type of service and approved for hard usage shall be used.

c. For connection of portable lamps, motors or other utilization equipment, flexible cord suitable for the type of service and approved for extra hard usage shall be used.

d. When a circuit which supplies portables or pendants includes an identified grounded conductor, receptacles, attachment plugs, connectors, and similar devices shall be of polarized type, and the identified conductor of the flexible cord shall be connected to the screw shell of any lampholder or to the identified terminal of any utilization equipment supplied.

e. When a pendant is used to supply a portable lamp or utilization equipment, the female portion of a polarized pin-plug connector or equivalent shall be attached to the lower end of the pendant, and the male portion shall be attached to the cord for the portable. The connector shall be designed to break apart readily in any position, and shall be suspended at a level not less than that specified in 1.7(2). Attachment plug receptacles in fixed position shall be located above the level specified in 1.7(2).

1.7 (6) *Equipment above hazardous areas.*

a. Equipment which is less than 12 feet above floor level, and which may produce arcs, sparks or particles of hot metal, such as cutouts, switches, receptacles, charging panels, generators, motors, or other equipment (excluding lamps and lampholders) having make-and-break or

sliding contacts, shall be of totally enclosed type or shall be provided with suitable guards or screens to prevent escape of sparks or hot metal particles.

b. Lamps and lampholders for fixed lighting which are located over lanes through which vehicles are commonly driven or which may otherwise be exposed to physical damage, shall be located not less than 12 feet above floor level unless of totally enclosed type or provided with suitable guards, screens or covers to prevent escape of sparks or hot metal particles.

c. Portable lamps shall be equipped with handle, lampholder hook and substantial guard attached to the lampholder or handle. All exterior surfaces which might come in contact with battery terminals, wiring terminals, or other objects shall be of nonconducting material or shall be effectively protected with insulation. Lampholders shall be of unswitched type, and shall not provide means for plug-in of attachment plugs. Outer shell shall be of moulded composition or other material approved for the purpose, and metal-shell, lined lampholders, either of switched or unswitched type, shall not be used. Unless the lamp and its cord are supported or arranged in such a manner that they cannot be used in the hazardous areas classified in 1.7(2), they shall be of a type approved for such hazardous locations.

1.7 (7) *Battery-charging equipment.* Battery chargers and their control equipment, and batteries being charged shall not be located within hazardous areas classified in 1.7(2). Tables, racks, trays, and wiring shall, in addition, conform to the following:

a. Scope. The provisions of this rule shall apply to all stationary installations of storage batteries using acid or alkali as the electrolyte and consisting of a number of cells connected in series with a nominal voltage in excess of 16 volts.

b. Definition of nominal battery voltage. The nominal battery voltage shall be calculated on the basis of 2.0 volts per cell for the lead-acid type, and 1.2 volts per cell for the alkali type.

c. Wiring and apparatus supplied from batteries. Wiring, appliances, and apparatus supplied from storage batteries shall be subject to the requirements of these rules applying to wiring, appliances, and apparatus operating at the same voltage.

d. Insulation of batteries of not over 250 volts. The provisions of this section shall apply to storage batteries having the cells so connected as to operate at a nominal battery voltage not exceeding 250 volts.

(1) *Lead-acid batteries.* Cells in lead-lined wood tanks, where the number of cells in series does not exceed 25, shall be supported individually on glass or glazed porcelain insulators. Where the number of the cells in series exceeds 25, the cells shall be supported individually on oil insulators.

(2) *Alkali-type batteries.* Cells of the alkali type in jars made of conducting material shall be installed in trays of nonconducting material, with not over 20 cells in a series circuit in any one such tray, or the cells may be supported singly or in groups on porcelain or other suitable insulators.

(3) *Unsealed jars.* Cells in unsealed jars made of nonconductive material shall be assembled in trays of glass or supported on glass or glazed porcelain insulators; or, where installed on a rack, shall be supported singly or in groups on glass or other suitable insulators.

(4) *Sealed rubber jars.* Cells in sealed rubber or composition containers shall require no additional insulating support where the total nominal voltage of all cells in series does not exceed 150 volts. Where the total voltage exceeds 150 volts, batteries shall be sectionalized into groups of 150 volts or less and each group shall have the individual cells installed in trays or on racks. Where trays or racks are required for this type of cell, such trays or racks shall be supported on glass or glazed porcelain insulators or oil-type insulators.

(5) *Sealed glass or plastic jars.* Cells in sealed glass jars or in sealed jars of approved heat-resistant plastic, with or without wood trays, require no additional insulation.

e. Insulation of batteries of over 250 volts. The provisions of 1.7(7)"*d*" shall apply to storage batteries having the cells so connected as to operate at a nominal voltage exceeding 250 volts and, in addition, the provisions of this section shall also apply to such batteries. Cells shall be

installed in groups having a total nominal voltage of not over 250 volts, in trays or on racks supported on oil insulators.

EXCEPTION No. 1. Where each individual cell, or subgroup in the tray or rack, is supported on oil insulators, no additional insulation for the group need be provided.

EXCEPTION No. 2. Cells of not over 10 ampere-hour capacity in sealed glass jars may be grouped in trays, the total nominal voltage of all cells in such group not to exceed 250 volts, and each such tray to be supported on glass or glazed porcelain insulators, the trays being mounted on racks supported on oil insulators with a total nominal voltage of not over 500 volts for all cells in series on each such insulated rack.

Maximum protection is secured by sectionalizing high-voltage batteries into cell groups insulated from each other.

f. Racks and trays. Racks and trays shall conform to the following:

(1) *Racks.* Racks, as required in this rule, refer to frames designed to support cells or trays. They shall be substantial, and made of:

Wood, so treated as to be resistant to deteriorating action by the electrolyte; or

Metal, so treated as to be resistant to deteriorating action by the electrolyte, and provided with nonconducting members directly supporting the cells or with suitable insulating material on conducting members; or

Other similar suitable construction.

(2) *Trays.* Trays refer to frames such as crates or shallow boxes usually of wood or other nonconducting material, so constructed or treated as to be resistant to deteriorating action by the electrolyte.

g. Battery rooms. Battery rooms shall conform to the following:

(1) *Use.* Separate battery rooms or enclosures shall be required only for batteries in unsealed jars and tanks where the aggregate capacity at the 8-hour discharge rate exceeds 5 kilowatt hours.

(2) *Ventilation.* Provision shall be made for sufficient diffusion and ventilation of the gases from the battery to prevent the accumulation of an explosive mixture in the battery room.

(3) *Wiring method.* In storage battery rooms, bare conductors, open wiring, Type MI cable, Type ALS cable, or conductors in rigid conduit or electrical metallic tubing shall be used as the wiring method. Rigid metal conduit, or electrical metallic tubing, where used, shall be of corrosion-resistant material or shall be suitably protected from corrosion.

(4) *Varnished-cambric conductors.* Varnished-cambric-covered conductors, Type V, shall not be used.

(5) *Bare conductors.* Bare conductors shall not be taped.

(6) *Terminals.* Where metal raceway or other metallic covering is used in the battery room, at least 12 inches of the conductor at the end connected to a cell terminal shall be free from the raceway or metallic covering and shall be bushed by a substantial glazed insulating bushing. The end of the raceway shall be sealed tightly to resist the entrance of electrolyte by spray or by creepage. Sealing compound, rubber insulating tape or other suitable material shall be used for this purpose.

1.7 (8) *Electric vehicle charging.*

a. Flexible cords used for charging shall be suitable for the type of service and approved for extra hard usage. Their ampacity shall be adequate for the charging current.

b. Connectors shall have a rating not less than the ampacity of the cord, and in no case less than 50 amperes.

c. Connectors shall be so designed and installed that they will break apart readily at any position of the charging cable, and live parts shall be guarded from accidental contact. No connector shall be located within a hazardous area defined in 1.7(2).

d. Where plugs are provided for direct connection to vehicles, the point of connection shall not be within a hazardous area as defined in 1.7(2), and where the cord is suspended from overhead, it shall be so arranged that the lowest point of sag is at least 6 inches above the floor. Where the vehicle is equipped with an approved plug which will readily pull apart, and where an automatic arrangement is provided to pull both cord and plug beyond the range of physical damage, no additional connector is required in the cable or at the outlet.

1.8 (88A) Hazardous locations — aircraft hangars.

1.8 (1) *Definition.* This occupancy shall include locations used for storage or servicing of aircraft in which gasoline, jet fuels, or other volatile flammable liquids, or flammable gases, are used, but shall not include such locations when used exclusively for aircraft which have never contained such liquids or gases, or which have been drained and properly purged.

1.8 (2) *Hazardous areas.* Classification under 1.2(88A).

a. Any pit or depression below the level of the hangar floor shall be considered to be a Class I, Division 1 location which shall extend up to said floor level.

b. The entire area of the hangar including any adjacent and communicating areas not suitably cut off from the hangar shall be considered to be a Class I, Division 2 location up to a level 18 inches above the floor.

c. The area within 5 feet horizontally from aircraft power plants, aircraft fuel tanks or aircraft structures containing fuel shall be considered to be a Class I, Division 2 hazardous location which shall extend upward from the floor to a level 5 feet above the upper surface of wings and of engine enclosures.

d. Adjacent areas in which hazardous vapors are not likely to be released such as stock rooms, electrical control rooms, and other similar locations, should not be classed as hazardous when adequately ventilated and when effectively cut off from the hangar itself by walls or partitions.

1.8 (3) *Wiring and equipment in hazardous areas.* All fixed and portable wiring and equipment which is or may be installed or operated within any of the hazardous locations defined in 1.8(2) shall conform to applicable provisions of 1.3(88A). All wiring installed in or under the hangar floor shall conform to the requirements for Class I, Division 1. When such wiring is located in vaults, pits, or ducts, adequate drainage shall be provided, and the wiring shall not be placed within the same compartment with any other service except piped compressed air.

1.8 (4) *Wiring not within hazardous areas.*

a. All fixed wiring in a hangar, but not within a hazardous area as defined in 1.8(2), shall be installed in metallic raceways or shall be Type MI or Type ALS cable, except that wiring in nonhazardous locations as defined in 1.8(2)"*d*" may be of general purpose type.

b. For pendants, flexible cord suitable for the type of service and approved for hard usage shall be used. Each such cord shall include a separate grounding conductor.

c. For portable utilization equipment and lamps, flexible cord suitable for the type of service and approved for extra hard usage shall be used. Each such cord shall include a separate grounding conductor.

d. Where a circuit which supplies portables or pendants includes an identified grounded conductor, receptacles, attachment plugs, connectors, and similar devices shall be of polarized type, and the identified conductor of the flexible cord shall be connected to the screw shell of any lampholder or to the identified terminal of any utilization equipment supplied. Acceptable means shall be provided for maintaining continuity of the grounding conductor between the fixed raceway system and the noncurrent-carrying metallic portions of pendant fixtures, portable lamps, and portable utilization equipment.

1.8 (5) *Equipment not within hazardous areas.*

a. In locations other than those described in 1.8(2), equipment which is less than 10 feet above wings and engine enclosures of aircraft and which may produce arcs, sparks or particles of hot metal, such as lamps and lampholders for fixed lighting, cutouts, switches, receptacles, charging panels, generators, motors, or other equipment having make-and-break or sliding contacts, shall be of totally enclosed type or shall be provided with suitable guards or screens to prevent escape of sparks or hot metal particles, except that equipment in areas described in 1.8(2)"*d*", may be of general purpose type.

b. Lampholders of metal shell, fiber-lined types shall not be used for fixed incandescent lighting.

c. Portable lamps which are or may be used within a hangar shall be approved for Class I locations.

d. Portable utilization equipment which is or may be used within a hangar shall be of a type suitable for use in Class I, Division 2 locations.

1.8 (6) *Stanchions, rostrums, and docks.*

a. Electric wiring, outlets and equipment (including lamps) on or attached to stanchions, rostrums or docks which are located or likely to be located in a hazardous area as defined in 1.8(2)"*c*" shall conform to the requirements for Class I, Division 2 locations.

b. Where stanchions, rostrums, or docks are not located or likely to be located in a hazardous area as defined in 1.8(2)"*c*", wiring and equipment shall conform to 1.8(4) and 1.8(5), except that such wiring and equipment not more than 18 inches above the floor in any position shall conform to 1.8(6)"*a*". Receptacles and attachment plugs shall be of locking type which will not break apart readily.

c. Mobile stanchions with electrical equipment conforming to 1.8(6) shall carry at least one permanently affixed warning sign to read: "WARNING—KEEP 5 FEET CLEAR OF AIRCRAFT ENGINES AND FUEL TANK AREAS."

1.8 (7) *Sealing.* Approved seals shall be provided in conformance with Class I, Division 1, 1.3(5)"*c*", and Class I Division 2, 1.3(5)"*b*", and shall apply to horizontal as well as to vertical boundaries of the defined hazardous areas. Raceways embedded in a masonry floor or buried beneath a floor shall be considered to be within the hazardous area above the floor when any connections or extensions lead into or through such area.

1.8 (8) *Aircraft electrical systems.* Aircraft electrical systems should be deenergized when the aircraft is stored in a hangar, and, whenever possible, while the aircraft is undergoing maintenance.

1.8 (9) *Aircraft battery—charging and equipment.*

a. Aircraft batteries should not be charged when installed in an aircraft located inside or partially inside a hangar.

b. Battery chargers and their control equipment shall not be located or operated within any of the hazardous areas defined in 1.8(2), and should preferably be located in a separate building or in an area such as described in 1.8(2)"*d*". Mobile chargers shall carry at least one permanently affixed warning sign to read: "WARNING—KEEP 5 FEET CLEAR OF AIRCRAFT ENGINES AND FUEL TANK AREAS." Tables, racks, trays, and wiring shall not be located within a hazardous area, and shall, in addition, conform to the provisions of 1.7(7).

1.8 (10) *External power sources for energizing aircraft.*

a. Aircraft energizers shall be so designed and mounted that all electrical equipment and fixed wiring will be at least 18 inches above floor level and shall not be operated in a hazardous area as defined in 1.8(2)"*c*".

b. Mobile energizers shall carry at least one permanently affixed warning sign to read: "WARNING—KEEP 5 FEET CLEAR OF AIRCRAFT ENGINES AND FUEL TANK AREAS."

c. Aircraft energizers shall be equipped with polarized external power plugs and shall have automatic controls to isolate the ground power unit electrically from the aircraft in case excessive voltage is generated by the grounding power unit.

d. Flexible cords for aircraft energizers and ground support equipment shall be approved for the type of service and extra hard usage and shall include a ground conductor.

1.8 (11) *Mobile servicing equipment with electrical components.*

a. Mobile servicing equipment (such as vacuum cleaners, air compressors, and air movers) having electrical wiring and equipment not suitable for Class I, Division 2 locations shall be so designed and mounted that all such fixed wiring and equipment will be at least 18 inches above the floor. Such mobile equipment shall not be operated within the hazardous areas defined in 1.8(2)"*c*" and shall carry at least one permanently affixed warning sign to read: "WARNING—KEEP 5 FEET CLEAR OF AIRCRAFT ENGINES AND FUEL TANK AREAS."

b. Flexible cords for mobile equipment shall be suitable for the type of service and approved for extra hard usage, and shall include a grounding conductor. Attachment plugs and receptacles shall be approved for the location in which they are installed, and shall provide for connection of the grounding conductor to the raceway system.

c. Equipment not of a type suitable for Class I, Division 2 locations should

not be operated in areas where maintenance operations likely to release hazardous vapors are in progress.

1.8 (12) *Grounding.* All metallic raceways, and all noncurrent-carrying metallic portions of fixed or portable equipment, regardless of voltage, shall be grounded as provided in 1.3(16)"*a*".

1.9 (88A) Gasoline dispensing and service stations.

1.9 (1) *Definitions.* This classification shall include locations where gasoline or other volatile flammable liquids or liquefied flammable gases are transferred to the fuel tanks (including auxiliary fuel tanks) of self-propelled vehicles.

Other areas used as lubritoriums, service rooms and repair rooms, and offices, salesrooms, compressor rooms and similar locations shall conform to 1.6(88A) and 1.7(88A) with respect to electrical wiring and equipment.

Where the authority enforcing these rules can satisfactorily determine that flammable liquids having a flash point below 100°F. such as gasoline will not be handled, he may classify such an area as nonhazardous.

1.9 (2) *Hazardous areas.*

a. The space within the dispenser up to 4 feet from its base and the space within 18 inches extending horizontally from the dispenser up to 4 feet from its base shall be considered a Class I, Division 1 location. This classification shall also apply to any space below the dispenser which may contain electrical wiring or equipment.

b. In an outside location, any area (excluding Class I, Division 1, but including buildings not suitably cut off) within 20 feet horizontally from the exterior enclosure of any dispensing pump shall be considered a Class I, Division 2 location which will extend to a level 18 inches above driveway or ground level.

c. In an outside location, an area (excluding Class I, Division 1, but including buildings not suitably cut off) within 10 feet horizontally from any tank fill-pipe shall be considered a Class I, Division 2 location which shall extend upward to a level 18 inches above driveway or ground level.

d. Electrical wiring and equipment any portion of which is below the surface of areas defined as Class I, Division 1 or Division 2 in 1.9(2)"*a*", "*b*", and "*c*" above shall be considered to be within a Class I, Division 1 location which shall extend at least to the point of emergence above grade.

e. The spherical volume within a three-foot radius from point of discharge of any tank vent-pipe shall be considered a Class I, Division 1 location and the volume between three-foot to five-foot radius from point of discharge of a vent shall be considered a Class I, Division 2 location. For any vent that does not discharge upward, the cylindrical volume below both the Division 1 and 2 locations extending to the ground shall be considered a Class I, Division 2 location. The hazardous area shall not extend beyond an unpierced wall.

1.9 (3) *Wiring and equipment within hazardous areas.* All electrical equipment and wiring within the hazardous areas defined in 1.9(2) shall conform to applicable provisions of 1.3(88A).

For special requirements for conductor insulation, see 1.3(13).

1.9 (4) *Wiring and equipment above hazardous areas.* Wiring and equipment above hazardous areas defined in 1.9(2) shall conform to 1.7(5) and 1.7(6).

1.9 (5) *Circuit disconnects.* Each circuit leading to or through a dispensing pump shall be provided with a switch or other acceptable means to disconnect simultaneously from the source of supply all conductors of the circuit including the grounded neutral, if any.

1.9 (6) *Sealing.*

a. An approved seal shall be provided in each conduit run entering or leaving a dispenser or any cavities or enclosures in direct communication therewith. The sealing fitting shall be the first fitting after the conduit emerges from the earth or concrete.

b. Additional seals shall be provided in conformance with 1.3(5) Class I, Division 1, "*c*" and 1.3(5) Class I, Division 2, "*b*", shall apply to horizontal as well as to vertical boundaries of the defined hazardous areas.

1.9 (7) *Grounding.* Metallic portions of dispensing pumps, metallic raceways, and all noncurrent-carrying portions of

electrical equipment regardless of voltage, shall be grounded as provided in 1.3(16)"*a*".

1.9 (8) Underground wiring shall be installed in rigid metal conduit, or, where buried under not less than 2 feet of earth, may be installed in nonmetallic conduit provided the potential is 600 volts or less. Where nonmetallic conduit is used, an additional ground conductor shall be included to provide for metallic continuity of the raceway system and for grounding of noncurrent-carrying metallic parts of equipment.

1.10 (88A) Bulk-storage plants.

1.10 (1) *Definitions.* This designation shall include locations where gasoline or other volatile flammable liquids are stored in tanks having an aggregate capacity of one carload or more, and from which such products are distributed (usually by tank truck).

1.10 (2) *Hazardous areas.*

a. Pumps, bleeders, withdrawal fittings, meters and similar devices.

(1) Adequately ventilated indoor areas containing pumps, bleeders, withdrawal fittings, meters and similar devices which are located in pipe lines handling flammable liquids under pressure shall be considered as Class I, Division 2 locations within a five-foot distance extending in all directions from the exterior surface of such devices. The Class I, Division 2 location shall also extend 25 feet horizontally from any surface of these devices and extend upward to three feet above floor or grade level.

(2) Inadequately ventilated indoor areas containing pumps, bleeders, withdrawal fittings, meters and similar devices which are located in pipe lines handling flammable liquids under pressure shall be considered as Class I, Division 1 locations within a five-foot distance extending in all directions from the exterior surface of such devices. The Class I, Division 1 location shall also extend 25 feet horizontally from any surface of the devices and extend upward to three feet above floor or grade level.

(3) Outdoor areas containing pumps, bleeders, withdrawal fittings, meters and similar devices which are located in pipe lines handling flammable liquids under pressure shall be considered as Class I, Division 2 locations within a three-foot distance extending in all directions from the exterior surface of such devices. The Class I, Division 2 location shall also extend up to 18 inches above grade level within 10 feet horizontally from any surface of the devices.

b. Transfer of flammable liquids to individual containers.

(1) In outdoor areas or where positive and reliable mechanical ventilation is provided in indoor areas in which flammable liquids are transferred to individual containers, such areas shall be considered to be a Class I, Division 1 location within three feet of the vent or fill opening extending in all directions and a Class I, Division 2 location within the area extending between a three-foot and five-foot radius from the vent or fill opening extending in all directions, and including the area within a horizontal radius of 10 feet from the vent or fill opening and extending to a height of 18 inches above floor or grade levels.

(2) When positive and reliable mechanical ventilation is not provided in indoor areas in which flammable liquids are transferred to individual containers, such areas shall be considered to be a Class I, Division 1 location.

c. Loading and unloading of tank vehicles and tank cars in outside locations.

(1) The area extending three feet in all directions from the dome when loading through an open dome or from the vent when loading through a closed dome with atmospheric venting shall be considered a Class I, Division 1 location.

(2) The area extending between a three-foot and five-foot radius from the dome when loading through an open dome or from the vent when loading through a closed dome with atmospheric venting shall be considered a Class I, Division 2 location.

(3) The area extending within three feet in all directions from a fixed connection used in bottom loading or unloading, loading through a closed dome with atmospheric venting, or loading through a closed dome with a vapor recovery system, shall be considered a Class I, Division 2 location. In the case of bottom loading or unloading this classifica-

tion shall also be applied to the area within a 10-foot radius from point of connection and extending 18 inches above grade.

In deciding upon extent of hazardous area, consideration should be given to the total area within which loading and unloading operation may occur such as racks, platforms, and driveways.

d. Aboveground tanks.

(1) The area above the roof and within the shell of a floating roof type tank shall be considered a Class I, Division 1 location.

(2) For all types of aboveground tanks the area within 10 feet from the shell, ends and roof of other than a floating roof shall be considered a Class I, Division 2 location. Where dikes are provided the area inside the dike and extending upward to the top of the dike shall be considered to be a Class I, Division 2 location.

(3) The area within five feet of a vent opening and extending in all directions shall be considered a Class I, Division 1 location.

(4) The area between five and 10 feet of a vent opening and extending in all directions shall be considered a Class I, Division 2 location.

For underground tanks see 1.9(88A).

e. Pits.

(1) Any pit or depression, any part of which lies within a Division 1 or Division 2 location as defined herein, shall be considered a Class I, Division 1 location unless provided with positive and reliable mechanical ventilation.

(2) Any such areas when provided with positive and reliable mechanical ventilation shall be considered a Class I, Division 2 location.

(3) Any pit or depression not within a Division 1 or Division 2 location as defined herein, but which contains piping, valves or fittings shall be classified as a Class I, Division 2 location.

f. Storage and repair garages for tank vehicles shall be considered to be a Class I, Division 2 location up to 18 inches above floor or grade level unless in the judgment of the authority enforcing these rules conditions warrant more severe classification or a greater extent of the hazardous area.

g. Office buildings, boiler rooms and other similar locations which are outside the limits of hazardous areas as defined herein, and which are not used for handling or storage of volatile flammable liquids or containers for such liquids, shall not be considered to be hazardous locations.

1.10 (3) *Wiring and equipment within hazardous areas.* All electrical wiring and equipment within the hazardous areas defined in 1.10(2) shall conform to applicable provisions of 1.3(88A).

1.10 (4) *Wiring and equipment above hazardous areas.* All fixed wiring above hazardous areas shall be in metallic raceways or shall be type ALS cable. Fixed equipment which may produce arcs, sparks or particles of hot metal, such as lamps and lampholders for fixed lighting, cutouts, switches, receptacles, motors, or other equipment having make-and-break or sliding contacts, shall be of totally enclosed type or shall be provided with suitable guards or screens to prevent escape of sparks or hot metal particles. Portable lamps or utilization equipment, and their flexible cords shall conform to the provisions of 1.3(88A) for the class of location above which they are connected or used.

1.10 (5) *Underground wiring.*

a. Underground wiring shall be installed in rigid metal conduit or, where buried under not less than 2 feet of earth, may be installed in nonmetallic conduit or duct, or in the form of cable approved for the purpose. Where cable is used, it shall be enclosed in rigid metal conduit from the point of lowest buried cable level to the point of connection to the aboveground raceway.

b. Conductor insulation shall conform to 1.3(13).

c. Where cable with nonmetallic sheath or nonmetallic conduit is used, an additional grounding conductor shall be included to provide for metallic continuity of the raceway system and for grounding of noncurrent-carrying metallic parts of equipment.

1.10 (6) *Sealing.* Approved seals shall be provided in conformance with 1.3(5),

Class I, Division 1, "*a*", and 1.3(5) Class I, Division 2, "*b*", shall apply to horizontal as well as to vertical boundaries of the defined hazardous areas. Buried raceways under defined hazardous areas shall be considered to be within such areas.

1.10 (7) *Gasoline dispensing.* Where gasoline dispensing is carried on in conjunction with bulk station operations, applicable provisions of 1.9(88A) shall apply.

1.10 (8) *Grounding.* All metallic raceways, and all noncurrent-carrying metallic portions of electrical equipment shall be grounded as provided in 1.3(16)"*a*".

1.11 (88A) Finishing processes.

1.11 (1) *Definition.* This section shall apply to locations where paints, lacquers or other flammable finishes are regularly or frequently applied by spraying, dipping, brushing or by other means, and where volatile flammable solvents or thinners are used or where readily ignitible deposits or residues from such paints, lacquers or finishes may occur.

1.11 (2) *Hazardous areas.* Classification with respect to flammable vapors. For deposits and residues, see 1.11(3).

a. The interiors of spray booths and their exhaust ducts, all space within 20 feet horizontally in any direction from spraying operations more extensive than touch-up spraying and not conducted within spray booths, all space within 20 feet horizontally in any direction from dip tanks and their drain boards, and all other spaces where hazardous concentrations of flammable vapors are likely to occur, shall be considered to be Class I, Division 1 locations.

b. All space within 20 feet horizontally in any direction from the open face of a spray booth, and all space within the room but beyond the limits for Class I, Division 1 as defined in 1.11(2)"*a*" for extensive open spraying, for dip tanks and drain boards and for other hazardous operations, shall be considered to be Class I, Division 2 locations unless the authority enforcing these rules judge otherwise.

c. Adjacent areas which are cut off from the defined hazardous areas by tight partitions without communicating openings, and within which hazardous vapors are not likely to be released, shall be classed as nonhazardous unless the rule-enforcing authority judges otherwise.

d. Drying and baking areas provided with positive mechanical ventilation adequate to prevent formation of flammable concentrations of vapors, and provided with effective interlocks to de-energize all electric equipment (other than equipment approved for Class I locations) in case the ventilating equipment is inoperative, may be classed as nonhazardous when the rule-enforcing authority so judges.

1.11 (3) *Wiring and equipment in hazardous areas.*

a. All electrical wiring and equipment within the hazardous areas defined in 1.11(2) shall conform to applicable provisions of 1.3(88A).

b. Unless approved for both readily ignitible deposits and the flammable vapor location, no electrical equipment shall be installed or used where it may be subject to hazardous accumulations of readily ignitible deposits or residues, except that wiring in rigid conduit or in threaded boxes or fittings containing no taps, splices or terminal connections may be installed in such locations. Type MI cable without fittings or boxes may be used.

c. Illumination of readily ignitible areas through panels of glass or other transparent or translucent material is permissible only where: (1) Fixed lighting units are used as the source of illumination, (2) the panel effectively isolates the hazardous area from the area in which the lighting unit is located, (3) the lighting unit is approved for its specific location, (4) the panel is of a material or is so protected that breakage will be unlikely and (5) the arrangement is such that normal accumulations of hazardous residue on the surface of the panel will not be raised to a dangerous temperature by radiation or conduction from the source of illimination..

d. Portable electric lamps or other utilization equipment shall not be used within a hazardous area during operation of the finishing process. When such lamps or utilization equipment are used during

cleaning or repairing operations, they shall be of a type approved for Class I locations, and all exposed metal parts shall be effectively grounded.

e. Electrostatic spraying or detearing equipment shall be installed and used only as provided in 1.11(4).

1.11 (4) *Fixed electrostatic equipment.* Where electrostatic spraying and detearing equipment is installed, such equipment shall be of approved type, and shall conform to the following requirements:

a. No transformers, power packs, control apparatus, or other electrical portion of the equipment (except high voltage grids and their connections) shall be installed in any of the hazardous areas defined in 1.11(2) unless of a type approved for location.

b. High voltage grids or electrodes shall be located in suitable noncombustible booths or enclosures provided with adequate mechanical ventilation, shall be rigidly supported and of substantial construction, and shall be effectively insulated from ground by means of nonporous noncombustible insulators.

c. High voltage leads shall be effectively and permanently supported on suitable insulators, shall be effectively guarded against accidental contact or grounding, and shall be provided with automatic means for discharging any residual charge to ground when the supply voltage is interrupted.

d. Goods being processed shall be supported on conveyors in such a manner that minimum clearance between goods and high voltage grids or conductors cannot be less than twice the sparking distance. A conspicuous sign indicating the sparking distance shall be permanently posted near the equipment.

e. Approved automatic controls which will operate without time delay to disconnect the power supply and to signal the operator in case of (1) stoppage of ventilating fans or failure of ventilating equipment from any cause, (2) stoppage of the conveyor carrying goods through the high voltage field, (3) occurrence of a ground or of an imminent ground at any point on the high voltage system, or (4) reduction of clearance below that specified in 1.11(4)"*d*".

f. Adequate fencing, railings or guards which are electrically conducting and effectively grounded shall be provided for safe isolation of the process, and signs shall be permanently posted designating the process zone as dangerous because of high voltage.

1.11 (5) *Electrostatic hand spraying equipment.* Electrostatic hand spray apparatus and devices used in connection with paint spraying operations shall be of approved types and shall conform to the following requirements:

a. The equipment shall be so designed that the maximum surface temperature of the equipment in the spraying area cannot exceed 150°F. under any condition. The high voltage circuits shall be designed so as to be intrinsically safe and not produce a spark of sufficient intensity to ignite any vapor-air mixtures nor result in appreciable shock hazard upon coming in contact with a grounded object. The electrostatically charged exposed elements of the hand gun shall be capable of being energized only by a switch which also controls the paint supply.

b. Transformers, power packs, control apparatus, and all other electrical portion of the equipment, with the exception of the hand gun itself and its connections to the power supply, shall be located outside of the hazardous area.

c. The handle of the spraying gun shall be electrically connected to ground by a metallic connection and be so constructed that the operator in normal operating position is in intimate electrical contact with the grounded handle. This requirement is to prevent build-up of a static charge on the operator's body.

d. All electrically conductive objects in the spraying area shall be adequately grounded. This requirement shall apply to paint containers, wash cans and any other objects or devices in the area. The equipment shall carry a prominent permanently installed warning regarding the necessity for this grounding feature.

e. Objects being painted shall be maintained in metallic contact with the conveyor or other grounded support. Hooks shall be regularly cleaned to insure this contact and areas of contact shall be sharp points or knife edges where possible. Points of support of the object shall be concealed from random spray where feasible and where the objects being sprayed are supported from a conveyor, the point of attachment to the conveyor shall be so located as to not collect spray material during normal operation.

f. The spraying operation shall take place within a spray area which is adequately ventilated to remove solvent vapors released from the operation. The electrical equipment shall be so interlocked with the ventilation of spraying area that the equipment cannot be operated unless the ventilation fans are in operation.

1.11 (6) *Wiring and equipment above hazardous areas.*

a. All fixed wiring above hazardous areas shall be in metallic raceways or shall be type MI cable or type ALS cable. Cellular metal floor raceways may be used only for supplying ceiling outlets or extensions to the area below the floor of a hazardous area, but such raceways shall have no connections leading into or through the hazardous area above the floor unless suitable seals are provided. No electrical conductor shall be installed in any cell, header or duct which contains a pipe for steam, water, air, gas, drainage, or for other service except electrical.

b. Equipment which may produce arcs, sparks or particles of hot metal, such as lamps and lampholders for fixed lighting, cutouts, switches, receptacles, motors, or other equipment having make-and-break or sliding contacts, where installed above a hazardous area or above an area where freshly finished goods are handled, shall be of totally enclosed type or shall be provided with suitable guards or screens to prevent escape of sparks or hot metal particles.

1.11 (7) *Grounding.* All metallic raceways, and all noncurrent-carrying metallic portions of fixed or portable equipment, regardless of voltage, shall be grounded as provided in 1.3(16)*"a"*.

1.12 (88A) Flammable anesthetics.

1.12 (1) *Definition.* Flammable anesthetics are gases or vapors such as cyclopropane, divinyl ether, ethyl chloride, ethyl ether, and ethylene, which may form flammable or explosive mixtures with air, oxygen, or nitrous oxide.

1.12 (2) *Hazardous areas.*

a. Any room or space in which flammable anesthetics or volatile flammable disinfecting agents are stored shall be considered to be a Class I, Division I location throughout.

b. In an anesthetizing location as defined in 1.12(1), the entire area shall be considered to be a Class I, Division I location which shall extend upward to a level 5 feet above the floor.

1.12 (3) *Wiring and equipment within hazardous areas.*

a. In hazardous areas as defined in 1.12(2), all fixed wiring and equipment, and all portable equipment, including lamps and other utilization equipment, operating at more than 8 volts between conductors, shall conform to the requirements of 1.3(1) to 1.3(15), inclusive, and of 1.3(16)*"a"* and *"b"*, for Class I, Division 1 locations, and all such equipment shall be specifically approved for the hazardous atmospheres involved.

b. Where a box, fitting or enclosure is partially but not entirely within a hazardous area, the hazardous area shall be considered to be extended to include the entire box, fitting or enclosure.

c. Flexible cords which are or may be used in hazardous areas for connection to portable utilization equipment, including lamps operating at more than 8 volts between conductors shall be of a type approved for extra hard usage, shall be of ample length, and shall include an additional conductor for grounding. A storage device for the flexible cord shall be provided, and shall not subject the cord to bending at a radius of less than 3 inches.

d. Receptacles and attachment plugs shall be of the type with provision for connection of the grounding conductor, and

where located within a hazardous area, shall be approved for Class I location.

1.12 (4) *Wiring and equipment above hazardous areas.*

a. Wiring above a hazardous area as defined in 1.12(2)"*b*" shall be installed in metal raceways or shall be Type MI cable or Type ALS cable.

b. Equipment which may produce arcs, sparks or particles of hot metal, such as lamps and lampholders for fixed lighting less than 8 feet above the floor, cutouts, switches, receptacles, generators, motors, or other equipment having make-and-break or sliding contacts, shall be of totally enclosed type or shall be provided with suitable guards or screens to prevent escape of sparks or hot metal particles.

c. Surgical and other lighting fixtures shall conform to 1.3(9) Class I, Division 2, except that surface temperature limitations set forth in 1.3(9) Class I, Division 2"*b*" shall not apply, and except that integral or pendant switches which are located above and cannot be lowered into the hazardous area need not be explosion-proof.

1.12 (5) *Sealing.* Approved seals shall be provided in conformance with 1.3(5) and 1.3(5) Class I, Division 1, "*c*", and shall apply to horizontal as well as to vertical boundaries of the defined hazardous areas.

EXCEPTION. Seals may be located within 18 inches of the point at which a conduit emerges from a wall forming the boundary of an anesthetizing location if all of the following conditions are met:

The junction box switch or receptacle contains a seal-off device between the arcing contacts and the conduit.

The conduit is continuous (without coupling or fitting) between the junction box and the sealing fitting within 18 inches of the point where the conduit emerges from the wall.

1.12 (6) *Circuits in anesthetizing locations.*

a. Except as provided in 1.12(6)"*e*", each circuit within or partially within an anesthetizing location as defined in 1.12(1)"*b*" shall be controlled by a switch having a disconnecting pole in each circuit conductor, and shall be supplied from an ungrounded distribution system which shall be isolated from any distribution system supplying areas other than anesthetizing locations. Such isolation may be obtained by means of one or more transformers having no electrical connection between primary and secondary windings, by means of motor generator sets, or by means of suitably isolated batteries.

b. Circuits supplying primaries of isolating transformers shall operate at not more than 300 volts between conductors, and shall be provided with proper overcurrent protection. Secondary voltage of such transformers shall not exceed 300 volts between conductors, and all circuits supplied from such secondaries shall be ungrounded and shall have an approved overcurrent device of proper rating in each conductor. Circuits supplied from batteries or from generators or motor-generator sets shall be ungrounded, and shall be protected against overcurrent in the same manner as transformer secondary circuits.

c. Transformers, motor - generator sets, batteries and battery chargers, together with their overcurrent devices shall be installed in nonhazardous locations, and shall conform to the requirements of 1.7(7).

d. In addition to the usual control and protective devices, the ungrounded system shall be provided with an approved ground contact indicator so arranged that a green signal lamp conspicuously visible to persons in the anesthetizing location remains lighted while the system is isolated from ground. An adjacent red signal lamp and an audible warning signal shall be energized when any conductor of the system becomes grounded through a resistance or a capacitive reactance of any value up to at least 60,000 ohms. The current through the ground indicator to the ground shall not exceed 2 milliamperes. The indicator and associated signals shall not be installed within a hazardous area.

e. Branch circuits supplying only fixed lighting fixtures above the hazardous location other than surgical lighting fixtures or supplying only approved perma-

nently installed X-ray equipment may be supplied by a conventional grounded system, provided: (1) Wiring for grounded and ungrounded circuits does not occupy the same raceways; (2) the lighting fixtures and the X-ray equipment (except the enclosed X-ray tube and the metal-enclosed high voltage leads to the tube) are located at least eight feet above the floor or outside the anesthetizing location; and (3) switches for the grounded circuits are located outside of the anesthetizing location.

NOTE: Remote-control stations for remote-control switches may be installed in the anesthetizing location if the remote-control circuit is energized from the ungrounded distribution system.

1.12 (7) *Low voltage equipment and instruments.*

a. Electrical apparatus and equipment used within a hazardous area, and which has exposed current-carrying elements or which is frequently in contact with the bodies of persons, shall be designed to operate at 8 volts or less unless it is entirely surrounded by a metallic casing or sheath. Power supply shall be ungrounded, and shall be electrically isolated from all circuits of higher voltage.

b. Where a low voltage unit receives current from an individual transformer located within a hazardous area, the flexible cord shall conform to 1.12(3)"*d*", the core and case of the transformer shall be effectively grounded, and the transformer shall be approved for Class I locations.

c. Where low voltage units within a hazardous area are supplied with current from a common source, such as a transformer, motor-generator set, or storage battery, such common source shall be installed in a nonhazardous location. Where located or used within a hazardous area, receptacles and attachment plugs shall be approved for Class I locations. Plugs shall be so designed that they cannot be inserted into receptacles for higher voltage. Flexible cords shall be of adequate length and ampacity, and shall be approved for extra hard usage. An extra conductor for grounding is not required.

d. Low voltage equipment and wiring (including flexible cords) shall be protected from dangerous overcurrents by suitable overcurrent devices or by inherent current limiting characteristics of the source of supply. Overcurrent devices shall not be installed in a hazardous area.

e. Resistance or impedance devices may be used to control low voltage units but shall not be used to limit maximum input voltage. Where a low voltage unit includes a switch or other make-and-break or sliding contact, or where it includes a resistor or resistance device which may under any operating conditions reach a surface temperature exceeding eighty percent of the lowest ignition temperature in degrees centigrade of the gases or vapors that may be present, the unit shall be of a type approved for Class I locations.

1.12 (8) *Other equipment.*

a. Suction, pressure, or insufflation equipment involving electrical elements, and located or used within a hazardous area shall be approved for Class I locations.

b. X-ray equipment installed or operated in an anesthetizing location as defined in 1.12(1)"*b*", shall be provided with approved means for preventing accumulation of electrostatic charges. All control devices, switches, relays, meters, and transformers shall be totally enclosed, and where installed or operated within a hazardous area, shall be approved for Class I locations. High voltage wiring shall be effectively insulated from ground and adequately guarded against accidental contact.

c. Equipment for generating high frequency currents or voltages such as used in electrocautery, diathermy, and television, where installed or used in an anesthetizing location, shall conform to 1.12(3) and 1.12(4).

1.12 (9) *Grounding.* In any hazardous area, all metallic raceways, and all non-current-carrying metallic portions of fixed or portable equipment (except equipment operating at not more than 8 volts between conductors) shall be grounded as provided in 1.3(16)"*a*" and "*b*".

This rule is intended to implement Chapter 88A of the Code of Iowa (as provided above).

PUBLIC INSTRUCTION DEPARTMENT

Pursuant to authority conferred by section 257.25, Code of Iowa, and in compliance with the requirement thereof, and for the purpose of implementing the same, Chapter 3 of the Rules and Regulations of the Department of Public Instruction, apppearing at pages 391 to 397, 1966 I.D.R., is hereby rescinded, and the following adopted in lieu thereof:

[Filed December 21, 1966]

TITLE II

CHAPTER 3

APPROVED SCHOOLS AND SCHOOL DISTRICTS

Division I

GENERAL STANDARDS

3.1 (257) General standards. For purposes of these approval standards, the following general standards shall apply.

3.1 (1) *Educational units governed by standards.* The following standards shall govern the approval of all schools and school districts operated by public school corporations and the approval of all schools operated under nonpublic auspices. "School" means: Nursery school, kindergarten, elementary school, junior high school, or high school that is operated in Iowa.

3.1 (2) *School board.* Each nonpublic school shall be governed by an identifiable agency which shall exercise functions necessary for the effective operation of the school. As used herein the agency governing each school, public and nonpublic, shall be referred to by the word "board."

3.1 (3) *Application for approval.* The board of any school or school district that is not on the approved list on the effective date of these standards and which seeks approval shall file an application for approval on or before the first day of October of the school year for which approval is desired.

3.1 (4) *Approved schools and school districts.* Each school or school district on the list of approved schools on the effective date of these standards shall continue to be approved except in those instances, when by subsequent action of the state board of public instruction, it is removed from the approved list. Each such school or school district shall submit such annual reports that the state board of public instruction may request.

3.1 (5) *When nonapproved.* A school or school district shall be considered as nonapproved on the day after the date it was removed from the approved list.

3.1 (6) *Innovative programs.* School officials who wish to initiate responsible administrative, organizational, or program innovations that depart in pattern but not in substance from the standards outlined herein are encouraged to do so, provided that all statutory conditions of section 257.25, Code of Iowa, are met. A description of such innovations shall be filed with the state board of public instruction as they are put into operation. On the basis of information gained by the staff of the department of public instruction concerning the success of such innovations, the state board of public instruction may, at its discretion, give approval of said innovations.

3.1 (7) *Provisional approval.* The state board of public instruction, at is discretion, may extend provisional approval on a year-to-year basis to schools or school systems which currently are not meeting all the standards outlined herein but which are making satisfactory annual progress toward that goal, provided that all self-executing conditions of the approval-standards law have been met.

Division II

DEFINITIONS

3.2 (257) Definitions. For the purposes of these approval standards, the following definitions shall be used.

3.2 (1) *Nursery school.* A nursery school shall be defined as a school which: (*a*) Provides a continuous program of educational activities in a suitable environment especially planned for three- and four-year-old children, who attend on a regular basis prior to kindergarten, provided that a child who reaches his fifth birthday during the school year shall be eligible to continue in nursery school until the close of that year; (*b*) meets all applicable standards of the state board of public instruction outlined herein; (*c*) adheres to

all applicable standards of the Iowa state department of health; and (*d*) complies with all applicable standards of the Iowa state department of social welfare.

3.2 (2) *Kindergarten.* A kindergarten is hereby defined as that part of an elementary school which provides a program of educational activities especially planned for developing the potentialities of children of school age who are past nursery-school age but who have not been enrolled in first grade.

3.2 (3) *Elementary school.* The elementary school is hereby defined as consisting of a kindergarten, if operated, and grades one through eight or grades one through six when grades seven and eight are included in a secondary school as defined herein.

3.2 (4) *Junior high school.* The junior high school is hereby defined as consisting of grades seven, eight, and nine, or grades seven and eight, when such grades are included in a unit that is separately organized and administered.

3.2 (5) *Four-year high school.* The four-year high school is hereby defined as consisting of grades nine, ten, eleven, and twelve when such grades are included in a unit that is separately organized and administered.

3.2 (6) *Senior high school.* The senior high school is hereby defined as consisting of grades ten, eleven, and twelve when such grades are included in a unit that is separately organized and administered.

3.2 (7) *Junior-senior high school.* The junior-senior high school is hereby defined as consisting of grades seven, eight, nine, ten, eleven, and twelve when such grades are included in a unit that is separately organized and administered.

3.2 (8) *Secondary school.* The secondary school is hereby defined according to one of the following patterns: (*a*) A junior high school comprising grades seven, eight, and nine, and a senior high school; (*b*) a combined junior-senior high school comprising grades seven through twelve; (*c*) a junior high school comprising grades seven and eight, and a four-year high school comprising grades nine through twelve; or (*d*) a four-year high school comprising grades nine through twelve.

3.2 (9) *Enrolled public school pupil.* A pupil shall be regarded as enrolled in a public school after he is registered and is taking part in that school's educational program.

3.2 (10) *Enrolled nonpublic school pupil.* A pupil shall be regarded as enrolled in a nonpublic school after he is registered and is taking part in that school's educational program. A pupil who also attends a public school for specified courses not available to him in his private school, as provided by law, shall be entitled to transportation under the terms of and to the extent provided in the Attorney General's opinion dated July 14, 1965, or such subsequent opinions as may be rendered on the subject.

3.2 (11) *School day.* A school day shall be defined as the number of hours the school is actually in session in any one of its divisions. In order to be counted as a school day, a school must be in session a minimum of five and one-half hours for all grades above the third; four hours for grades one, two, and three, respectively; and two and one-quarter hours for both the kindergarten and the nursery school. These minimum hours shall be exclusive of the lunch period.

3.2 (12) *Day of school.* A day of school shall be defined as a day that the school is in session and the pupils are under the guidance and instruction of the teachers. School shall be considered in session during field trips and excursions if pupils are engaged in school projects or activities under the guidance and direction of teachers.

3.2 (13) *Day of attendance.* A day of attendance shall be a day during which a pupil was present, for at least the above-prescribed minimum number of hours, under the guidance and instruction of the teachers. When a nursery school or a kindergarten is limited to half-day sessions, each half-day session attended by a pupil shall count as a day of attendance. A day of more than the minimum number of hours may not be counted as more than one day. Pupils shall not be counted in attendance on a day when school was dismissed for an improvement-of-instruction institute or other educational meeting.

3.2 (14) *Aggregate days of attendance.* Aggregate days of attendance shall mean the sum of the days of attendance for all pupils who were enrolled during the school year.

3.2 (15) *Average daily attendance.* Average daily attendance shall be defined as the average obtained by dividing the aggregate days of attendance for the school year by the total number of days school was legally in session. For example, if there had been one hundred seventy-nine days of school and school was dismissed one day for an improvement-of-instruction meeting, the average daily attendance would be computed by dividing the aggregate days of attendance for the one hundred seventy-nine-day period by one hundred seventy-nine.

3.2 (16) *Member.* A pupil shall be considered a member of a class or a school from the date he is enrolled until the date he leaves the class or the school permanently. The date of the pupil's withdrawal shall be the date on which it became officially known that he had left that class or school, which will not necessarily be the first day after the date he last attended. Membership, on any date, may be obtained by adding the total number of enrollments to the total number of re-enrollments and subtracting therefrom the total number of withdrawals. Membership may also be obtained by adding the total number present to the total number absent. Membership means the number belonging.

3.2 (17) *Aggregate days of membership.* Aggregate days of membership shall mean the sum of the days of attendance and the days of absence for all pupils who were enrolled during the school year.

3.2 (18) *Average daily membership.* Average daily membership shall mean the aggregate days of membership divided by the number of days of school.

3.2 (19) *Pupils between seven and sixteen years of age.* When reporting the number of pupils enrolled who are between the ages of seven and sixteen during the school year, a pupil shall be counted if any portion of the school year falls between his seventh and sixteenth birthdays.

3.2 (20) *High school dropout.* For purposes of school approval, a high school dropout shall be a pupil who has been in membership in grade nine, ten, eleven, or twelve in a school at any time, during the twelve-month period from July 1 through the following June 30, who withdraws from such school for any reason other than those specified in section 257.27, Code of Iowa, and who is not an enrolled member of that school during the ensuing twelve-month period.

A high school pupil shall be recorded as having transferred to another school if, within the twelve-month period cited herein, he has become enrolled in a recognized educational institution.

A high school pupil shall not be regarded as a dropout within the meaning of section 257.27 if, within the twelve-month period cited herein, he has been (*a*) issued a diploma in formal recognition of his successful completion of a high school program of instruction, or (*b*) issued either a certificate of attendance or of completion of a high school's program of instruction.

Division III

ADMINISTRATION

3.3 (257) Administration. The following standards shall apply to the administration of approved schools.

3.3 (1) *Board records.* Each board shall adopt and maintain accurate records which shall provide for the recording of the minutes of all board meetings, coding of all receipts and expenditures, and the recording and filing of all reports. All public school boards shall maintain census records required by the appropriate sections of the Code of Iowa and they shall retain copies of attendance reports on all children of compulsory school age who have attended nonpublic schools.

3.3 (2) *Report of nonpublic school instruction.* Between September 1 and October 1 of each year the secretary of each public school board shall request from each nonpublic school located within the public school district a report of school instruction and attendance as required by section 299.3 of the Code of Iowa. Each such nonpublic school shall submit the required duplicate report on forms prescribed by the state board of public instruction. One copy of this duplicate report shall constitute the report that the secretary of the public school board is legally required to file in the office of the county superintendent.

Each nonpublic school, between September 1 and October 1 of each year, shall send to each school district from which it receives pupils a list of the pupils of compulsory school age who are residents of that district and who are enrolled in

that nonpublic school. The list shall include the name, grade, date of birth, name of parent or guardian, and location of residence.

3.3 (3) *Activity fund records.* Accurate, complete, and up-to-date records of all pupil-activity funds shall be maintained according to a system approved by the state board of public instruction.

3.3 (4) *Audit of school funds.* The results of the annual audit of all public school funds by a state auditor or a private auditing firm shall be made part of the official records of the board.

3.3 (5) *State aid for an improvement-of-instruction meeting.* One day of state aid per pupil in average daily attendance shall be granted each year to each public school district that dismissed school a day for an improvement-of-instruction meeting called pursuant to chapter 272, Code of Iowa. Two half-day meetings shall be regarded as equivalent to a one-day meeting.

3.3 (6) *Time loss adjustment.* Time loss adjustment on general aid, for days lost, shall not be granted when the school term ends prior to May 30.

3.3 (7) *Minimum school year.* The minimum length of the school year shall be one hundred eighty days. The one day or equivalent devoted to an inmprovement-of-instruction meeting shall be counted as one of the one hundred eighty days but the other one hundred seventy-nine days shall be days of school.

3.3 (8) *School system organizational structure.* Each board that maintains a school system comprising both an elementary and a secondary school shall adopt and record in its minutes an elementary- and secondary-school organizational structure consistent with standards 3.2(3), 3.2(4), 3.2(5), 3.2(6), 3.2(7), and 3.2(8).

3.3 (9) *Elementary school organization.* Each board that maintains a nonpublic elementary school only, shall adopt and record in its minutes an elementary school organizational structure consistent with standard 3.2(3).

3.3 (10) *Secondary school organization.* Each board, maintaining a nonpublic secondary school only, shall adopt and record in its minutes a secondary school organizational structure consistent with standards 3.2(4), 3.2(5), 3.2(6), 3.2(7), and 3.2(8).

3.3 (11) *Records of certificates.* The board shall require each administrator, supervisor, teacher, assistant teacher, teacher associate, and substitute teacher on its staff to supply evidence that he has registered with the county superintendent of schools a certificate which is in force and valid for the type of position in which he is employed. The minutes of the board shall show that this evidence has been supplied for each such person.

3.3 (12) *Records required regarding teacher assignment.* The board shall require its superintendent or other designated administrative official to have on file at the beginning of and throughout each school year complete official transcripts of the preparation of all regularly employed members of the instructional professional staff. This official shall maintain for all members of said staff, including substitute teachers, a file consisting of copies of their legal certificates or copies of records made therefrom showing that they are legally eligible for the positions in which they are employed and that these certificates are registered in the office of the county superintendent of schools. The board shall also require said official to have on file for each member of the noninstructional professional staff a statement of professional recognition as defined in standard 3.4(2).

All members of the instructional professional staff shall teach only in those subjects, grades, or areas of special service in which they have met the personnel approval standards of the board of public instruction set out in the *Iowa Departmental Rules* and amendments thereto.

3.3 (13) *Pupil accounting system.* Each board shall adopt and record in its minutes a system of pupil accounting that is consistent with the principles and procedures included in the state board of public instruction's handbook, *Pupil Accounting for Iowa Schools.*

3.3 (14) *Permanent office records and cumulative records of pupils.* Each board shall require its administrative staff to establish and maintain an accurate and complete permanent office record for every enrolled pupil. This record shall be established immediately after a pupil en-

rolls. It shall be kept up to date; it shall be retained permanently; and it shall be stored in a fire-resistant safe or vault. A copy of this record shall be sent to the receiving school when a pupil transfers from one school or school system to another.

In addition to the permanent office record, the board shall require the instructional, guidance, and administrative personnel to establish and maintain a pupil's cumulative record. This record shall be a collection of pertinent data relating to the pupil which may be of assistance in counseling him. This record shall be established immediately after a pupil enrolls and it shall be kept up to date. It shall be made readily available to all professional staff members who have a direct concern for the pupil's welfare. It, minus certain personal information of a restricted nature which may have had value only to the school in which the pupil was enrolled, shall be sent to the officials of the receiving school when the pupil is transferred.

The permanent office record and the pupil's cumulative record shall be adequate in form and completeness when checked against the state board of public instruction's handbook, *Pupil Accounting for Iowa Schools.*

3.3 (15) *Record of dropouts.* Each school shall prepare annually, in a manner prescribed by the state board of public instruction, a permanent office record of the number and percent of pupil dropouts for the preceding twelve months and this record shall clearly identify those pupils who are high school dropouts as defined in standard 3.2(20) and in section 257.27, Code of Iowa.

3.3 (16) *Board's responsibility for establishing standards for high school graduation.* Each board that operates a secondary school which extends through grade twelve shall formulate, and record in its minutes policies, consistent with law and these standards, that pupils must meet to be eligible for high school graduation.

Division IV

SCHOOL PERSONNEL

3.4 (257) School personnel. The following standards shall apply to the personnel employed in approved schools.

3.4 (1) *Instructional professional staff.* Every person who holds a teacher's certificate endorsed for administering, supervising, teaching, or performing a special school service in a school or school system shall be eligible for classification as a member of the instructional professional staff of the school or school system in which he is employed.

3.4 (2) *Noninstructional professional staff.* Every person who holds a statement of professional recognition in one of the noninstructional areas listed in section 257.25, subsection 8, paragraph "*b*", Code of Iowa, or in one of the other noninstructional professional areas designated by the state board of public instruction, shall be eligible for classification as a member of the noninstructional professional staff of the school or school system in which he is employed.

3.4 (3) *Basis for approval of professional staff.* Each member of the professional staff shall be classified as either instructional or noninstructional. A professional staff member shall be regarded as approved when he holds either an appropriate certificate and an approval statement indicating the specific teaching assignments he may be given, or, alternatively, a statement of professional recognition for the specific type of noninstructional school professional service for which he is employed.

3.4 (4) *Substitute teacher.* A substitute teacher is hereby defined as a person who serves in place of a regularly employed teacher who is absent from his position. A person who holds only a substitute teacher's certificate shall serve as a teacher a maximum of ninety days during one school year in place of a regularly employed teacher.

3.4 (5) *Assistant teacher.* A person employed by a board to serve as a teacher under the guidance of a teacher holding a professional certificate shall be classified as an assistant teacher and, at the minimum, he shall hold a certificate that authorizes such service.

3.4 (6) *Teacher associate.* A person employed by a board not to teach but to supervise pupils on a monitorial or service basis when not in the presence of a properly certificated teacher, shall be classified as a teacher associate, and shall hold a certificate that authorizes such service.

3.4 (7) *Teacher aide.* A person who is authorized by a board to perform nonteaching assistance in supportive tasks which facilitate teaching, but who never

teaches or supervises pupils, shall be classified as a member of the noncertificated personnel. Persons employed as teacher aides shall be at least sixteen years of age.

3.4 (8) *Required administrative personnel.* Each board that operates a school system consisting of both elementary schools and secondary schools shall employ as its executive officer and chief administrator a person who holds a teacher's certificate endorsed for service as school superintendent. In addition, no later than September 1, 1970, this board shall place a certificated secondary school principal in direct charge of each secondary school and a certificated elementary school principal at the head of each elementary school. Not more than one secondary school shall be assigned to one secondary school principal. Not more than two elementary schools shall be assigned to one elementary school principal. Where only a secondary school is operated by a board, the school shall be in direct charge of a secondary school principal. Where only an elementary school is operated by a board, the school shall be in direct charge of an elementary school principal.

3.4 (9) *Staffing policies — elementary schools.* The board operating an elementary school organized as defined in standard 3.2(3), or, alternatively, organized according to a plan submitted in accordance with the procedures described in standard 3.1(6), shall develop, adopt, and record in its minutes staffing policies designed to attract, hold, and effectively utilize competent professional personnel—instructional and noninstructional. Said policies shall include but not be limited to guidelines or criteria to be used in determining: (*a*) The scope and size of the staff; (*b*) the school or system-wide average class enrollment per teacher; (*c*) the maximum class enrollment per teacher; (*d*) extra-class duties; (*e*) time for planning and parent-teacher communications; (*f*) the employment of substitute teachers, assistant teachers, teacher associates, and teacher aides; (*g*) salaries and salary schedules, and (*h*) participation by members of the professional staff in the formation of school policies.

When grades seven and eight are a part of an organized and administered junior high school, the staffing policies adopted by the board for secondary schools shall apply.

3.4 (10) *Staffing policies — secondary schools.* The board operating a secondary school organized according to one of the four patterns defined in standard 3.2(8), or, alternatively, organized according to a plan submitted in accordance with the procedures described in standard 3.1(6), shall develop, adopt, and record in its minutes staffing policies designed to attract, hold, and effectively utilize competent professional personnel—instructional and noninstructional. Said policies shall include but not be limited to guidelines or criteria to be used in determining: (*a*) The scope and size of the staff needed to provide each class with an instructor who is approved to teach each course in which pupils are enrolled, and to provide the nonclass services mandated by section 257.25(6)"*a*", "*b*", and "*c*" of the Code of Iowa; (*b*) the maximum pupil enrollment in each class; (*c*) the total number of classes including the number of different classes for which separate or special preparations must be made; (*d*) the assignment of nonteaching duties such as study hall monitoring and supervision of pupil activities; (*e*) the employment of substitute teachers, assistant teachers, teacher associates, and teacher aides; (*f*) salaries and salary schedules; and (*g*) participation by members of the professional staff in the formation of school policies.

3.4 (11) *Nursery school staff.* The staff of a nursery school shall consist of one teacher, one assistant teacher, and either one teacher associate or teacher aide for each fifteen children or major fraction thereof, provided that no nursery school staff shall be assigned more than two groups of children.

3.4 (12) *Provision for nursery school health supervision.* Each nursery school shall have health supervision, on at least a part-time basis, by a physician or by a person who has an Iowa license as a registered professional nurse.

3.4 (13) *Annual check for tuberculosis.* All persons employed in approved schools shall be required to undergo an annual check for tuberculosis and file the results with the board.

3.4 (14) *Physical examinations.* Except as otherwise provided in rules of this department, the board shall require each employee to file with it at the beginning of his service and at three-year intervals

thereafter, a written medical report of a physical examination by the licensed physician who has performed said examination.

Division V

EDUCATIONAL PROGRAM

3.5 (257) Educational program. The following standards shall apply to the educational program of approved schools.

3.5 (1) *Curriculum defined.* The word curriculum is hereby defined as including all pupil experiences that take place under the guidance of the school. It shall be used to describe the school-connected learning experiences of any pupil and also to indicate the arrangement of a group of courses to be taken by groups of pupils having a common objective.

3.5 (2) *Educational program defined.* The educational program is hereby defined as including the entire offering of the school, including the out-of-class activities, and the arrangement or sequence of subjects and activities. It may be referred to as the program of studies and activities.

3.5 (3) *Educational program—form and content.* The educational program, as adopted by each board, shall set forth the administrative measures and the sequence of learning situations through which attempts are made to provide pupils with well-articulated, developmental learning exepriences from the date of school entrance until high school graduation.

3.5 (4) *Educational program—description and filing.* The board shall require its administrators and professional staff to develop and furnish a description of the total elementary- and secondary-school educational program that the board is willing to approve. This description, after having been adopted by the board, and all subsequent revisions thereof shall be filed with the state department of public instruction as evidence of compliance with the provisions of law as itemized below.

The description of the elementary school educational program shall be in sequential order and shall explain the manner in which pupils are served in each of the areas of instruction specified in chapters 257 and 280, Code of Iowa.

The description of the educational program for any separately organized and administered junior high school shall be in sequential order and shall explain the manner in which pupils are served in each of the areas of instruction specified in chapters 257 and 280, Code of Iowa.

The description of the secondary school educational program, excepting that part which is separately organized and administered as a junior high school, shall be in sequential order and shall explain how the pupils are served in each of the subjects and services specified in chapters 257, 280, 321 (section 321.177), Code of Iowa, provided that the description adopted by the board of a nonpublic school may omit any reference to driver education.

3.5 (5) *Provision for special education services.* The board maintaining a junior and a senior high school, a junior or a senior high school, or a combined junior-senior high school shall adopt and record in its minutes a plan which makes the provision for special education services required by section 257.25, Code of Iowa. The required services shall be those defined in the rules and regulations of the state board of public instruction implementing chapter 281, Code of Iowa, and shall be designed for handicapped pupils as defined therein. This plan shall be filed with the state department of public instruction as evidence of compliance with the approval-standards law.

3.5 (6) *Instructional guide for each subject.* Classroom instruction in each subject taught in the schools shall be based on careful planning. The resource guide, developed for each instructional sequence, shall include a statement of its educational purposes; suggested instructional activities, materials, and content; and a description of the means of evaluating each pupil's progress during the educational sequence.

3.5 (7) *Subject offering.* A school shall be judged as offering a subject when: (*a*) The teacher of the subject has met the personnel approval standards of the state board of public instruction for that subject; (*b*) instructional materials and facilities for that subject have been provided; and (*c*) pupils have been informed, on the basis of their individual aptitudes, interests, and abilities, about the possible value of the subject for them.

A subject that the law requires to be taught annually shall be regarded only when, during each year, pupils enroll in it and are instructed in it in accordance with all applicable standards outlined herein.

Subjects which the law requires schools to offer and teach shall be made available during the school day in session as defined in standards 3.2(11) and 3.2(12) herein.

3.5 (8) *Unit of credit.* A unit of credit is hereby defined as that amount of credit earned by a pupil who successfully completes a course that is either pursued for 36 weeks for the required number of minutes per week as specified by the state board of public instruction or as an equated requirement as part of an innovative program properly described and filed with the state board of public instruction as prescribed in standard 3.1(6) herein. A fractional unit of credit shall be awarded in a manner consistent with this standard.

In order for a course not specifically designated as a laboratory course to yield one unit of credit, the course must either be pursued for 36 weeks for at least 200 minutes per week or for the equivalent of 120 hours of instruction.

In order for a course specifically designated as a laboratory course to yield one unit of credit, the course must either be pursued for 36 weeks for at least 275 minutes per week or for the equivalent of 165 hours of instruction.

3.5 (9) *Organization of daily and weekly schedule.* Daily and weekly schedules shall be organized by school officials in a manner which, in their judgment, best fits the conditions within their schools. Instructional innovations—such as team teaching, provisions for individual students, and modular scheduling—which require variable lengths of time and other instructional arrangements shall be permitted provided such arrangements are described and filed with the state board of public instruction in accordance with standard 3.1(6).

Each course taught shall, to some degree, incorporate a laboratory approach to learning. Courses in which one-third or more of the instruction time is laboratory based, and such other courses as the state board of public instruction may designate, shall be considered laboratory courses in order to yield one unit of credit.

3.5 (10) *Program of testing and evaluation.* The board shall require its administrators and professional staff to develop and present to it for approval a long-range program of systematic, periodic testing and evaluation of all pupils enrolled.

This program of testing and evaluation, which shall be co-ordinated throughout all elementary- and secondary-school grades, shall include the use of comparable tests that have yielded stabilized and consistent year-to-year data about pupils' development in relation to specified educational objectives. The school staff shall show how teacher-made tests, observational records, and informal (and largely subjective) appraisals of pupils' development fit into this program. The minutes of the board shall show that this program has been adopted.

Individual psychological examinations of pupils shall be administered by a person holding a teacher's certificate endorsed for service as a school psychologist or by a person who has been approved by the state department of public instruction as competent specifically in the administration of individual psychological examinations.

3.5 (11) *Evaluation of educational program.* School officials shall, year-by-year, systematically evaluate their educational program to determine its effectiveness and its adequacy in terms of its scope. In making this evaluation, school officials shall: (*a*) Use techniques such as conducting follow-up studies of graduates, preparing pupil dropout studies, and identifying over- and under-achievers; and (*b*) take into consideration the comments and recommendations of pupils, parents, and professional staff members obtained through surveys, discussion groups, conferences, and questionnaires.

3.5 (12) *Parent-teacher communications.* School officials in every school shall provide for parent-teacher communications to improve the pupil-home-school relationship, and to meet more effectively each individual pupil's needs.

3.5 (13) *Guidance program in secondary schools.* Every board that operates a junior high school, a combined junior-senior high school, or a senior high school shall provide therein an organized and functioning guidance program to aid pupils with their personal, educational, and vocational planning and problems. The guidance program shall be staffed with guidance counselors who have met the professional standards established by the state board of public instruction for such personnel. Their number, as specified in chapter 257,

Code of Iowa, and their manner of use shall be set out in the minutes of the board.

Guidance counselors shall be provided adequate space, facilities, and materials, and they shall be alloted time on the program schedule for performing guidance services. Individual and group conferences with pupils, parents, and professional staff members shall also be provided for in the guidance program.

3.5 (14) *Guidance services in elementary schools.* Effective September 1, 1970, the board shall institute a program of guidance services for its elementary schools. Each pupil shall have access to the minimum amount of guidance service specified by the board and recorded in its minutes.

3.5 (15) *Nursery school program.* Each board that operates a nursery school shall require its professional staff to develop an educational program that meets the conditions for nursery school activities as specified in chapter 257, Code of Iowa. This program and all subsequent revisions thereof, when adopted by the board, shall be recorded in its minutes.

3.5 (16) *Kindergarten program.* Each board that operates a kindergarten shall require its professional staff to develop, subject to official adoption by said board, an educational program that meets the conditions for kindergarten activities as specified in chapter 257, Code of Iowa. This program and all subsequent revisions thereof, when adopted by the board, shall be recorded in its minutes.

3.5 (17) *Instructional supplies.* Instructional supplies are hereby defined as items that are used in the teaching-learning process and that are usually consumed in less than five years. In determining how to classify borderline items as instructional supplies rather than as instructional materials or equipment, the financial accounting and the educational plant and facilities handbooks published by the state board of public instruction shall be used as guidelines.

3.5(18) *Instructional supplies required.* Each board shall provide each school with instructional supplies sufficient for each subject and each supporting service offered in the school. Handbooks published by the state board of public instruction which relate to each subject and supporting service shall be used as guidelines.

3.5 (19) *Instructional materials and equipment.* Instructional materials and equipment are hereby defined to mean science apparatus, laboratory tables and demonstration desks; shop tools and machinery; gymnasium equipment and apparatus; equipment for business education, art, industrial arts, and music rooms; audio-visual aids equipment; equipment needed in rooms designed especially for each subject taught (such as English and language arts, foreign languages, mathematics, sciences, social studies, and vocational subjects); maps, atlases, and charts; library books and periodicals; encyclopedias and reference books; and the like.

3.5 (20) *Instructional materials and equipment required.* Each board shall provide each school with instructional materials and equipment that are adequate to meet the needs for all courses, activities, and services. Handbooks published by the state board of public instruction relating to each subject and supporting service shall be used as guidelines.

3.5 (21) *Elementary school library materials.* Centralized library materials shall be provided in each elementary school system, even though at any given time the bulk of the collection of books and other types of learning materials is actually housed in classrooms. Items such as books; pictures; maps; charts; audio-visual equipment with appropriate slides, films, filmstrips and sound recordings; and museum items shall be included as parts of said materials. The entire collection shall be cataloged and classified according to the Dewey decimal or comparable system and made accessible to teachers and pupils alike. An area shall be provided in each elementary school attendance center for the preparation of learning and instructional materials.

Division VI

ACTIVITY PROGRAM

3.6 (257) Activity program. The following standards shall apply to the activity program of approved schools.

3.6(1) *Pupil activity programs—general guidelines.* Each school or school system shall have a pupil activity program sufficiently broad and balanced to offer opportunities for all pupils to participate. The activity program shall be co-operatively planned by pupils and teachers, shall be

supervised by qualified school personnel, and shall be designed to: (*a*) Meet the needs and challenge the interests and abilities of all pupils consistent with their individual stages of development; (*b*) contribute to the physical, mental, aesthetic, civic, social, moral, emotional, and spiritual growth of all pupils; (*c*) offer opportunities for both individual and group activities; (*d*) be integrated with the instructional program; (*e*) provide balance whereby a limited number of activities will not be perpetuated at the expense of others; (*f*) be controlled to a degree that interscholastic activities do not unreasonably interfere with the regularly scheduled daily program, and (*g*) furnish guidance to pupils to insure that they regulate the amount of time they participate in the activity program so that they will not jeopardize benefits they might receive from other aspects of the school program.

The school shall make reasonable efforts to provide and maintain adequate facilities and equipment to develop and encourage a broad activities program.

3.6 (2) *Pupil activity program in elementary schools.* Elementary schools shall have a broad and balanced pupil activity program, closely integrated with the instructional program, and designed to help pupils achieve maximum personal development. The program shall provide opportunities for pupils to participate in a variety of physical activities, in arts and crafts, music, creative dramatics, homeroom and citizenship projects, class projects, hobby pursuits, and other activities the school may provide.

3.6 (3) *Interscholastic sports activities in elementary school.* Elementary schools comprised of kindergarten and grades one through six, shall not participate in, encourage, promote, or sponsor interscholastic sports activities.

3.6 (4) *Supervised intramural sports.* Supervised intramural sports activities shall be encouraged in grades seven, eight, and nine.

Two levels of priority shall be considered in this standard: First, the school or school system shall provide professionally qualified personnel, space and facilities, equipment and supplies, and a broad program of basic instruction in physical education, based upon individual and group needs of all pupils; second, the school or school system shall sponsor a broad and varied, voluntary program of intramural sports activities for all pupils in grades seven, eight, and nine.

3.6 (5) *Pupil activity program in junior high schools.* The junior high school shall have a broad and balanced pupil activities program closely integrated with the instructional program, designed to help pupils achieve maximum personal development. In addition, opportunities shall be provided in the areas of clubs, intramural athletics, music groups, supervised social activities, student government embodying the principles of democracy, and other activities to meet the increasing range of interests, abilities, and aptitudes of junior high pupils.

3.6 (6) *Pupil activity program in senior high schools.* The senior high school shall have a pupil activity program based on mutual as well as individual needs, interests, abilities, and enthusiasms. The program shall be organized and administered in such a manner that broad and varied experiences which contribute to the enrichment of the total educational program will be available. Opportunities shall be provided in the following areas: (*a*) Physical activities and athletics, including intramurals; (*b*) speech activities and dramatics; (*c*) vocal and instrumental music; (*d*) student council organization embodying democratic principles; (*e*) journalism; (*f*) clubs and social activities; (*g*) class activities; (*h*) assemblies; and (*i*) other areas as may be developed under adequate school supervision.

3.6 (7) *Balanced activity program required.* The activity program in the senior high school in specific areas shall not be over emphasized to the extent that other worthwhile and constructive activities are unduly weakened or eliminated.

Division VII

EDUCATIONAL PLANT

3.7 (257) Educational plant. The following standards shall apply to the educational plant of approved schools or school systems.

3.7 (1) *Educational plant defined.* The educational plant of a school or school system is hereby defined as the site, buildings, and equipment that constitute the physical facilities.

3.7 (2) *Educational plant requirements.* The educational plant shall be

adequate to support all of the courses, activities, and services offered by each school.

3.7 (3) *Safe buildings and grounds required.* Every school building shall be safe. The buildings and grounds shall be so maintained as to provide a safe and healthful environment.

3.8 (3) *Reserved for future use.*

Division VIII

PROVISIONS FOR IN-SERVICE GROWTH OF PROFESSIONAL STAFF

3.9 (257) In-service growth of professional staff. The following standards shall apply to the provisions for the in-service growth of the professional staff.

3.9 (1) *Budget for in-service growth.* The board—in recognition of the high importance of the teacher in the establishment and maintenance of an optimal learning environment for pupils—shall make provision in its buget for the support of a planned, comprehensive program for the in-service growth of its professional staff—instructional and noninstructional.

3.9 (2) *Professional library.* The board shall establish and maintain a professional library-instructional materials center for use by its professional staff. The budget shall provide for annual expenditures to make planned additions to the equipment, supplies, and professional books, magazines, and instructional print and nonprint materials essential to the work and professional growth of the staff.

PUBLIC INSTRUCTION BOARD AND REGENTS, BOARD OF

(Joint Rules)

Pursuant to authority conferred by section 280A.33, 1966 Code of Iowa, and the advice of the state advisory committee on community and junior colleges, and for the purpose of implementing chapter 280A, 1966 Code of Iowa, the following approval standards [Rules 5.2 (280A) to 5.13 (280A), inclusive] for merged area vocational schools and community colleges are hereby adopted:

(To be inserted in departmental rules appearing at 1966 I.D.R. 401.)

TITLE III

AREA VOCATIONAL SCHOOLS, JUNIOR AND COMMUNITY COLLEGES

[Filed October 5, 1966]

CHAPTER 5

AREA VOCATIONAL SCHOOLS AND COMMUNITY COLLEGES

5.2 (280A) Definitions. For purposes of these approval standards, the following definitions shall be used.

5.2 (1) *Accreditation.* Accreditation is the process of granting approval to an institution to indicate that such institution has met the minimum requirements of excellence for an institution of its type.

5.2 (2) *Area community college.* An area community college shall satisfy the definition of both an "area vocational school" and an "area community college" as set forth in sections 280A.1 and 280A.2, Code of Iowa.

5.3 (280A) Administration.

5.3 (1) *Superintendent.* The superintendent, who shall be the holder of a teacher's certificate authorizing service as superintendent of an area vocational school or area community college, shall be the chief administrative officer of the area community college operated under the jurisdiction of a merged area board, and he shall be the executive officer of that board. The superintendent shall be responsible for the operation of the area community college with respect to its educational program, its faculty and student personnel programs, and the use of its facilities. He shall delegate to the directors all necessary administrative and supervisory responsibilities to insure an efficient operation of the institution.

5.3 (2) *Administrative assistant.* The administrative assistant shall be responsible to the superintendent for projects and duties assigned.

5.3 (3) *Business manager.* The business manager shall perform the functions of financial accounting, record keeping, and reporting, and he shall implement decisions of the administration relative to budgeting. In addition, he shall be responsible

for inventory keeping, equipment and plant maintenance, operation of plant, and operation of services such as food service and bookstore.

5.3 (4) *Director.* A director, who shall be the holder of a teacher's certificate authorizing service in the administrative position of director of a division of an area community college or of a separate attendance area, shall be administratively responsible to the superintendent.

5.3 (5) *Chairman or department head.* A chairman or department head is a person who holds a teacher's certificate authorizing service as community college or vocational school instructor and who heads a department of instruction within a division.

5.3 (6) *Administrative structure.* Each merged area board, subject to the approval of the state board of public instruction, shall, for each educational institution or branch thereof which it may operate, establish and staff an administrative structure consistent with the educational services offered. Each area community college shall have the following divisions with a director, responsible to the superintendent, for each such division: Vocational-technical education, adult or continuing education, education in arts and sciences, student personnel services, and institutional services. If additional attendance centers are operated, a center director shall be appointed for each such center.

5.3 (7) *Financial records and reports.* The area community college shall maintain accurate financial records and make reports in the form prescribed by the state department of public instruction.

5.3 (8) *Enrollment.* An area community college shall meet minimum enrollment requirements if it offers instruction as outlined in standard 5.5 (280A), and if, to the satisfaction of the state board of public instruction, it: (*a*) Is able to provide classes of reasonable economic size as needed by students of the merged area, (*b*) meets the needs of the students of the merged area in terms of available curricula as evidenced by periodic geographical area occupational surveys, and (*c*) shows by its past and present enrollment and placement picture that it meets the individual and employment needs.

The full-time equivalent of part-time students shall be determined by dividing by twelve the sum of all credit hours carried by all part-time students.

The total full-time equivalent enrollment of an institution shall be determined by adding to the quotient above, the total number of full-time students.

5.3 (9) *Student records and transcripts.* The area community college shall maintain for each student a permanent record which shall include: (*a*) A summary of the secondary school records, (*b*) original copies of official transcripts on intransferring students, (*c*) a record of each course in which the student has been enrolled. The permanent records shall be maintained in perpetuity, and they shall be kept in a fire resistant storage located in a designated administrative office.

A cumulative record folder, including copies of both the permanent record and a compilation of any data which will assist the faculty members to understand the student better and to assist the student to develop his talents to the greatest extent possible, shall be maintained for each student, and it shall be located in a guidance office or records center.

Official transcripts of the permanent student records shall be issued to the student involved and to authorized persons upon the approval and signature of the designated school official. The transcripts shall provide, as a minimum, the items enumerated in any adequate transcript guide which the state department of public instruction may designate.

5.3 (10) *Registrar.* The registrar shall provide for all student registrations, keep the official student records, issue all transcripts of student records, maintain statistics on student enrollments, class size, room and space utilization, and other pertinent data.

5.3 (11) *Admissions officer.* The admissions officer shall enforce the policies of the admissions requirements, receive and act upon all applications for admission, co-operate with the directors and department heads, and co-operate with the public schools in the area.

5.3 (12) *Catalog.* The catalog of the area community college shall be the official publication of the college. It shall include accurate information on the following: (*a*) Statement of institutional policy; (*b*) listing of administrative, faculty, and staff personnel; (*c*) curricular offerings;

(*d*) all courses by course number, title, credit hours, and description; (*e*) admission requirements; (*f*) retention standards; (*g*) graduation requirements; (*h*) grading system; (*i*) rules of conduct; (*j*) college costs; and (*k*) institutional accreditation or approval. The catalog shall be published at least every other year.

5.3 (13) *Admission requirements.*

a. Arts and sciences. The minimum requirement for admission as an entering freshman, including preprofessional education, shall be graduation from an approved secondary school or its equivalent. The method of determining equivalency of a secondary school diploma shall be consistent with the practices employed by the three state institutions for higher education in Iowa. The minimum requirement for admission of a student transferring from another college shall be completion of college credit from an accredited collegiate institution. The method of determining accreditation of an institution shall be in accordance with recognized institutional standards.

b. Technical curricula. The minimum requirements for admission to technical curricula shall be: (1) Graduation from an approved high school, or evidence of demonstrated interest, aptitude, and ability to profit from technical education; (2) possession of physical, mental, and emotional capability to profit from technical education; and (3) fulfillment of the prerequisites for enrollment in a curriculum including the meeting of specific standards for entrance to the particular technical curriculum which shall have been established by the state board of public instruction.

"Part-time supplemental courses" are those in which instruction is given to individuals for the purpose of increasing or extending their skill and knowledge in the occupation in which they are or have been engaged. Admission to such courses in a technical area shall be limited to persons who have left the full-time school, under conditions not in violation of the compulsory school law, and who are or have been employel in the activity in which instruction is sought.

c. Vocational. The standard minimum requirements for admission to vocational curricula shall be: (1) Evidence of demonstrated interest, aptitude, and ability to profit from vocational education; (2) possession of physical, mental, and emotional capability to profit from vocational education; and (3) fulfillment of the prerequisites for enrollment in a curriculum including the meeting of specific standards for the particular vocational curriculum which shall have been established by the state board of public instruction.

"Part-time supplemental courses" are those in which instruction is given to individuals for the purpose of increasing or extending their skill and knowledge in the occupation in which they are or have been engaged. Admission to such part-time courses in a vocational area shall be limited to persons who have left the full-time school, under conditions not in violation of the compulsory school law, and who are employed in the activity in which instruction is sought.

d. Vocational education for persons with handicaps. The requirements for admission to programs of vocational education for persons who have academic, socio-economic, or other handicaps which prevent succeeding in regular vocational education programs shall be based on analysis, evaluation, and screening of each individual's needs, abilities, and interests in accordance with procedures established by appropriate divisions of the state department of public instruction.

e. High school completion. The requirements for admission of persons to programs for high school completion shall be: (1) Chronological age of the typical high school graduate, and (2) evidence of interest and ability to complete a high school curriculum.

f. Adult general education courses. The requirements for admission of persons to adult general education courses shall be: (1) Chronological age of the typical high school graduate, and (2) evidence of interest.

5.3 (14) *High school students in arts and science courses and in vocational-technical courses.*

a. Arts and science courses. Students with demonstrated superior competence in specific areas of academic fields may be admitted to college level course work in comparable areas for college credit. Authorization to undertake such

work shall have co-operative approval of the college administration and the high school principal.

b. Vocational-technical courses. Courses for all students of high school age who may best serve themselves by enrolling for vocational and technical training while also enrolled in a local high school, public or private, shall be offered in accordance with plans developed for such students subject to approval by the state department of public instruction.

5.3 (15) *School year and length of periods.* The length of the school year and the length of periods for: (*a*) Offerings comprising the first two years of college work including preprofessional education, and (*b*) offerings in vocational and technical education, respectively, shall comply with the following conditions. The duration of continuing education (general and occupational) shall be governed by the course content.

a. Arts and sciences. The academic year of that portion of the educational program of an area community college which is devoted to instruction yielding credits for the first two years of college work including preprofessional education shall be a minimum of thirty-six weeks of instruction. One hour per week including passing time for twelve weeks shall be regarded as the minimum basis for one quarter hour of credit. Courses involving laboratory work shall include in addition to the required lecture minimum, at least, one quarter time per week of supervision in the laboratory. Appropriate adjustment shall be made if work is offered on the semester plan.

b. Vocational-technical education. An area community college shall provide for forty-eight weeks of instruction consisting of four twelve-week quarters. Provision shall be made for conducting programs of instruction for which the scheduling does not fit into the normal school year. The base period shall be one hour in length including passing time.

5.3 (16) *Graduation requirements.* Graduation from an area community college shall be certified by the issuance of a diploma indicating the type of two-year curriculum or program which the student has completed. No student shall be issued a diploma who has not earned a cumulative grade point ratio of 1.80 or above. Grades and grade points shall be awarded as follows: A-4, B-3, C-2, D-1, F-0.

a. Associate in arts and science. The degree is issued to a person who has been graduated from a two-year college curriculum shall certify that its recipient is either an associate in arts or an associate in science.

b. Associate in applied science. The degree issued to a person who has been graduated from a two-year technology curriculum shall certify that the recipient is an associate in applied science.

c. Graduate in vocational or technical education. A diploma shall be issued to a person who has been graduated from a vocational curriculum or a technical curriculum of less than two years' duration and it shall specify the type of curriculum completed.

d. Certificate in course of instruction. A certificate of completion shall be issued to signify that a student has satisfactorily completed a course of instruction other than the above.

5.4 (280A) Faculty.

5.4 (1) *Certificate and preparation in field of instruction.* An area community college instructor or area vocational school instructor must hold a certificate issued by the state board of public instruction which is valid for teaching in such institutions. The instructor must be prepared in his respective field of instruction as outlined herein.

5.4 (2) *Approval in area in arts and and sciences.* Each instructor in any of the following areas shall hold a master's degree in his principal field of instruction from an accredited graduate school: (*a*) Business, (*b*) English, (*c*) the fine arts, (*d*) foreign languages, (*e*) mathematics, (*f*) physical education, (*g*) sciences, (*h*) social science, and (*i*) speech.

5.4 (3) *Other fields.* Each person offering service or instruction in any of the following fields shall have met the preparation requirements indicated for each field.

a. Accounting. An instructor in accounting shall hold a master's degree in business from an accredited graduate school providing that the degree includes

15 semester hours of credit in accounting of which at least three semester hours shall be graduate credit.

b. Counseling and guidance. A counselor shall have a master's degree in counseling and guidance or in college student personnel work with a major in counseling from an accredited institution.

c. Pre-engineering drawing. An instructor in this area shall hold a bachelor's degree from an institution approved by the department of public instruction with emphasis in the area of engineering graphics and competency in the field of drafting as evidenced by work experience.

d. Librarian. A professional librarian shall hold a master's degree or equivalent in library science from an accredited institution. An assistant librarian shall have a bachelor's degree with a major in library science from an accredited collegiate institution.

e. Business skills. An instructor in business skills shall hold a bachelor's degree from an accredited collegiate institution, providing that the degree includes a major in business or commerce, with advanced course work for credit in office machine operation, shorthand, and stenography or typewriting—whichever business skills the instructor will teach.

5.4 (4) *Approval in areas in vocational-technical education.* Instructors in vocational-technical education areas shall meet the approval standards for the fields taught as outlined in the Iowa State Plan for Vocational Education in: (*a*) Agriculture, (*b*) distribution, (*c*) health occupations, (*d*) home economics, (*e*) office occupations, (*f*) trade and industry, and (*g*) related courses designed to increase knowledge and understanding and develop attitudes concerned with occupations and necessary for general education.

5.4 (5) *Approval in adult or continuing education.* Instructors in vocational-technical education areas shall meet the approval standards as set forth in section 5.4"*a*"; in other fields as set forth in section 5.4"*b*". For all adult general education classes, the instructor shall display (*a*) a genuine interest in teaching, (*b*) evidence of proficiency in the area of instruction, and (*c*) compliance with all rules and regulations established by the area school superintendent or the appointed director.

5.4 (6) *Instructor load.*

a. Arts and sciences. The standard load of an instructor in arts and science courses shall be twelve credit hours, with the exception that any faculty member may teach the equivalent of one three-credit-hour adult or continuing education course at night in addition to a full-time day school load; in no case shall it exceed sixteen credit hours.

b. Vocational-technical. The full-time teaching load of an instructor in shop or laboratory vocational and technical courses shall not exceed six hours per day, and an aggregate of thirty hours per week, including teaching, supervision, coordination, and other assignments provided that this limitation does not include continuing education or supplemental programs. When the teaching assignment includes classroom subjects (nonlaboratory and nonshop), consideration shall be given to establishing the teaching load more in conformity with that of "*a*" above.

5.4 (7) *Faculty organization.* The faculty shall be organized in such a way as to promote unity through two-way communication between the faculty and administration and to insure faculty participation in the development of the curriculum, improvement of instruction, development of general policy, and such other matters as are appropriate. The faculty shall meet regularly to fulfill these functions. The faculty shall be organized into departments or instructional areas, and, where the department is sufficiently large to justify it, it shall be led by a chairman or departmental head who has released time and office facilities commensurate with his leadership responsibilities. The chairman or departmental head shall work in cooperation with his departmental staff in: (*a*) Development of a departmental curriculum responsive to the needs of the principal types of prospective students and occupations; (*b*) determination and administration of a departmental testing program; (*c*) participation with the administration in employing and promoting staff members; (*d*) conduct of in-service education; and (*e*) leadership and stimulation of the experienced members of the department.

5.4 (8) *Faculty development.* The administration of the college shall encourage the continued development of faculty potential by: (*a*) Regularly stimulating de-

partment chairmen or heads to meet their responsibilities in this regard; (*b*) lightening the teaching loads of first-year instructors whose course preparation and in-service training demand it; (*c*) stimulating faculty research and curricular evaluation; (*d*) underwriting the expenses of faculty attending national meetings of professional organizations related to their teaching areas; (*e*) maintaining a program of leaves for experienced faculty who need the refreshment of travel or advanced study; and (*f*) encouraging the development of an atmosphere in which the faculty brings a wide range of ideas and experiences to the students, each other, and the community.

5.5 (280A) Curriculum.

5.5 (1) *Arts and sciences.* The first two years of college work including preprofessional education shall be offered in division of arts and sciences, and this work shall provide courses in: (*a*) Business, (*b*) English, (*c*) the fine arts, (*d*) foreign languages, (*e*) mathematics, (*f*) sciences, (*g*) social sciences, and (*h*) speech. A continuing survey of the institutions of higher learning to which students tend to transfer shall be carried on by each area institution to determine how well such students succeed and which adjustments in its curriculum and standards, if any, need to be made.

5.5 (2) *Technical and vocational education.* Instruction shall be offered in technical and vocational education in no less than five different occupational fields as defined by the state department of public instruction leading to immediate employment. The occupational fields in which instruction is offered shall be determined by merged area and geographical area needs as identified by periodic surveys in these areas. Advisory committees shall be used in connection with these surveys and in establishing instructional programs.

a. Technical education. The curricula which may be offered under the heading "technical education" shall be classified as: (1) Agricultural education, (2) distributive education, (3) health occupations education, (4) home economics education, (5) office occupations education, (6) trade and industrial education, and (7) special technical education programs.

b. Vocational education. The curricula which may be offered under the heading "vocational education" shall be classified in the same manner as those offered under the heading of technical education.

c. Curriculum content. A technical education curriculum shall include fifteen to thirty percent in related instruction, for example, communication skills, social studies, economics, and human relations; twenty to thirty percent in related basic and applied mathematics and science; forty to sixty percent in technical skills and specialties; and zero to ten percent in electives.

Vocational curricula will require more time devoted to the development of skills and specialties than will technical curricula.

5.5 (3) *Part-time occupational education.* Part-time adult continuing or supplemental education shall be offered as needed in the technical and vocational areas cited herein including education for single skill occupations, supervisory development, related instruction for apprentices, and new industry and business education.

5.5 (4) *Part-time general education.* Part-time adult or continuing general education shall be offered as needed in adult basic education; adult secondary education; continuing general education of a liberal, informational, avocational, or recreational type; and community service programs.

5.5 (5) *Programs of technical and vocational education for the handicapped.* Surveys shall be conducted in each merged area to determine the educational needs of persons who, due to academic, socio-economic, or other handicaps, are prevented from succeeding in regular technical or vocational education programs, and appropriate modifications in facilities, materials, and instructional arrangements shall be made to make it possible for those whose abilities and interests warrant it to enroll in such programs.

5.6 (280A) Community services. The area community college shall provide a program of community services designed to meet the needs of the persons residing in the merged area. Programs shall be developed with the assistance of an advisory committee. The purpose of the community service programs shall be to foster agricultural, business, industrial, cultural, and recreational development in the area.

5.7 (280A) Standards of work and student load.

5.7 (1) *Arts and sciences.* Each course which is offered in the arts and sciences division for college credit shall be taught at a standard consistent with the quality and quantity of similar courses offered in accredited institutions of higher learning.

Courses of a remedial nature or a pre-freshman level shall not bear college transfer credit and shall be clearly identified in the college catalog and on transcripts.

A normal full-time student's load shall be sixteen credit hours. Additional work may be taken by superior students with faculty approval, but no student shall be permitted to register for more than twenty credit hours without college approval.

A full-time student in arts and sciences shall be defined as one who is carrying twelve or more hours of college credit.

5.7 (2) *Technical and vocational education.* Each course offered in the area of technical and vocational education shall be taught at a standard consistent with the quality and quantity of work needed to prepare the student for successful employment in the occupation for which instruction is being offered.

A full-time student in technical or vocational education shall be defined as one who is taking twelve or more credit hours of technical or vocational education credit.

Curricula in technical and vocational education shall be offered on the basis of an average load of thirty class hours per five-day week, twelve weeks per quarter. Students enrolled in part-time curriculum work shall be scheduled, based on class needs, to accomplish this average load, but over a longer period of time.

a. Class work. The term "class work" shall mean lecture and other classroom instruction. One quarter hour of technical or vocational credit shall require one hour of class work per week for twelve weeks.

b. Laboratory work. The term "laboratory work" shall mean demonstration by the instructor, and experimentation and practice by students. One quarter hour of technical or vocational credit shall require two hours of laboratory work per week for twelve weeks.

c. Shop work. The term "shop work" shall mean development of manipulative skills and job proficiency. One quarter hour of technical or vocational credit shall require three hours of shop instruction for twelve weeks.

5.8 (280A) Library.

5.8 (1) *Staff.*

a. A professional librarian as defined by standard 5.4(3)"*d*" herein shall be employed.

b. The librarian shall have faculty rank equivalent to that of a department head as defined by standard 5.4 (7) herein.

c. An area institution with a full-time equivalent enrollment up to 500 shall employ one professional librarian, and, for each increase of 500 in enrollment, one additional professional librarian shall be employed.

d. An area institution with a full-time equivalent enrollment up to 500 shall employ one assistant librarian as defined by standard 5.4(3)"*d*" and also at least one clerical assistant; at least one additional clerical assistant shall be added for each additional 500 students enrolled.

e. Student assistants may be employed on a part-time basis, provided they are not left with complete supervision of the library or a branch thereof in the absence of a professional librarian or an assistant librarian for longer than a two-hour period.

5.8 (2) *Expenditures.*

a. The library expenditures shall be at least five percent of the total general fund budget.

b. The percent of the general fund budget devoted to the library shall, if necessary, be augmented as the student enrollment of course offerings, or if the library is responsible for audio-visual services.

c. The library expenditures for an area institution shall exceed five percent of the general fund budget each year by the amount needed to meet the conditions of standard 5.8(3)"*a*" herein.

5.8 (3) *Collections.*

a. An area community college with an enrollment up to 1,000 full-time equivalent students shall have a professionally selected book collection of at least twenty volumes per student; for each additional

500 students, there shall be an additional ten volumes per student. The collection of an area vocational school shall be evaluated in terms of its adequacy for the number and variety of programs offered and the number of students enrolled.

b. In addition to the book collection the library shall have a professionally selected list of periodicals, newspapers, government documents, maps, pamphlets. and basic reference books all appropriate for each area in which instruction is given.

c. The audio-visual services of the library shall include recordings, tapes, slides, film strips, and other appropriate audio-visual items.

d. The library collection shall be fully organized for use, using classification schemes and cataloging practices in general use by professional librarians.

e. Provision shall be made for locating library materials as needed for ready reference in classrooms, laboratories, and shops.

5.8 (4) *Quarters.* Whether housed in a separate building or as a part of a complex, the library shall be centrally located on the campus or at the attendance center; its lighting shall conform to generally accepted standards for libraries; it shall be air conditioned; there shall be free access to the collections with seating accomodations for at least 25 percent of the full-time equivalent students enrolled. Provision shall be made for expansion as the student enrollment and collection grow.

5.8 (5) *General standard.* Merged area boards shall take into account recognized standards developed by professional librarians and accrediting associations in developing, equipping, staffing, housing, and operating library services in the educational institutions which they maintain and operate. Evaluative instruments developed by these librarians and associations shall be used in appraising the adequacy of libraries in area institutions.

5.9 (280A) Laboratories, shops, equipment, and supplies. Laboratories, shops, equipment, and supplies comparable with that used in the occupations for which instruction is offered shall be provided in accordance with the conditions of the most recent Iowa state plan for vocational education. Similarly, arts and science courses shall be supported in a manner comparable to those which prevail in standard, accredited colleges and universities to which students may wish to transfer college credits.

Specific annual budgetary provisions shall be made to meet this standard.

5.10 (280A) Physical plant. The location, buildings, and equipment of the area institution shall be well maintained and in good repair. A consistent plan of systematic maintenance shall be in evidence.

The physical plant shall be adequate in size and properly equipped for the program offered.

5.11 (280A) Student personnel services. A program of student personnel services shall be provided to meet the needs of students.

5.11 (1) *Counseling and related services.* Professionally prepared and certificated counselors shall be employed on the staff of the director of personnel services. There shall be one professional counselor for each three hundred full-time equivalent students. These services shall deal with stuudent academic, vocational, and personal adjustment problems. More specifically, these services shall be concerned with standarized testing, personal data collection, counseling, information service, placement, and follow-up. Allotments shall be made of space, time, equipment, and materials necessary for a comprehensive program providing counseling and related services in keeping with the total programs of the institution.

5.11 (2) *Housing.* Unmarried students under twenty-one years of age and not living at home shall be required to live in approved housing. The inspection and approval of private residences for student housing shall be done by the division of personnel services to insure that students will be protected from exploitation and will live in a healthful situation. If the area institution maintains a residence hall, its staff shall be selected in terms of their interest with priority given to those who have experienced background or preparation for this type of work.

5.11 (3) *Health services.* Provision shall be made for health services adequate to meet those student needs which fall within the responsibility of the area institution operated by a merged area board.

5.11 (4) *Extracurricular activities.* Sufficient extracurricular activities to afford students an opportunity for leadership and initiative shall be provided. Planning of the activities shall involve both students and faculty, but all activities shall be under the direct supervision of qualified members of the faculty or staff.

5.12 (280A) Approval procedures.

5.12 (1) *Procedure for first and second years of operation.* Temporary approval of an area community college for each of the first two years of operation shall be granted annually subject to approval by the state board of public instruction and the state board of regents upon certification by the state department of public instruction that said institution has followed prescribed procedures in getting started and that it gives promise of ultimate compliance with all standards contained herein.

During the second year of operation, the institution shall prepare a comprehensive self-study following the directions issued by the state department of public instruction.

5.12 (2) *Procedures after second year of operation.*

a. During the third year of operation, the institution shall be visited by a team of six examiners equally representing the state board of public instruction and the state board of regents and chosen by the respective boards. The chairman of the team shall be selected by the state department of public instruction. The examiners shall spend a minimum of two days at the institution visited.

b. Within one month after the visit the chairman of the examination team shall submit to the state board of public instruction and the state board of regents a report, together with the institution's self-study and pertinent supplementary materials. The report shall identify the institution's strengths and weaknesses on the basis of the state standards and the final pages of the report shall consist of a specific recommendation as to whether or not approval by the state board of public instruction and the state board of regents seems warranted. The head of the institution shall have an opportunity to file supplementary statements or data. The state department of public instruction shall distribute copies of the report, the self-study, any supplementary statements or data filed by the head of the institution, and related materials to the members of the state board of public instruction and the state board of regents.

c. If, after the visit by the examination team, the institution is given full approval by the state board of public instruction and the state board of regents, its approval shall continue, ordinarily, on an annual basis for a period of five years, contingent upon evidence that the institution is making consistent efforts to strengthen the areas in which weaknesses were noted. To provide this evidence of progress, the institution shall submit by April 1, of each year, a report of what improvements have been made and what changes are planned for the next year. To supplement and verify this annual report, a representative of the state department of public instruction shall visit each institution at least one day each year. However, acting jointly, the state board of public instruction and the state board of regents have the discretionary authority to review the approval in intervening years.

On the basis of this report and the visit by its representative, the state department of public instruction shall recommend to the state board of public instruction and the state board of regents whether or not an institution's approval should be continued. The institution shall be revisited by an examination team every five years. If the state department of public instruction believes that the situation in a given institution warrants such, it shall arrange for a revisit by an examination team, which shall always be preceded by a self-study, even though a period of five years has not yet elasped.

d. If, after the visit by the examination team, the institution is given provisional approval by the state board of public instruction and the state board of regents, the intsitution shall be revisited by an examination team within three years after the original visit. One year after the team visit and again a year later, the institution shall be visited by a representative of the state department of public instruction who will submit an annual report as provided in standard 5.12(2)"*c*" herein.

On the basis of the visit and the report, the state department will recommend to the state board of public instruction and the state board of regents whether con-

tinuation of provisional approval seems warranted. Provisional approval shall continue if, in the judgment of the state board of public instruction and the state board of regents, the institution has made satisfactory progress in improving areas where weaknesses were noted by the examination team.

"Provisional approval" shall mean that the institution's strengths are judged to be greater than the weaknesses and that there is a good possibility that the weaknesses can be corrected within three years or less.

5.12 (3) *State financial aid.* An institution that has received temporary approval, full approval, or provisional approval by the state board of public instruction and the state board of regents is eligible to receive financial aid from state funds.

5.12 (4) *Progress toward regional accreditation.* Each area community college that has not received accreditation by the regional association is expected to demonstrate that it is making annual progress toward meriting such accreditation.

5.13 (280A) Standards for area vocational schools. Area vocational schools; with the exception of offering the first two years of college work including preprofessional education and with the exception of providing instructors, facilities and equipment for such college work; shall be subject to the same standards as outlined for area community colleges and hereinabove set forth insofar as applicable.

[EDITOR'S NOTE: Sections 5.2 (280A) to 5.13 (280A), inclusive, of this chapter are joint rules of the Board of Public Instruction and the Board of Regents]

PUBLIC INSTRUCTION DEPARTMENT

(continued)

Pursuant to authority conferred by section 280A.25 (7), Code 1966, and for the purpose of implementing sections 280A.18 (3) and 280A.23 (3, 5), Code 1966, the following new rules are hereby adopted and added to chapter 5 of the rules of the department of public instruction:

[Filed October 10, 1966]

CHAPTER 5

AREA VOCATIONAL SCHOOLS AND COMMUNITY COLLEGES

5.14 (280A) Tuition rates. The board of directors of any merged area vocational or area community college may establish tuition rates, as provided by statute, not to exceed one hundred dollars per semester of eighteen weeks, for students enrolled for a full course of study and may establish equivalent and lesser rates for students enrolled for less than a full semester work load or for specific course-subjects of less than eighteen weeks' duration.

5.15 (280A) Attendance outside resident area. The boards of directors of two or more merged areas, may by agreement provide for attendance of students residing in one area in the vocational school or community college of another area for the purpose of taking courses not offered in the area of their residence. The boards of directors of merged areas entering into such agreements may provide for sharing of costs and expenses of such courses. No agreement entered into under this section shall have any force or effect until approved by the State Board of Public Instruction.

PUBLIC INSTRUCTION DEPARTMENT

(continued)

Pursuant to authority conferred by section 280A.25 (6), Code 1966, and for the purpose of implementing said section, the following new rules relating to area school sites and buildings, are hereby adopted and added to chapter 5 of the rules of the department of public instruction:

[Filed October 10, 1966]

CHAPTER 5

AREA VOCATIONAL SCHOOLS AND COMMUNITY COLLEGES

Building and Site Approval

5.16 (280A) Site—size. All sites for area school shall be approved by the state board of public instruction. The minimum size for an Area School site shall be 80

acres for the first 100,000 in total population in the merged area plus additional 10 acres for each additional 25,000 in population or major portion thereof. Provided, however, that the state board of public instruction may waive said requirement for good cause shown.

5.17 (280A) Building plans. All building plans and specifications for construction shall be submitted to the state board of public instruction for review and approval of educational adequacy.

5.18 (280A) Preliminary planning. Each merged area board shall present evidence of adequate, preliminary planning along with the preliminary building plans and specifications. Preliminary planning includes: (1) Tentative program approval; (2) a master campus plan; (3) written educational specifications; (4) site plot showing location of proposed facilities, and existing facilities; (5) elevations and floor plans; and (6) specifications of materials.

5.19 (280A) Other governmental approval. After a tentative approval has been received from the state board of public instruction, evidence shall be submitted indicating the approval by the state fire marshal and by the state department of health, when required, before final approval will be made by the state board of public instruction.

5.20 (280A) Parking lots. All-weather parking lots of adequate size to accommodate the enrollment shall be included as part of the planned construction.

5.21 (280A) Flexibility and expansion. Evidence shall be presented to show that flexibility and expansion of the proposed construction is possible.

5.22 (280A) Physically handicapped. The facilities planned shall be functional for the physically handicapped.

5.23 (280A) Adequate facilities. All administrative facilities, classrooms, laboratories and related facilities shall be educationally adequate for the purpose for which they are designed.

5.24 (280A) Air-conditioning. All buildings or parts of buildings, used for instructional or office purposes, shall be air-conditioned, to accommodate year-around use of such facilities.

5.25 (280A) Library. An instructional material center shall be planned as a part of the master campus plan and some space made available for library services within the initial construction.

5.26 (280A) Commons. An area of the school plant shall be provided where students may gather informally and where food is available.

5.27 (280A) Permanent facilities. All facilities constructed with state funds appropriated for area school construction shall be of a permanent type.

5.28 (280A) Nonacceptable facilities. No facility intended primarily for events for which admission may be charged, nor any facility specially designed for athletic or recreational activities other than physical education, shall be constructed with state-appropriated funds.

PUBLIC INSTRUCTION DEPARTMENT
(continued)

Pursuant to authority conferred by section 257.25, subsections 9 through 12, Code 1966, and for the purpose of implementing same, the following rules relating to extracurricular activities, contests, competitions and organizations, are hereby adopted as chapter 9 of the Rules of the Department of Public Instruction:

TITLE VII

INTERSCHOLASTIC COMPETITION

[Filed December 13, 1966]

CHAPTER 9

EXTRACURRICULAR INTERSCHOLASTIC COMPETITION

9.1 (257) Purpose. The purpose of this chapter of rules is to implement the provisions of subsection 9 of section 257.25, Code of Iowa, and so much of subsection 10, 11, and 12 of said section as may be applicable to subsection 9.

9.2 (257) Approved list. Neither school districts nor pupils of said school districts shall participate in events sponsored by organizations which are required to meet requirements imposed by statute or rule for their operations, if such organizations are found not to be in compliance therewith. After official notice to the school districts of such noncompliance by an organization, continued participation shall be cause for said district to be removed

immediately from the approved list of schools by the state board of public instruction.

9.3 (257) Filings by organizations. Each organization, as defined in section 257.25 (9), Code of Iowa, shall maintain a current file with the state department of public instruction of the following items:

9.3 (1) *Constitution and bylaws.*

9.3 (2) *Current membership lists.*

9.3 (3) *Organization policies.*

9.3 (4) *Minutes of all meetings of organization governing bodies and executive boards thereof.*

9.3 (5) *Proposed constitution and bylaw amendments or revisions.*

9.3 (6) *General bulletins.*

9.3 (7) *Other information pertinent to clarifying organization administration.*

9.4 (257) Governing body of organizations. The membership of the governing body of each organization shall be school administrators, teachers, and elective school officers. Provided, however, that such membership shall include:

9.4 (1) *School board member.* One member who shall be a member of a school board in Iowa, appointed by the Iowa Association of School Boards to represent the lay public.

9.4 (2) *Activity member.* One member, who is either a coach, sponsor or director, of an activity sponsored by the organization to which he is elected and who works directly with the students or the program; this member is to be elected by ballot of the member schools, the vote to be cast by the school's designated representative of the organization involved.

9.5 (257) Organization elections. The election procedure for each organization shall be conducted as provided by their constitution. All criteria for protecting the voters' anonymity and insuring adequate notice of elections shall be maintained in the election procedures. In addition, there shall be one representative designated by the state board of public instruction present at the counting of all ballots. That representative shall also validate election results.

9.6 (257) Salaries. No remuneration, salary, or remittance shall be made to any member of a governing board of an activity organization for his service thereon.

9.7 (257) Expenses. Travel and actual expenses of said governing board members and officers of the board shall be paid from organizational funds only when on official business for the organization. Actual expenses shall be paid for travel within the state, but not more than first class air travel for transportation outside the state, along with other necessary (itemized and reasonable) expenses. Itemized accounting of the travel and business expenses of employees shall be furnished to the department of public instruction in an annual report.

9.8 (257) Compensation reported. Full and detailed reports of salaries, expense accounts and fringe benefits paid employees shall be filed with the department of public instruction. All reports of expenditures and amounts paid full-time or part-time employees shall be submitted annually to the state board of public instruction.

9.9 (257) Bond. The executive board of each activity organization shall purchase a blanket fidelity bond from a corporate surety approved by it, conditioned upon the faithful performance of the duties of the executive officer, the members of the executive board, and all other employees of the activity organization. Such blanket bond shall be in a penal amount set by the executive board and shall be the sum of 50% of the largest amount of moneys on hand in any 30-day period during the preceding fiscal year, and 20% of the net valuation of all assets of the activity organization as of the close of the last fiscal year, but such bond shall in no case be in an amount less than $10,000.

9.10 (257) Access to records. Upon request, organizations shall make available to the state department of public instruction or its delegated representative all records, data, written policies, books, accounts, and other materials relating to any or all aspects of their operations.

9.11 (257) Appearance before state board. At the request of the state board of public instruction or its executive officer, members of the governing boards and employees of said organizations shall appear before and give full accounting and details on the aforesaid matters to the state board of public instruction.

9.12 (257) Eligibility requirements reported. All organizations shall submit to the state board of public instruction for their approval detailed eligibility requirements for students who participate in organizational activities.

9.13 (257) Organization policies. The constitution or bylaws of organizations sponsoring contests for participation by approved schools shall reflect the following policies:

9.13 (1) *"All Star" games.* "All Star" games of any type shall not be held.

9.13 (2) *Team participation.* Participation in events shall be by school teams only and not selected individuals, with the exception of individual sports events such as wrestling, track, golf, tennis, etc., and music and speech activities.

9.13 (3) *Contests outside Iowa.* Out-of-state participation shall be limited to regularly scheduled interscholastic activities. Out-of-state participation for students or member schools in other activities must be approved by their respective association or organization.

9.13 (4) *Promoting interstate contests.* No activity organization shall promote or support interstate contests or competition between individuals, teams or groups.

9.13 (5) *Chaperones.* It is the responsibility of all school districts to see that all teams or contestants are properly chaperoned when engaged in interscholastic activities.

9.13 (6) *Insurance subsidies.* No financial subsidies shall be paid to any type of insurance company for participants in any organization.

PUBLIC INSTRUCTION DEPARTMENT

(continued)

Pursuant to authority conferred by sections 257.25 and 281.3(12), Code 1966, and for the purpose of implementing section 257.25 (8) *"a"* (1) and chapter 281, Code 1966 the following rules relating to special education of handicapped children are hereby adopted:

TITLE X

SPECIAL EDUCATION AND GUIDANCE

[Filed December 13, 1966]

CHAPTER 12

SPECIAL EDUCATION

12.1 (281) Definitions. The following terms shall have the following meanings:

12.1 (1) *"Education for children requiring special education"* shall include classes, programs, therapy, supplemental instruction, supplemental assistance, special equipment, special materials, special transportation, payment of tuition, supplemental services, or other activities, singularly or in combination, provided to handicapped children.

12.1 (2) *"Children requiring special education"* are defined to include the following classes of handicapped children:

a. Children *"crippled"* or children who have *"heart disease or tuberculosis, or who by reason of physical defects cannot attend the regular public school classes with normal children"* shall include those children commonly identified as crippled or other health impaired. They are those pupils who suffer from physical disabilities or severe health impairments which make it impractical or impossible for them to participate in normal classroom programs without modification, provided that "physical disability" does not include handicapping conditions otherwise defined in this chapter. Pupils with specific learning disabilities are pupils who manifest an educationally significant discrepancy between their estimated intellectual potential and actual level of performance related to basic disabilities in the learning processes, which may or may not be accompanied by demonstrable central nervous system dysfunction and which are not secondary to generalized mental retardation, educational or cultural deprivation, severe emotional disturbance, or sensory loss.

b. Children who *"have defective sight"* shall include those children commonly identified as visually handicapped. They are those pupils whose impairment, with maximum correction, does not permit them to make satisfactory use of regular instructional materials or techniques.

c. Children who *"are hard of hearing"* shall include those children commonly identified as hearing handicapped. They

are those pupils having a hearing loss which significantly restricts benefit from or participation in the normal classroom program and necessitates a modified instructional program.

d. Children who *"have an impediment in speech"* shall include those children commonly identified as children with a communication handicap. They are those pupils with a disorder of communication, present when one has deviation in speech, voice, or language to the degree that it makes a difference: It interferes with self-expression, or ability to comprehend speech, or causes the individual to become maladjusted to his environment. Speech deviations which do not fit one or more of these criteria are not considered to be of a handicapping nature but rather may be of a developmental nature or an expression of individuality. The speech handicapped pupil's special education needs shall be met through six distinct speech therapy services: identification, remediation, referrals, resource, administrative, and research services.

e. Children who are *"emotionally maladjusted"* shall include those children commonly identified as emotionally disturbed or socially maladjusted. They are those pupils who display an inability to develop or maintain satisfactory intrapersonal or interpersonal relationships.

f. Children *"intellectually incapable of profiting from ordinary instructional methods"* shall include those children commonly identified as mentally handicapped. They are those pupils, who as a result of subaverage general intellectual functioning which is associated with impairment of maturation learning and social adjustment, are incapable of being educated profitably and efficiently through ordinary classroom instruction. *"Subaverage general intellectual functioning"* refers to performance which is greater than one standard deviation below the population mean on an approved individual test of general intelligence, administered by an approved examiner.

12.2 (281) Reporting need status. To promote education for children requiring special education, special education personnel shall periodically, on forms provided, report to the State Division of Special Education and to local school administrators the nature and extent of present special education services and indications of present and projected needs for such services.

12.3 (281) Delegation of authority. To adequately supervise education for children requiring special education, locally employed directors of special education shall be delegated authority for the administration, supervision, and co-ordination of all special education activities and personnel within the school system or area served. Where more than one preson of a particular specialty area is employed, the administrator will designate one as responsible for insuring program continuity and consistency.

12.4 (281) Local educational units. To initate, organize, and operate services for children requiring special education, local educational units shall:

12.4 (1) *Preliminary plan.* Initiate special education services only after careful planning which insures sound establishment of such services, proper identification of children, meeting of required standards, and continuity of instruction which includes follow-up activities at all levels consistent with needs of the handicapped child and necessary expansion of services. Services may be established independently by a single school district or jointly by two or more contiguous school districts or in cooperation with an intermediate unit.

12.4 (2) *Planning considerations.* In planning, specifically consider the number of handicapped pupils necessary to accommodate appropriate groupings according to nature and severity of handicaps, ages of children, and educational objectives at all educational levels, and shall provide for appropriate and continuing identification procedures. Evidence of adequate planning shall be made available to the Division of Special Education upon request and shall be considered in the approval of special education services.

12.4 (3) *Filings.* Submit the following:

a. Application for the approval of individual programs for which full-time special personnel are not employed before the program is initiated. Individual programs are defined as "Programs established specifically for one child including, but not limited to special transportation, home or

hospital instruction, provision of special equipment, supplemental instruction, and other special services."

b. Approval applications for the operation of special classes and the employment of special personnel during the ensuing summer or the following academic year. These shall be submitted annually before June 20 to be eligible for approval. Application for approval of programs to be initiated after the beginning of the regular academic school year (August) shall be submitted at least 30 days before the program is scheduled to be initiated.

12.4 (4) *Records kept.* Keep in its files required evidence of the existence of a handicap and approval of the pupil's participation in the program.

12.4 (5) *Sequential program.* Provide special instructional services only as a part of a sequential program designed to fulfill the educational and developmental goals, including vocational training and guidance, which are commensurate with the abilities of handicapped children enrolled and for whom the special service provided has been recommended by approved special education personnel.

12.4 (6) *Economy of effort.* Insure that special class curricula utilize portions of regular school curricula whenever reasonable and consistent with the needs of children enrolled in the special class.

12.4 (7) *Written approval obtained for services.* Insure that special written approval has been obtained from the State Division of Special Education prior to initiating special education services involving the employment of special personnel which are employed part-time in special education and part-time in another capacity within the school or part-time in two or more of the special education personnel areas.

12.4 (8) *Prerequisite program approval.* Insure that preschool programs for handicapped children are established only after a "Proposed Program Plan," submitted on forms provided, has been approved by the State Division of Special Education.

12.4 (9) *Summer programs.* Insure that rules pertinent to programs, eligibility, equipment, materials, facilities, supervision and duties of personnel are observed in summer programs for children requiring special education.

12.5 (281) Special education personnel. Special education personnel shall:

12.5 (1) *Certification.* Meet the Department of Public Instruction certification requirements for the position employed and shall meet the approval requirements of the State Department of Public Instruction as provided for particular special education services and programs.

12.5 (2) *Co-operation.* Co-operate with other disciplines represented in schools and local regional agencies in order that all possible resources may be explored and utilized to complement the special services provided.

12.5 (3) *Records and reports.* Maintain sufficient records and reports to assure continuity and effective program planning and shall submit to the Division of Special Education records and reports specifically requested.

12.5 (4) *Facilities.* Be provided by the local educational agency with office time, secretarial and clerical assistance, office space, supplies, equipment, and regularly available facilities as determined by professional standards to be appropriate to carry out assigned responsibilities and functions.

12.6 (281) Approval conditions. Each approved public school system shall have equal opportunity for approval of programs and reimbursement of excess costs for special education services and shall observe the following additional conditions:

12.6 (1) *Advance payment.* The cost of any program must be paid by the school system before reimbursement can be claimed.

12.6 (2) *Claims prorated.* State reimbursement for the excess costs of approved programs shall be prorated if appropriated funds are insufficient to reimburse audited claims in full.

12.6 (3) *Computation basis.* Computation of state reimbursement shall be computed on an annual basis (July 1 through June 30).

12.6 (4) *Time for making claim.* Reimbursement claims for all approved special education services and programs shall be submitted upon completion of the school year and prior to June 20.

12.7 (281) Classrooms. Special classes and rooms for special education shall be at least equivalent in quality to regular class-

rooms in the system, located in buildings housing regularly enrolled children of comparable ages, and containing facilities in keeping with an educational program designed to meet the needs of the children enrolled. Rooms shall be sufficient to accomodate the use of special equipment and individual or small group instruction if necessary. Classes for trainable mentally handicapped children may be segregated from the general school population. In some cases, for compelling reasons, a local educational agency may find it necessary, on a temporary basis, to locate other special classes in a segregated facility. Approval to locate a special class in a segregated facility shall be obtained from the State Division of Special Education prior to the initiation of such a program. Annual reapproval is required.

12.8 (281) Tuition. If the resident school of "children requiring special education" does not directly provide appropriate special education services, tuition may be paid to another school system which has agreed to provide appropriate special education services to such pupils.

12.9 (281) Identification services. Identification services, including locating pupils with handicapping conditions through routine screening and evaluative testing of referrals from parents, teachers, physicians, or others, may be provided by the local educational agency to the general school population.

12.10 (281) Transportation. Special transportation may be provided by the local educational agency for any pupil whose handicap or subsequent special education service requires him to be transported to and from or in and about school.

12.11 (281) Special equipment. Various types of special equipment and materials appropriate to meet specific educational needs of handicapped pupils may be provided by the local educational agency. Such equipment and materials shall be acquired, inventoried, and used according to guidelines established by the State Division of Special Education.

12.12 (281) Physician's report. Prior to placement in special classes for handicapped children, each pupil must be examined by a licensed physician; and the physician's report must be on file in the office of the Special Education Director or local school system.

12.13 (281) Eligibility requirements. Eligibility of children for special education shall, in addition to prescribed evaluations to determine diagnoses, meet the following requirements:

12.13 (1) *Crippled or other health impaired children.* Diagnosis of crippling conditions and health impairments based upon a comprehensive physical examination by a licensed medical examiner. The Director of Special Education shall determine the eligibility of pupils with specific learning disabilities to receive services. Determination of eligibility shall be consistent with the pupil's needs as indicated by the following evaluations performed by approved examiners:

a. An evaluation of the pupil's educational functioning level.

b. A psychological evaluation including at least an individual test of intelligence.

c. An evaluation of verbal communication skills.

d. A physical examination including a neurological examination.

e. A vision examination.

f. An audiologic evaluation.

g. A psychiatric evaluation when appropriate.

h. Social case study.

Children shall be re-evaluated annually by appropriate specialists.

12.13 (2) *Visually handicapped children.* Determination based upon a comprehensive evaluation by a licensed eye examiner.

12.13 (3) *Hearing handicapped children.* Determination based upon:

a. An otologic examination and subsequent otologic examination (required at least every two years or as recommended by the otologist).

b. A vision examination.

c. An audiologic evaluation by an approved hearing clinician and subsequent evaluations made at the request of the teacher or as recommended by the hearing clinician.

d. A psychological evaluation.

12.13 (4) *Communication handicapped children:*

a. For each pupil with a communication disorder who receives remediation services, a certificate of existence of the

handicapped, dated and signed by an approved speech clinician, shall consist of results of professionally reliable tests or evaluative techniques of articulation, hearing acuity, language, fluency, voice, prosody, and the peripheral speech mechanism.

b. Children shall be re-evaluated annually by an approved speech clinician.

c. Certificates shall be removed from the child's records upon completion of the therapy program.

12.13 (5) *Emotionally disturbed children.* Evaluated by a psychiatrist or approved clinical psychologist and special education services provided shall be consistent with recommendations made by the examiner. An annual re-evaluation shall be made by appropriate specialists.

12.13 (6) *Mentally handicapped children.* Diagnosis of mental retardation and subsequent recommendations for purposes of educational planning shall be based upon a comprehensive evaluation which includes investigation and testing of intellectual, physical, cultural, educational, medical, emotional, and sensory factors by approved examiners. Each child shall be re-evaluated by an approved psychological examiner at least once every three years.

12.13 (7) *Required mental capacity.* Pupils enrolled in special education classes, other than those designated for the mentally handicapped, shall be capable of functioning at an intellectual level above that of a mentally handicapped pupil. In classes for educable mentally handicapped, special permission must be obtained from the State Division of Special Education prior to the placement of a pupil with a measured IQ of 80 or above on an individual test of intelligence administered by an approved psychologist. In classes for trainable mentally handicapped, special permission must be obtained frm the State Division of Special Education prior to the placement of a pupil with a measured IQ of 30 or less on an individual test of intelligence administered by an approved psychologist.

12.14 (281) Authorized personnel. The following types of special education personnel are authorized to be employed by a local educational agency:

12.14 (1) *Special education directors.* Employed to administer, supervise, and coordinate a total special education program.

12.14 (2) *Special consultants.* Employed to assist school administrators in carrying out programs for pupils in need of special education.

12.14 (3) *Speech clinicians.* Employed to provide clinical speech services necessary for identifying, planning, co-ordinating, and carrying out programs for speech, voice, and language handicapped pupils.

12.14 (4) *School psychologists.* Employed to provide those psychological services necessary for the identification of pupils in need of special education services and for planning and carrying out programs for them.

12.14 (5) *Hearing clinicians.* Employed to provide services necessary for the identification of public school pupils having hearing impairments and for planning and providing special education services for them.

12.14 (6) *School social workers.* Employed to serve handicapped pupils through group or individual case work practice, consultation with school personnel, and counseling of parents and pupils.

12.14 (7) *Physical and occupational therapists.* Employed to provide those specific therapies needed by handicapped pupils.

12.14 (8) *Hospital teachers and teachers of the homebound.* Employed to provide instruction for pupils unable to attend regular classes because of a physical handicap.

12.14 (9) *Teachers for specific types.* Employed to teach children who are physically handicapped, emotionally disturbed. educable mentally handicapped, trainable mentally handicapped, visually handicapped, hearing handicapped, and children with specific learning disabilities. Itinerant or resource teachers may be employed for children with specific learning disabilities, visually handicapped children and hearing handicapped children.

12.14 (10) *Supplemental teachers.*

12.14 (11) *Matrons and teacher aides.*

12.14 (12) *Work study co-ordinators and work adjustment co-ordinators.*

12.15 (281) Special approvals. Special approval and reimbursement may be given for special education service for which spe-

cific provisions are not otherwise made or for experimental or demonstration type services involving new practices or procedures which show promise for future application in other schools. A plan shall be submitted on forms provided by the State Division of Special Education and approved by that division before such programs are established.

12.16 (281) Teacher load. The maximum number of pupils per teacher shall be:

12.16 (1) *Crippled and other health impaired children.* The number of pupils and the chronological age range of pupils enrolled shall not exceed the sum of fifteen except that the number of pupils shall not exceed ten in classes for specific learning disabilities.

12.16 (2) *Visually handicapped children.* The number of pupils and the chronological age range of pupils enrolled shall not exceed the sum of fifteen.

12.16 (3) *Hearing handicapped children.* Eight pupils.

12.16 (4) *Emotionally disturbed children.* Enrollment shall not exceed ten pupils and the chronological age range shall not exceed four years.

12.16 (5) *Educable mentally handicapped children.* The number of pupils and the chronological age range of pupils enrolled shall not exceed the sum of 20 provided that the chronological age range shall not exceed six years.

12.16 (6) *Trainable mentally handicapped children.* Ten pupils, provided that the chronological age range shall not exceed eight years and provided that an additional five students may be enrolled upon employment of an approved matron.

12.17 (281) Handbook as guide. The guide for programming for children requiring special education shall be the Special Educator's Handbook issued by the State Division of Special Education, Department of Public Instruction.

12.18 (281) When provisions mandatory. For purposes of meeting the requirements placed on junior and senior high schools by the provisions of section 257.25, subsection 8, paragraph "*c*", the provisions of the foregoing rules shall be applicable. Said provisions shall be made either directly within such schools or indirectly through payments of tuition or other authorized expenses.

PUBLIC INSTRUCTION BOARD

(continued)

Pursuant to authority conferred by section 257.10 (11), Code of Iowa, and [ch. 247] section 25, subsection 7, Laws of the 61st General Assembly [§280A.25 of the Code]; and for the purpose of implementiing section 33 of chapter 247, Laws of the 61st General Assembly [§280A.33 of the Code]; the following rules are hereby adopted:

[Filed October 5, 1966]

TITLE XI

TEACHERS

CHAPTER 14

CLASSIFICATION OF CERTIFICATES

Division VII

MERGED AREA PERSONNEL

14.26 (257) Superintendent. In addition to the option provided in section 14.14(3)"*a*" the following options are hereby authorized for the professional certificate.

14.26 (1) *Option II.* Applicant shall hold a doctor's degree with specialization in educational administration granted by an institution, approved by the state board of public instruction, shall have had five years of successful administrative experience, and shall be recommended by the institution awarding the degree as having competence to serve successfully as chief administrator of an Iowa area vocational school or area community college and as executive officer of a merged area board.

14.26 (2) *Option III.* Applicant shall have had five years of successful experience as administrator of a regionally accredited community college or vocational school, shall hold at least a master's degree with at least two years of graduate study from a regionally accredited institution, and shall be recommended by the institution awarding the master's degree as having competence to serve successfully as chief administrator of an Iowa area vo-

cational school or area community college and as executive officer of a merged area board.

14.26 (3) *Option IV.* Applicant shall have had at least five years of successful teaching experience and two years of successful administrative experience in a vocational school, community college, junior college, or four-year college with successful programs in general education or college transfer, or adult or continuing general education, and at least three programs of vocational education. He shall hold an earned doctor's degree in an academic area, vocational education, adult or continuing education, student personnel work, higher education, or education with specialized work in administration.

14.26 (4) *Option V.* Applicant shall hold a master's degree granted by an institution recognized by the state board of public instruction, and shall be evaluated by a review committee appointed by the state superintendent of public instruction as having competence to serve successfully as chief administrator of an Iowa area vocational school or area community college and as executive officer of a merged area board.

14.27 (257) Director.

14.27 (1) *Director of a division of area vocational school or area community college, or administrative center thereof.* To qualify for a professional certificate with authorization to serve as director of a division of an area vocational school or area community college, or attendance center thereof, an applicant shall submit evidence of preparation and experience which meets one of the following options.

14.27 (2) *Option I.* Applicant shall hold a master's degree granted by an institution, approved by the state board of public instruction, with specialization in one of the following: (*a*) Subject-matter field taught in the area institution, (*b*) administration, (*c*) vocational-technical education, or (*d*) student personnel work.

Applicant shall have had four years of successful teaching experience and shall be recommended for this certificate by the institution granting the master's degree.

14.27 (3) *Option II.* Applicant shall hold a master's degree granted by an institution recognized by the state board of public instruction, and shall be evaluated by a review committee appointed by the state superintendent of public instruction as having competence to serve successfully as director of a division of an area vocational school or area community college, or attendance center thereof.

14.28 (257) Instructor.

14.28 (1) *Instructor in an arts and sciences field of an area community college or public community or junior college.* To qualify for a professional certificate with authorization to teach in an arts and sciences field of an area community college or public community or junior college, an applicant shall submit evidence of preparation and experience as follows:

a. Applicant shall hold a master's degree granted by an institution, approved by the state board of public instruction, with specialization in a field of instruction offered in the arts and sciences division of an area community college. This preparation shall include 6 semester hours of professional preparation appropriate for college teaching, provided that adequate experience in college teaching as evaluated by a review committee appointed by the state superintendent of public instruction shall be accepted in lieu of part or all the required credits in professional education.

14.28 (2) *Instructor in a vocational or technical field in an area vocational school or area community college or public community or junior college.* To qualify for a professional certificate with authorization to teach in a vocational or technical field in an area vocational school or area community college or public community or junior college, an applicant shall submit evidence of preparation and experience as follows:

a. Applicant shall hold a bachelor's degree granted by an institution, approved by the state board of public instruction, with specialization for teaching in one vocational or technical field offered in the vocational-technical division of an area vocational school or area community college and recommendation by the preparing institution.

14.28 (3) *Instructor in a vocational or technical field in an area vocational school or area community college or public community or junior college.* To qualify for a preprofessional certificate with authorization to teach in a vocational or technical field in an area vocational school or

area community college or public community or junior college, an applicant shall submit evidence of preparation and experience as follows:

a. Applicant shall have competence in one vocational or technical field offered in an area vocational school or an area community college based on adequate preparation and experience as evaluated by a review committee appointed by the state superintendent of public instruction.

PUBLIC SAFETY DEPARTMENT

Pursuant to authority of chapter 301, Acts of the Sixty-first General Assembly, [§325.38] the following rules are adopted.

[Filed July 28, 1966]

CHAPTER 1

MOTOR CARRIERS SAFETY REGULATIONS

1.1 (325) Definitions.

1.1 (1) "Vehicle" means every device in, upon, or by which any person or property is or may be transported or drawn upon a highway for compensation.

1.1 (2) "Motor vehicle" means every self-propelled vehicle used for carrying freight or property for compensation which is required to be registered for a gross weight of 10,000 pounds or more, or is used to transport more than nine passengers for hire, but not including city transit buses or school buses.

1.1 (3) "Trailer" means every vehicle without motive power required to be registered for a gross weight of 8,000 pounds or more, designed for carrying persons or property for compensation, and for being drawn by a motor vehicle.

1.1 (4) "Semitrailer" means every vehicle without motive power required to be registered for a gross weight of 24,000 pounds, or more, designed for carrying persons or property for compensation, and for being drawn by a motor vehicle and so constructed that some part of its weight and that of its load rests upon or is carried by another vehicle.

1.1 (5) "Motor truck or truck" means every motor vehicle required to be registered for a gross weight of 10,000 pounds or more, designed for carrying livestock, merchandise, or freight of any kind for compensation.

1.1 (6) "Truck tractor" means every motor vehicle required to be registered for a gross weight of more than 24,000 pounds, designed and used for drawing other vehicles for compensation and not so constructed as to carry a load other than a part of the weight of the vehicle and load so drawn.

1.1 (7) "Bus" means any motor vehicle used to transport more than nine persons for compensation but not including city transit buses or school buses.

1.2 (325) Equipment.

1.2 (1) *Electrical equipment wiring specifications.* Wiring for both low tension and high tension circuits shall be constructed and installed so as to function reliably and adequately and shall conform to the appropriate requirements in the SAE Standard for "Insulated Cable" or by wiring which is mechanically and electrically at least equal to such cable. Required lamps shall be connected to the source of power with such standard wire. The source of power, and candle power of the bulb and the electrical wiring shall be of such size and characteristics that required lamps shall when lighted be capable of being seen at least 500 feet under clear atmospheric conditions during the time lamps are required to be lighted. This shall not be so construed as to prohibit the use of the frame or other metal parts of a motor vehicle as a return ground system provided that for truck tractor-semitrailer combinations, the truck tractor is electrically bonded to the semitrailer.

1.2 (2) *Wiring to be protected.* Wiring shall, when possible, be grouped together and protected by nonmetallic tape, braid, or other covering capable of withstanding severe abrasion or shall be protected by being enclosed in a metallic sheath or tube. Wiring shall be properly supported. Wiring shall not be so located as to be likely to be charred, overheated, or enmeshed in moving parts. Insofar as is practicable, wiring shall not be adjacent to any part of the fuel system. The edges of all holes in metal through which the wiring passes unless the wiring is metal

covered, shall be rolled or bushed with a grommet of rubber or other suitable material.

1.2 (3) *Grounds.* The battery ground and trailer return ground connections on a grounded system shall be readily accessible. The contact surfaces of electrical connections shall be clean and free of oxide, paint, or other nonconductive coating.

1.2 (4) *Battery installation.* Every storage battery on every vehicle, unless located in the engine compartment, shall be covered by a fixed part of the motor vehicle or protected by a removable cover or enclosure. Removable covers or enclosures shall be substantial and shall be securely latched or fastened. The storage battery compartment and adjacent metal parts which might corrode by reason of battery leakage shall be painted or coated with an acid-resisting paint or coating and shall have openings to provide ample battery ventilation and drainage. Wherever the cable to the starting motor passes through a metal compartment, the cable shall be protected against grounding by an acid and waterproof insulating bushing. Wherever a battery and a fuel tank are both placed under the driver's seat, they shall be partitioned from each other, and each compartment shall be provided with an independent cover, ventilation, and drainage.

1.2 (5) *Overload protection devices.* The current to all low tension circuits shall pass through overload protective devices except that this requirement shall not be applicable to battery-to-starting motor or battery-to-generator circuits, ignition and engine control circuits, horn circuits, electrically-operated fuel pump circuits, or electric brake circuits. Protective devices for electric circuits on every motor vehicle the date of manufacture of which is subsequent to June 30, 1953, except motor vehicles being transported in driveaway-towaway operations, shall be arranged so that either the head lamp circuit or circuits shall not be affected by a short circuit in any of the other lighting circuits on the motor vehicle, or if the head lamp circuit is protected in common with other electrical circuits, the protection device shall be an automatic reset overload circuit breaker.

1.2 (6) *Detachable electrical connection.* Electrical wiring between towing and towed vehicles shall be contained in a cable or cables or entirely within another substantially constructed protective device. All such electrical wiring shall be mechanically and electrically adequate and free of short or open circuits. Suitable provision shall be made in every such detachable connection to afford reasonable assurance against connection in an incorrect manner or accidental disconnection. Detachable connection made by twisting together wires from the towed and towing units are prohibited. Precaution shall be taken to provide sufficient slack in the connecting wire or cable to accomodate without damage all normal motions of the parts to which they are attached.

1.2 (7) *Wiring—installation.* Electrical wiring shall be systematically arranged and installed in a workmanlike manner. All detachable wiring, except temporary wiring connections for driveaway-towaway operations, shall be attached to posts or terminals by means of suitable cable terminals which conform to the SAE Standard for "Cable Terminals" or by cable terminals which are mechanically and electrically at least equal to such terminals. The number of wires attached to any post shall be limited to the number which such post was designed to accomodate. The presence of bare, loose, dangling, chafing, or poorly connected wires is prohibited.

1.3 (325) Brakes.

1.3 (1) *Brake tubing and hose, adequacy.* Brake tubing and brake hose shall be:

a. Designed and constructed of proper material and so installed as to insure proper continued functioning;

b. Sufficiently long and flexible as to accomodate without damage all normal motions of the parts to which they are attached;

c. Suitably secured against chafing, kinking, or other mechanical injury; and

d. Brake hose shall be so constructed as to insure adequate and reliable functioning and shall conform to the appropriate specifications set forth in the SAE Standards for "Hydraulic Brake Hose", "Air Brake Hose", or "Vacuum Brake Hose".

1.3 (2) *Brake tubing and hose connections.* All connections for air, vacuum, or hydraulic braking systems shall:

a. Be adequate in material and construction to insure proper continued functioning;

b. Be designed, constructed, and installed so as to insure when properly connected, an attachment free of leaks, constrictions, or other defects;

c. Have suitable provision in every detachable connection to afford reasonable assurance against accidental disconnection;

d. Have the vacuum brake engine manifold connection at least 3/8 inch in diameter.

1.3 (3) *Brake lining.* The brake lining on every motor vehicle and trailer shall be so constructed and installed as not to be subject to excessive fading and grabbing and shall be adequate in thickness, means of attachment, and physical characteristics to provide for safe and reliable stopping of the motor vehicle.

1.3 (4) *Single valve to operate all brakes.* Every motor vehicle, the date of manufacture of which is subsequent to June 30, 1953, which is equipped with power brakes, shall have the braking system so arranged that one application valve shall when applied operate all the service brakes, on the motor vehicle or combination of motor vehicles. This requirement shall not be construed to prohibit motor vehicles from being equipped with an additional valve to be used to operate the brakes on a trailer or trailers. This rule shall not be applicable to driveaway-towaway operations unless the brakes on such operations are designed to be operated by a single valve.

1.3 (5) *Warning devices and gauges.*

a. Air brakes. Every bus, truck, and truck tractor using compressed air for the operation of its own brakes or the brakes on any towed vehicle shall be equipped with a warning signal readily audible or visible to the driver, which will give continuous warning at all pressures below a fixed pressure not less than one-half the compressor governor cutout pressure. In addition, each such vehicle shall be epuipped with a pressure gauge which will indicate to the driver the pressure in pounds per square inch available for braking.

b. Vacuum warning signal. Every bus, truck, and truck tractor using vacuum for the operation of its own brakes or the brakes on any towed vehicle shall be equipped with a warning signal readily audible or visible to the driver, which will give continuous warning at any time the vacuum in the vehicle's supply reservoir is less than 8 inches of mercury. In addition, each such vehicle shall be equipped with a vacuum gauge which will indicate to the driver the vacuum in inches of mercury available for braking.

1.4 (325) Glazing and window construction.

1.4 (1) *Glazing in specified openings.*

a. Windshield condition. Every motor vehicle windshield shall be free of discoloration or other damage, except that discoloration and damage as follows are allowable:

(1) Coloring or tinting applied in manufacture for reduction of glare.

(2) Any crack not over 1/4 inch wide, if not intersected by any other crack and if it does not interfere with the driver's vision.

(3) Any damaged area which can be covered by a disc 3/4 inch in diameter, if not closer than 3 inches to any other such damaged area and does not interfere with driver's vision.

b. Use of vision-reducing matter. No motor vehicle may be operated with any label, sticker, decalcomania, or other vision-reducing matter covering any portion of its windshield or windows at either side of the driver's compartment, except that stickers required by law may be affixed, at the bottom of the windshield, provided no portion of any label, sticker, decalcomania, or other vision-reducing matter may extend upward more than 4½ inches from the bottom of such windshield.

1.4 (2) *Window construction.* Windows in trucks and truck tractors. Every truck and truck tractor, except vehicles engaged in armoured car service, shall have, in addition to the area provided by the windshield, at least one window on each side of the driver's compartment which windows shall have sufficient area so as to allow clear and unrestricted vision to the right and left. However, if the cab is designed with clear openings where doors or windows are customarily located, then no windows shall be required in such locations.

1.5 (325) Fuel systems.

1.5 (1) *Requirements and prohibitions.*

a. Fuel container location. No part of any fuel tank or container or intake

pipe shall project beyond the overall width of any motor vehicle upon which it is mounted. No part of any fuel tank shall be located forward of the front axle of the power unit upon which it is located, except that this requirement shall not apply to trucks manufactured prior to September 30, 1953, which have a total fuel capacity of less than 20 gallons, nor shall fuel be supplied to the engine of a bus, truck, or truck tractor from a fuel tank or container located on a semitrailer or trailer.

b. Fuel container on bus. No part of any fuel tank or container or intake pipe shall be located within or above the passenger-carrying portion of any bus unless securely sealed off from such compartment by means of a substantial metal cover. The fuel contained, including intake pipes, caps, and vents, on every bus, except buses having a seating capacity of nine or less persons, shall be so designed that, in the event of overturn, the fuel will not be spilled at a rate in excess of one ounce per minute.

c. Gravity or syphon feed prohibited. No fuel system on a motor vehicle shall be so constructed as to permit gravity or syphon feed direct to the carburetor or injector.

d. Selector valves. If a motor vehicle is equipped with a selector control valve for fuel feed from two or more tanks, such valve shall be installed so that either (1) it is in normal reach of the driver so that he can readily operate it without taking his eyes from the road or moving from his customary driving position, or (2) the driver must stop the vehicle and leave his seat in order to operate the valve.

e. Liquid fuel tank requirements.

(1) Every liquid fuel tank or container used for fuel for use on any motor vehicle shall be of substantial construction, free of leaks, securely attached to the motor vehicle, and shall have its filling opening provided with a plug or cap with means for securing it in place, such as by the use of properly fitted screw threads or bayonet type joint, and without leaks except as elsewhere provided in these regulations with regard to tank vents.

(2) Replacement side-mounted gasoline tanks, the date of manufacture of which is subsequent to November 30, 1953, shall comply with the requirements of paragraphs "*f*" and "*i*" of this section.

f. Liquid fuel tank construction.

(1) *Material.* Material used in the construction of the tank and its fittings shall be suitable for the purpose intended.

(2) *Joints.* Joints of the tank body shall be closed only by arc, gas, seam, or spot welding, brazing, or silver soldering.

(3) *Fittings.* The tank shall be provided with suitable flanges or spuds for the assembly of all fittings.

(4) *Threads.* Threads on all fittings shall be American (National) Standard Taper Pipe Thread or SAE Standard Sort Dryseal Taper Pipe Thread except that straight (nontapered) threads may be used on fittings having integral flanges and using gaskets for sealing. There shall not be less than four full threads in engagement in any fitting.

(5) *Drains and bottom fittings.* Drains and other bottom fittings shall not extend more than 3/4 inch below the lowest part of the tank and shall be designed or guarded to minimize their being torn loose. All drain fittings shall be so designed and located as to permit complete drainage. The drain shall be located in a suitable flange or spud.

(6) *Fuel discharge line.* The fitting through which the fuel is drawn from the tank shall be located above the normal full line of the tank.

(7) *Excess flow valve.* When pressure devices are used to force fuel from the tank, means shall be provided to prevent the continued flow of fuel in the event the fuel feed line is broken.

(8) *Fill-pipe design.* The fill-pipe shall be designed and located so as to minimize the probability of its being torn loose in the event of an accident. The fill-pipe and vents on any fuel tank having a total fuel capacity in excess of 25 gallons shall be so designed and constructed as to permit filling at a rate of at least 20 gallons per minute without spillage.

(9) *Air vent.* Every fuel tank shall be equipped with an air vent of a nonspill type (ball check or equivalent). The air vent may be mounted separately or combined with the filler cap or safety vent.

(10) *Safety vents, fusible.* Side-mounted fuel tanks having a total capacity in excess of 25 gallons shall be provided with a fusible safety vent or vents which

shall be so designed as to limit the pressure rise in the tank under any fire condition to a maximum of 50 pounds per square inch gauge. The vent area shall be sufficient to prevent a rise in pressure in the tank of more than 10 percent of the release pressure of the safety vent or vents when the tank is subjected to a fire of any magnitude. If but one fusible safety vent is provided, it shall be located in the top of the tank; if more than one fusible safety vent is provided, at least one shall be in the top of the tank.

(11) All fuel tanks having a fuel capacity in excess of 25 gallons shall be provided with means of relieving pressure in the tank due to fire before such pressure would result in the failure of the body, seams, or any bottom opening in the tank.

g. Liquid fuel tank capacity markings. The tank shall be marked with its liquid capacity and shall be provided with means to indicate that it shall not be filled to more than 95 percent of its total capacity.

h. Liquid fuel tank identity markings. Each tank shall be marked to identify its manufacturer and to indicate the approximate date of manufacture by lot number or otherwise.

i. Liquid fuel tank installation.

(1) *General requirement.* The tank shall be mounted in accordance with the best commercial practice.

(2) *Location of fill-pipe.* The nozzle opening in the fill-pipe shall be outside the cab or body and must be so located as to minimize the likelihood of spillage of fuel during the filling process on the exhaust system or battery.

j. Liquid fuel tank tests.

(1) *Drop test on corner of tank.* The tank when filled with water equal in weight to that of its fuel capacity shall withstand without leakage a drop of 30 feet falling so as to strike squarely on one corner on concrete or equivalent surface which shall not rupture under the impact. The fill-pipe and cap, fuel gauge sending device, and the air intake and safety vents shall not leak more than 1 ounce of water per minute as a result of this test.

(2) *Drop test on fill-pipe.* The tank when filled with water equal in weight to that of its fuel capacity shall withstand without leakage a drop of 10 feet falling so as to strike squarely on the fill-pipe on concrete or equivalent surface which shall not rupture under the impact. The fill-pipe or cap shall not leak more than 1 ounce of water per minute as a result of this test.

(3) *Safety vent test.* The safety vent, or vents, shall limit the rise in internal pressure in the tank to a maximum of 50 pounds per square inch gauge when the tank is filled to three-fourths of rated capacity with standard fuel and placed in inverted position with the fuel feed outlet connection plugged when an enveloping flame is applied to the tank with sufficient intensity to produce an internal fuel temperature rise of 6 to 8 degrees F. per minute starting from a fuel temperature of 50 to 80 degrees F. Neither the tank, fill-pipe, fuel gauge, air intake vent nor any other opening except blown fusible plugs shall leak more than one ounce of fuel per minute after having been subjected to these conditions. Other types of tests or calculations may be employed to determine compliance with this requirement if a comparable result is obtained.

(4) *Rupture test.* The tank and all appurtenances including the fill-pipe, cap, fuel gauge, and air intake vent shall withstand without rupture an internal hydrostatic pressure of 150 percent of the maximum at which the safety vent is required to release.

(5) *Spillage test.* At ordinary room temperature the tank when filled to capacity with its normal fuel and turned through an angle of 150 degrees from its normal position, with outlet pipe plugged, shall not spill or leak fuel at a rate greater than 1 ounce per minute. The fill-pipe, cap, fuel gauge outlet, air intake vent, safety vent, and any other openings shall withstand this test.

k. Liquid fuel tank certificates. Every gasoline fuel tank designed and constructed to comply with these requirements shall be plainly and permanently marked with the date of manufacture and a certification of the manufacturer that it complies with such requirements.

1.5 (2) *Liquefied petroleum gas fuel systems.* Every motor vehicle utilizing liquefied petroleum gas for any purpose shall be equipped with a fuel system, being utilized for such purpose, which complies with Division IV, June 1959 edition of the "Standards for the Storage and Handling

of Liquefied Petroleum Gas" of the National Fire Protection Association, 60 Batterymarch Street, Boston 10, Massachusetts, provided, however, that such fuel systems installed on motor vehicles prior to the effective date of this order shall comply with the "Standards for the Storage and Handling of Liquefied Petroleum Gas" of the National Fire Protection Association, as published in the 1951 edition, or such subsequent edition of the "Standards for the Storage and Handling of Liquefied Petroleum Gas" of the National Fire Protection Association, in effect at the time of such installation; provided further, however, that in any case compliance with the 1959 edition shall be deemed to be permissible. This section, in every case, requires the marking of the container in such fuel system to indicate compliance with the standard as provided herein.

1.6 (325) Coupling devices and towing methods.

1.6 (1) Coupling devices and towing methods, except for driveaway-towaway operations.

a. Fifth wheel mounting. The lower half of every fifth wheel mounted on any truck tractor or dolly shall be securely affixed to the frame thereof by U-bolts of adequate size, securely tightened, or by other means providing at least equivalent security. Such U-bolts shall not be of welded construction. The installation shall be such as not to cause cracking, warping, or deformation of the frame. Adequate means shall be provided positively to prevent the shifting of the lower half of a fifth wheel on the frame to which it is attached.

b. Fifth wheel parts, securing. The upper half of every fifth wheel shall be fastened to the motor vehicle with at least the security required for the securing of the lower half to a truck tractor or dolly.

c. Fifth wheel locking. Locking means shall be provided in every fifth wheel mechanism, including adapters when used, so that the upper and lower halves may not be separated without the operation of a positive manual release. A release mechanism operated by the driver from the cab shall be deemed to meet this requirement. On fifth wheels designed and constructed as to be readily separable, the fifth wheel locking device shall apply automatically on coupling for any motor vehicle the date of manufacture of which is subsequent to December 31, 1952.

d. Tow bar. Every trailer shall be equipped with a tow bar and means of attaching the tow bar to the towing and towed units which shall be structurally adequate for any weight drawn, properly and securely mounted, without excessive slack but with sufficient play to allow for universal action of the connection, and provided with a suitable locking means to prevent accidental separation of the towed and towing motor vehicle. The mounting of the trailer hitch (pintle-eye or equivalent mechanism) on the towing motor vehicle shall include sufficient reinforcement or bracing of the frame to provide sufficient strength and rigidity and to prevent undue distortion of the frame.

e. Tracking. Coupling devices shall be so designed, constructed, and installed, and the vehicles in the combination shall be so designed and constructed, as to insure that any vehicle or vehicles being towed on level, smooth, paved surface will follow in the path of the towing vehicle without shifting or swerving from side to side over three inches to each side of the path of the towing vehicle when it is moving in a straight line.

f. Safety chains. Every trailer shall be coupled with a safety chain or chains (stay chains or cables) directly to the frame of the motor vehicle by which it is to be towed. Attachment to the pintle hook will not meet this requirement. No more slack shall be left in safety chains or cables than shall be necessary to permit proper turning. Chains or cables shall be so connected to the towed and towing vehicle and to the tow bar as to prevent the tow bar from dropping to the ground in the event the tow bar fails. The means of attachment to both the towing and towed vehicles shall be capable of developing the full capacity of the safety chains or cables. Each chain or cable shall have an ultimate strength at least equal to the gross weight of the trailer being towed. Every trailer and every dolly used to convert a semitrailer to a trailer shall be equipped with two safety chains or cables; the points of attachment of which to the frame or axle of the full trailer dolly shall be not less than 48 inches apart, or as near thereto as the configuration of the frame or axle permits.

g. Location of lower half of fifth wheel. The lower half of every fifth wheel shall be so located that, for any condition of loading, the relationship of position of king pin to the rear axle or axles of the towing motor vehicle results in proper distribution of the total gross weight of the motor vehicles to the axles and does not unduly interfere with the steering, braking, or maneuvering of the towing motor vehicle, or otherwise contribute to the unsafe operation of the motor vehicles comprising the combination.

h. Location of upper half of fifth wheel. The upper half of every fifth wheel shall be so located as to accomplish proper distribution of weight to the axles and safe movement of the combination of motor vehicles in all turning maneuvers.

1.6 (2) Coupling devices and towing methods, driveaway-towaway operations.

a. Number in combination. No more than 2 saddle-mounts may be used in any combination. No more than one motor vehicle shall be towed by tow bar.

b. Bumper tow bars on vehicles prohibited. Tow bars of the type which depend upon the bumpers as a means of transmitting forces between the vehicle shall not be used.

(1) *Tow bars, structural adequacy and mounting.* Every tow bar shall be structurally adequate and properly installed and maintained.

(2) *Tracking.* The tow bar shall be so designed, constructed, maintained, and mounted as to cause the towed vehicle to follow substantially in the path of the towing vehicle. Tow bars of such design or in such condition as to permit the towed vehicle to deviate more than 3 inches to either side of the path of a towing vehicle moving in a straight line are prohibited.

1.7 (325) Heaters.

1.7 (1) On every motor vehicle, every heater shall comply with the following requirements:

a. Definition. The term "heater" means any device or assembly of devices or appliances used to heat the interior of any motor vehicle.

b. Prohibited types of heaters. The installation or use of the following types of heaters is prohibited:

(1) *Exhaust heaters.* Any type of exhaust heater in which the engine exhaust gases are conducted into or through any space occupied by persons or any heater which conducts engine compartment air into any such space.

(2) *Unenclosed flame heaters.* Any type of heater employing a flame which is not fully enclosed, except that such heaters are not prohibited when used for heating the cargo of tank motor vehicles.

(3) *Heaters permitting fuel leakage.* Any type of heater from the burner of which there could be spillage or leakage of fuel upon the tilting or overturning of the vehicle in which it is mounted.

(4) *Heaters permitting air contamination.* Any heater taking air, heated or to be heated, from the engine compartment or from direct contact with any portion of the exhaust system; or any heater taking air in ducts from the outside atmosphere to be conveyed through the engine compartment, unless said ducts are so constructed and installed as to prevent contamination of the air so conveyed by exhaust or engine compartment gases.

1.8 (325) Defrosting device. Every bus, truck, and truck tractor shall be equipped with a device or other means, not manually operated, for preventing or removing such obstructions to the driver's view: Provided, however, that this section shall not apply in driveaway-towaway operations when the driven vehicle is a part of the shipment being delivered.

1.9 (325) Rear-vision mirrors. Every bus, truck, and truck tractor shall be equipped with two rear mirrors, one at each side firmly attached to the outside of the motor vehicle and so located as to reflect to the driver a view of the highway to the rear along both sides of the vehicle: Provided, however, that only one outside mirror shall be required, which shall be at the driver's side, on trucks which are so constructed that the driver has a view to the rear by means of interior mirror: And provided further, that in driveaway-towaway operations the driven vehicle shall have at least one mirror furnishing a clear view to the rear.

1.10 (325) Speedometer. Every bus, truck, and truck tractor shall be equipped with a speedometer indicating vehicle speed in miles per hour, which shall be operative with reasonable accuracy; however, this requirement shall not apply to

any driven vehicle which is part of a shipment being delivered in a driveaway-towaway operation if such driven vehicle is equipped with an effective means of limiting its maximum speed to 45 miles per hour nor to any towed vehicle.

1.11 (325) Exhaust system location. No part of the exhaust system of any motor vehicle shall be so located as would be likely to result in burning, charring, or damaging the electrical wiring, the fuel supply, or any combustible part of the motor vehicle. The exhaust system of every bus shall discharge to the atmosphere at or within 6 inches forward of the rearmost part of the bus. The exhaust system of every truck and truck tractor shall discharge to the atmosphere at a location to the rear of the cab or, if the exhaust projects above the cab, at a location near the rear of the cab. Any defects in the manifold or exhaust system causing exhaust gases to be emitted at other than proper exhaust point shall be corrected immediately.

1.12 (325) Floors. The flooring in all motor vehicles shall be substantially constructed, free of unnecessary holes and openings, and shall be maintained so as to minimize the entrance of fumes, exhaust gases or fire. Floors shall not be permeated with oil or gasoline, and shall have the interior surface in safe condition.

1.13 (325) Protection against shifting cargo. Carrying cargo such as beams, pipes, sheet steel, and heavy rolls, the nature of which is such that the shifting thereof due to rapid deceleration or accident would be likely to result in penetration or crushing of the driver's compartment must, in addition to having the load securely fastened or braced, be provided with header boards or similar devices of sufficient strength to prevent such shifting and penetration. All motor vehicles shall be so constructed or be equipped with adequate cargo fastening devices so that the load will not shift so as to cause the driver to lose control while traversing any curve on a highway or while making a turn at any urban intersection.

1.14 (325) Recapped or regrooved tires. Recapped tires or regrooved tires may not be used on the steering axle or axles of any bus, truck or truck tractor.

1.15 (325) Special tires. Special use tires and tires commonly known as piggy-back trailer tires or tires manufactured for specific type short haul operations shall not be used on any bus, truck or truck tractor, trailer or semitrailer engaged in over-the-road operation.

[Effective August 1, 1966]

REGENTS, BOARD OF

THE UNIVERSITY OF IOWA

Pursuant to authority conferred by section 262.9(3), Code of Iowa, 1962, Rules and Regulations of the State Board of Regents, admission requirements to The University of Iowa as they appear on page 471, Section 5, College of Law, and amended May 22, 1964, [1966 I.D.R. 632] are hereby rescinded and the following adopted in lieu thereof.

COLLEGE ADMISSION

[Filed December 14, 1966]
[Effective September 1, 1968]

5. (262.9) College of Law. Address all inquiries concerning admission to the Director of Admissions, The University of Iowa, Iowa City, Iowa. Beginning students may enter the College of Law only in the fall semester. Except for good cause shown, applications for admission must be filed by May 1 preceding the fall semester in which the applicant wishes to enter.

To be considered for admission, an applicant should have attained a cumulative grade-point average of at least 2.3 on all college work undertaken. The grade-point average is based upon The University of Iowa's marking system in which a grade of "A" is equivalent to four points. Other marking systems will be evaluated by the Office of Admissions.

Applicants for admission must present a baccalaureate degree from an approved college or university prior to commencing work in the College of Law.

Each applicant for admission must take the Law School Admission Test administered by the Educational Testing Service, Princeton, New Jersey, and have his score forwarded to the College of Law. The test is given several times per year and may be taken at numerous locations in the United States and throughout the world. Applicants are urged to take the test in the fall or winter preceding the fall semester for

which they are making application. Except upon a showing acceptable to it, the Admissions Committee will not consider applications from students who fail to take the test prior to the June 1 preceding the fall semester in which they wish to enter.

Fulfillment of the specific requirements for admission listed above does not insure admission to the College of Law. From the applicants meeting the minimum requirements, the Admissions Committee of the College of Law will select those applicants who, in their judgment, appear to be best qualified for the study and practice of law. The Law Admissions Committee may require personal interviews of applicants.

ADMISSION WITH ADVANCED STANDING

A transfer student may be eligible for admission if he (1) has attended a school approved by the Association of American Law Schools; (2) is in good standing at the time of his withdrawal (evidenced by a letter from the Dean of the school from which he is transferring); (3) meets the admission requirements for beginning students; and (4) has done substantially above average work in the law school he attended. Where an applicant has completed more than one year of law study, advanced standing will be permitted only in exceptional cases. Applicants for admission with advanced standing should comply with the procedures required for admission to the first-year class.