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STATE OF IOWA
1970

# IOWA DEPARTMENTAL RULES

## JULY 1970 SUPPLEMENT

Containing
The permanent rules and regulations of general application promulgated by the state departments from January 1, 1970 to July 1, 1970

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CODE EDITOR

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STATE OF IOWA
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## NOTICE

The statutes provide that the Code Editor may publish cumulative, semi-annual supplements to the Iowa Departmental Rules. Inquiry should be made each six months of the Superintendent of Printing for distribution of these supplements.

## 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.

July 1970 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 state-wide 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 procured.

"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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# IOWA DEPARTMENTAL RULES JULY 1970

## ARCHITECTURAL EXAMINERS

Pursuant to the authority of sections 118.5 and 118.8 of the Code, rules of the State Board of Architectural Examiners appearing in the 1966 IDR, pages 52 and 53, are hereby rescinded and the following adopted in lieu thereof:

[Filed April 8, 1970]

CHAPTER 1

REGISTERED ARCHITECTS

**1.1(118)** Examinations shall be in two classes known as Standard N.C.A.R.B. Written Examinations and Standard N.C.A.R.B. Senior Examinations.

**1.2(118) Examinations.** The Board of Architectural Examiners hereby adopts and incorporates by reference as fully as if set out herein, the standards contained in Section I, "Examinations" of Circular of Information No. 3-69 issued by the National Council of Architectural Registration Boards.

**1.3(118) Admission to examinations.** The Board of Architectural Examiners hereby adopts and incorporates by reference as fully as if set out herein, the standards contained in Section E, "Standards for Admission to the NCARB Examinations" of Circular of Information No. 3-69 issued by the National Council of Architectural Registration Boards.

**1.4(118) Education and training equivalents.** The Board of Architectural Examiners hereby adopts and incorporates by reference as fully as if set out herein, the standards contained in Section F, "Education and Training Equivalents" of Circular of Information No. 3-69 issued by the National Council of Architectural Registration Boards.

**1.5(118) Professional experience equivalents.** The Board of Architectural Examiners hereby adopts and incorporates by reference as fully as if set out herein, the standards contained in Section G, "Professional Experience Equivalents" of Circular of Information No. 3-69 issued by the National Council of Architectural Registration Boards.

**1.6(118) Council record.** Each applicant for registration to practice architecture in the state of Iowa shall present a council record prepared by the N.C.A.R.B. to the Board for their files. Applicants for the written examinations are required to make application to N.C.A.R.B. for a council record at least six weeks before the personal audience is held.

[Effective May 8, 1970]

The above rules were submitted to the Attorney General on January 30, 1970. On March 19, 1970, more than thirty days thereafter, the Attorney General issued a statement attached herewith, wherein he recites the disapproval of the rules and gives his reasons therefore. Since the Attorney General had the above rules more than thirty days before issuing his opinion, the rules were filed irrespective thereof, as provided in Section 17A.8 of the Code.

## AUDITOR OF STATE

The following are rules of the Savings and Loan Division, Auditor of State, which have been proposed pursuant to the authority of sections 534.10, 534.31 and 534.42 of the Code (as amended). Rule 3.1(534) appearing in the January 1968 supplement to the I.D.R. 9 is amended by adding subrule 3.1(4).

[Filed January 6, 1970]

*SAVINGS AND LOAN DIVISION*

SAVINGS LIABILITY—DIVIDENDS

**3.1(4)** *Special housing certificate.* The association may offer a "special housing certificate", the basic features of which are as follows:

1. Maximum rate—six percent.

2. Minimum amount—$10,000.

3. Term—minimum two years; maximum five years. Automatically renewable, if desired.

4. Eligible investors—only those savers who had accounts with a qualifying balance as of December 15, 1969; i.e., at least $10,000, including earnings credited for that dividend period.

5. Maximum amount of certificates which can be issued—no more than twenty percent of savings capital as of November 30, 1969, but no more than ten percent may mature during the first six months of 1972, and five percent during any subsequent six-month period.

6. Period during which such certificates can be issued—December 19, 1969 to July 31, 1970.

7. Existing certificate forms may be adapted by use of a penalty clause which may be added as a sticker or stamp and which shall provide for forfeiture of earnings for emergency withdrawal or withdrawal prior to maturity, as the case may be, of not less than three months' earnings, or as provided by regulations of the Federal Home Loan Bank System in existence on the date of filing this rule in the office of the secretary of state.

8. It is intended that this special certificate be limited generally to the similar certificate authorized for federally chartered associations.

9. Certificates issued under these rules may be issued retroactively to January 1, 1970.

[Effective January 6, 1970]

# AUDITOR OF STATE
## (continued)

Pursuant to the authority of sections 534.10, 534.31, and 534.42 of the Code as amended by 62nd G.A., chapter 382, section 7, rules appearing in chapter 3, January, 1968 I.D.R. Supplement, pages 9 and 10, relating to the Savings and Loan Division, are hereby amended as follows:

[Filed January 26, 1970]

Strike all of subrules 3.1(2) and 3.1(3) and insert in lieu thereof the following:

**3.1(2)** *Variable term certificates.* The association may offer certificates in either single payment plan, bonus plan, variable rate plan, or otherwise for from three months to ten years so long as any particular such certificate is within the limitations imposed by the Federal Home Loan Bank System existing as of January 26, 1970 and so long as the same are approved by the Savings and Loan Division, Auditor of State. Such certificate plans shall be authorized retroactive to January 21, 1970.

**3.1(3)** *Ninety-day passbook accounts.* Associations may offer passbook accounts whereby a higher rate of return on investment may be offered than is offered on regular passbook accounts, in return for requiring a minimum of ninety days notice prior to any withdrawal. Such ninety-day notice passbook accounts shall be within the limitations imposed by the Federal Home Loan Bank System existing as of January 26, 1970 and shall be approved by the Savings and Loan Division, Auditor of State. Such accounts shall be authorized retroactive to January 21, 1970.

[Effective January 26, 1970]

# BANKING DEPARTMENT

STATE BANK DIVISION

Pursuant to the authority granted in Ch. 273, Sec. 213, Acts of the First Regular Session of the Sixty-third General Assembly, and Rule 8.2(5) of the permanent rules of Department of Banking, State Bank Division, filed in the office of the Secretary of State on December 9, 1969, the Superintendent of Banking has adopted the following *temporary* rules:

[Filed January 26, 1970]

Rules 8.2(1) through 8.2(4) of the permanent rules of Department of Banking, State Bank Division, filed in the office of the secretary of state on December 9, 1969, are hereby rescinded and the following substituted therefor:

**8.2(1)** *Single maturity time deposits of $100,000 or more.* The following schedule shall apply:

| Maturity | Maximum percent per annum |
|---|---|
| 30- 59 days | 6¼% |
| 60- 89 days | 6½% |
| 90-179 days | 6¾% |
| 180 days to 1 year | 7% |
| 1 year or more | 7½% |

**8.2(2)** *Single maturity time deposits of less than $100,000.* The following schedule shall apply:

| | |
|---|---|
| 30 days to 1 year | 5% |
| 1 year or more | 5½% |
| 2 years or more | 5¾% |

**8.2(3)** *Multiple maturity time deposits.* The following shall apply:

*a.* Interest payable ninety days or more after the date of deposit or ninety days or more after the last preceding date on which it might have been paid shall not exceed a rate of five percent per annum.

*b.* Interest payable at intervals of less than ninety days, but at least thirty days, after the last preceding date on which it might have been paid shall not exceed a rate of four and one-half percent per annum.

**8.2(4)** *Savings deposit.* The maximum rate of interest is four and one-half percent per annum.

[Effective January 26, 1970]

[Note attached by department]

These rules were filed pursuant to section 17A.8 of the Code, without the approval of the Attorney General.

# BANKING DEPARTMENT
## (continued)

STATE BANK DIVISION

Pursuant to the authority granted in Ch. 273, Sec. 213, Acts of the First Regular Session of the Sixty-third General Assembly, and 8.2(5) of the permanent rules of Department of Banking, State Bank Division, filed in the Office of the Secretary of State on December 9, 1969, the Superintendent of Banking has adopted the following *temporary* rule:

[Filed March 10, 1970]

Rule 8.2(3) of the permanent rules of Department of Banking, State Bank Division as amended effective January 26, 1970 on filing of the amended rule in the office of the secretary of state, is hereby further amended by rescinding such rule and substituting the following therefor:

**8.2(3)** *Multiple maturity time deposits.* The following schedule shall apply:

| | |
|---|---|
| 30 days or more but less than 90 days | 4½% |
| 90 days or more but less than 1 year | 5% |
| 1 year or more but less than 2 years | 5½% |
| 2 years or more | 5¾% |

[Effective March 10, 1970]

[Note by editor]

These rules were filed without approval of the Attorney General.

# BANKING DEPARTMENT
## (continued)

STATE BANK DIVISION

Pursuant to the authority granted in Chapter 273, Section 213, Acts of the First Regular Session of the Sixty-third General Assembly, and 8.2(5) of the permanent rules of Department of Banking, State Bank Division, filed in the Office of the Secretary of State on December 9, 1969, the Superintendent of Banking has adopted the following *temporary* rule:

[Filed June 30, 1970]

Rule 8.2(1) of the permanent rules of Department of Banking, State Bank Division as amended effective January 26, 1970 on filing of the amended rule in the office of the secretary of state, is hereby further amended by rescinding such rule and substituting the following therefor:

**8.2(1)** *Single maturity time deposits of $100,000 or more.* The following schedule shall apply:

| Maturity | Maximum percent per annum |
|---|---|
| 30- 59 days | No maximum limitation |
| 60- 89 days | No maximum limitation |
| 90-179 days | 6¾% |
| 180 days to 1 year | 7% |
| 1 year or more | 7½% |

[Effective June 30, 1970]

[Note by editor]

These rules were filed without approval of the Attorney General.

# CONSERVATION COMMISSION

Pursuant to the authority of section 107.24 of the Code, the following official notices are hereby rescinded.

[Filed April 14, 1970]

*DIVISION OF FISH AND GAME*

**(109) 1.** Official notice (not numbered) filed September 19, 1962, as shown on page 140 of the 1966 IDR, pertaining to the use of outboard motors on Willow Slough, is hereby rescinded.

**(109) 2.** Official notice (not numbered) filed September 19, 1962, as shown on page 141 of the 1966 IDR, pertaining to the use of outboard motors on Colyn Area, is hereby rescinded.

**(109) 3.** Official notice (not numbered) filed September 19, 1962, as shown on page 141 of the 1966 IDR, pertaining to the use of outboard motors on Goose Lake, Greene County, is hereby rescinded.

This rule is intended to implement Sections 109.5 and 109.6, Code of Iowa, 1966.

[Effective April 15, 1970]

# CONSERVATION COMMISSION
**(continued)**

Pursuant to the authority of section 107.24, chapter 109, of the Code, the following rule is hereby adopted.

[Filed June 9, 1970]

DIVISION OF FISH AND GAME
*MUSSELS—METHODS AND SEASONS*

**1.12(109)** Mussels may be taken, for commercial purposes, from the public waters of the state subject to the following regulations.

**1.12(1)** *Seasons.*

*a.* Mississippi river. Entire length —April 15 to September 30 of each year.

*b.* Remainder of state. June 15 to November 30 of each year.

**1.12(2)** *Methods.*

*a.* Crowfoot bar designed to catch mussels by the insertion of hooks between the shells of the mussels. Such bar not to exceed twenty feet in length.

*b.* By hand.

This rule is intended to implement sections 109.39 and 109.100, Code 1966, as amended by the 62nd General Assembly.

[Effective June 15, 1970]

# EMPLOYMENT SAFETY COMMISSION

Pursuant to authority of section 88A.11 of the Code, the following rules are adopted.

[Filed April 10, 1970]

EDITOR'S NOTE

*These rules were filed with the secretary of state as chapter 1 of Title IV. They have been renumbered as chapter 4 to avoid a duplication in numbering.

GENERAL DIVISION

TITLE IV

CHAPTER 4*

HEAD, EYE, AND RESPIRATORY PROTECTION

**4.1(88A)T.IV Purpose and scope.**

**4.1(1)** *Purpose.* The purpose of these rules is to provide reasonable and adequate means, ways and methods for the proper selection and safe use of head, face, neck, eye, and respiratory protective equipment.

**4.1(2)** *Scope.* These rules will apply to all references made in Iowa employment safety commission rules pertaining to head, eye, and respiratory protection.

**4.2(88A)T.IV General requirements—when head, eye, and respiratory devices are required.**

**4.2(1)** Head, eye, and respiratory protection meeting the requirements of these rules shall be used in all instances when approved head, eye, and respiratory protection is required by the rules of the Iowa employment safety commission.

**4.2(2)** In such cases, employers shall make available protectors of a type suitable for the work to be performed, and employees shall wear such protectors.

**4.2(3)** Areas where protective equipment must be worn shall be the following:

*a. Head protection.* Head protection shall be worn by all workmen and all authorized persons frequenting areas where there is a reasonable hazard of injury from objects falling from overhead, or when in close proximity to electrical contact with exposed conductors of high voltage.

(1) Protective head gear shall meet the requirements for Class A or B hard hats as defined in this rule.

(2) Class B protective head gear shall be worn when in close proximity to electrical contact with exposed conductors of high voltage.

*b. Eye protection.* Eye protection shall be worn by all workmen and all authorized persons frequenting areas where there is a reasonable hazard of damage to the eyes from

| Hazard Involved | When Engaged in the Following Jobs |
|---|---|
| Relatively large flying objects, such as rivets, nails, metal or rock chips, fragments from mushroomed tools | Chipping, finishing of iron and steel castings and forgings, lathe work, jobs using tools such as chisels, swages, flatters, fullers, jack hammers, rock drills, sledges. |
| Dust and small flying particles | Scaling and grinding of metals, stone dressing, wood working. |
| Flying glass fragments | Bottling and canning operations, cutting and grinding. |
| Dust, wind, and metal sparks | Electric spot and butt welding where there is no exposure to radiant energy. |
| Splashing metal | Casting, tinning, babbitting, pouring lead joints. |
| Gases, fumes and smoke | Handling of volatile and corrosive chemicals. |
| Liquids | Dipping in galvanizing, pickling and plating tanks, handling of corrosive acids, and solutions. |
| Reflected light and glare, welding flash | Working near or adjacent to furnaces, welding operations. |
| Injurious radiant energy when a moderate reduction of intensity of the visible radiant energy is desired | Oxycetylene, oxyhydrogen, or resistance welding and cutting, testing of lamps involving exposure to excessive brightness, tending electric, Bessemer, and other types of furnaces crucible steel making. |
| Injurious radiant energy when a large reduction of the visible radiant energy is desired | Electric arc welding and cutting, irradiation with ultra-violet light, hydrogen welding. |

*c. Respiratory protection.* Respirators shall be worn where a process presents the hazard of exposure to harmful vapors, gases, dusts, mists or fumes if the contaminant level is equal to or above the Threshold Limit Values as set out in the Iowa employment safety commission's rules, General Division, Title IV, Chapter 2. Where the process is enclosed or ventilated a supply of appropriate protectors or other equivalent safety measures shall be readily available for use in emergency.

**4.2(4)** Atmospheric contaminants shall be measured by the Threshold Limit Values as set out in the Iowa employment safety commission's rules, General Division, Title IV, Chapter 2.

**4.2(5)** Protectors shall meet the following minimum requirements:

*a.* They shall provide adequate protection against the particular hazards for which they are designed.

*b.* They shall be reasonably comfortable when worn under the designated conditions.

*c.* They shall fit snugly and shall not unduly interfere with the movements of the wearer.

*d.* They shall be durable.

*e.* They shall be capable of being disinfected.

*f.* They shall be easily cleanable.

**4.2(6)** Workers whose vision requires the use of corrective lenses in spectacles and who are required by any rule to wear protective goggles shall wear protective equipment of one of the following types:

*a.* Spectacles whose protective lenses provide optical correction.

*b.* Goggles, protectors or shields that can be worn over corrective spectacles without disturbing the adjustment of the spectacles or

*c.* Goggles that incorporate corrective lenses mounted behind the protective lenses.

**4.2(7)** Every protector shall be distinctly marked to facilitate identification of the manufacturer.

**4.2(8)** When limitations or precautions are indicated by the manufacturer, they shall be transmitted to the user and care taken to see that such limitations and precautions are strictly observed.

**4.3(88A)T.IV Exceptions.**

**4.3(1)** Variations from the requirements of this rule may be granted by the Iowa Employment Safety Commission only when it is demonstrated to the satisfaction of the commission that equivalent protection is afforded.

**4.4(88A)T.IV Definitions.**

**4.4(1)** *General information.*

*a.* Where the word "approved" is used with qualification, it refers to approval by the Iowa Employment Safety Commission having jurisdiction over the specific requirement.

*b. Mandatory and advisory rules.* Mandatory requirements of these rules are characterized by the word "shall". If a rule is of an advisory nature, it is indicated by the word "should" or it is stated as a recommendation.

**4.4(2)** *Specific definitions.* As used in this rule, the following words shall have the indicated definitions, and all other words shall have meaning according to their common usage.

*a. Abrasive-blasting respirator.* See respirator.

*b. Absorptive lens.* A filter lens whose physical properties are designed to attenuate the effects of glare, reflective, and stray light. In this rule, it refers to shades 1.7 through 3.0 in the chart in Table 1.

*c. Aerodynamic diameter.* The diameter of a unit density sphere having the same settling velocity as the particle in question of what ever shape and density.

*d. Aerosol.* A suspension of fine, solid, or liquid particles in air as dust, fume, mist, smoke, or fog.

*e. Air-line respirator.* See respirator.

*f. Air-purifying respirator.* See respirator.

*g. Air-regulating valve.* An adjustable valve used to regulate airflow to the facepiece, helmet, or hood of an air-line respirator.

*h. Air-supply device.* A hand- or motor-operated blower for the hose mask, or a compressor or other source of respirable air for air-line and abrasive-blasting respirators.

*i. Air-supply line.* A hose to conduct respirable air from the air-supply device to that portion of a supplied-air respirator carried on the wearer's person.

*j. Auxiliary magnifier or enlarger.* A single lens or a pair of lenses joined together in a suitable manner to be inserted into the window in a welding helmet or hand shield to magnify or enlarge the area of the point of operation.

*k. Available.* Reasonably accessible (not intended to denote who pays for the protective device).

*l. Breathing tube.* A tube through which air or oxygen flows to the facepiece, helmet, or hood.

*m. Bridge size.* The distance between lenses on the nose side of each eye, expressed in millimeters.

*n. Canister (air-purifying).* A container filled with sorbents and catalysts that remove gases and vapors from air drawn through the unit. The canister may also contain an aerosol (particulate) filter to remove solid or liquid particulates.

*o. Canister (oxygen-generating).* A container filled with a chemical which generates oxygen by chemical reaction.

*p. Cartridge.* A small container filled with air-purifying media.

*q. Cartridge-type respirator.* See respirator.

*r. Catalyst.* In respirator use, a substance which converts a toxic gas (or vapor) into a less-toxic gas (or vapor).

*s. Chemical-cartridge respirator.* See respirator.

*t. Contaminant.* A harmful, irritating, or nuisance material that is foreign to the normal atmosphere.

*u. Corrective lens.* A lens ground to the wearer's individual corrective prescription.

*v. Cover lens (cover circle).* A removable disc of colorless glass, plastic-coated glass, or plastic that covers the filter lens and protects it from weld spatter, pitting, or scratching when used in a goggle.

*w. Cover plate.* A removable pane of colorless glass, plastic-coated glass, or plastic that covers the filter plate and protects it from weld spatter, pitting, or scratching when used in a helmet, hood, or goggle.

*x. Crown strap(s).* As applied to protective hats and caps, it is that part of the suspension that supports the shell in proper position on the wearer's head and acts as a shock absorber when the shell is subjected to impact; as applied to helmets and face shields, it is that part of the suspension that supports the device in proper position in front of the wearer's face.

*y. Demand respirator.* See respirator.

*z. Detachable coupling.* A device by means of which the respirator wearer, without using handtools, may detach the air-supply line from that part of the respirator worn on the person or from the air-supply source.

*aa. Disinfection.* The act or process of destroying organisms that may cause disease and removal of pathogenic organisms, especially by means of chemical substances.

*ab. Dispersoid.* A colloidal or finely divided substance.

*ac. Dust.* A solid mechanically produced particle with sizes varying from submicroscopic to visible or macroscopic.

*ad. Eyepiece.* A gastight, transparent window(s) in a full facepiece through which the wearer may see.

*ae. Eye size.* A measurement expressed in millimeters and denoting the size of the lens-holding section of an eye frame.

*af. Exhalation valve.* A device that allows exhaled air to leave a respirator and prevents outside air from entering through the valve.

*ag. Face mask.* A device worn in front of the eyes and a portion of or all of the face, whose predominant function is protection of the eyes and face.

*ah. Facepiece.* That portion of a respirator that covers the wearer's nose and mouth in a half-mask facepiece or nose, mouth, and eyes in a full facepiece. It is designed to make a gastight or dust-tight fit with the face and includes the headbands, exhalation valve(s), and connections for air-purifying device or respirable-gas source or both.

*ai. Face shield.* A device worn in front of the eyes and a portion of, or all of, the face, whose predominant function is protection of the eyes and face.

*aj. Filter.* A fibrous media (canned or uncanned) used in respirators to remove solid or liquid particles from the airstream entering the respirator enclosure.

*ak. Filter lens (filter circle).* A removable disc in the eyecup of a goggle that absorbs varying proportions of the ultarviolet, visible, and infrared rays according to the composition and density of the lens.

*al. Filter plate.* A removable pane in the window of a helmet, hood, or goggle that absorbs varying proportions of the ultraviolet, visible, and infrared rays according to the composition and density of the plate.

*am. Filter respirator.* See respirator.

*an. Fog.* A mist of sufficient concentrate to perceptibly obscure vision.

*ao. Full facepiece.* A facepiece that covers the wearer's nose, mouth, eyes, and face and makes a gastight or dust-tight fit with his face. It includes eyepieces, the head harness, and breathing tube.

*ap. Fume.* A solid condensation particle of extremely small particle size, generally less than one micron in diameter.

*aq. Gas.* An aeriform fluid which is in the gaseous state at ordinary temperature and pressure.

*ar. Gas mask.* See respirator.

*as. Goggle.* A device, with contour-shaped eyecups or facial contact with glass or plastic lenses, worn over the eyes and held in place by a headband or other suitable means for the protection of the eyes and eye sockets.

*at. Half-mask facepiece.* A facepiece that covers the wearer's nose and mouth but not his eyes, and makes a gastight or dust-tight fit with his face; the headbands are included in the half-mask assembly.

*au. Hand shield.* A device, usually held in the hand or supported on the wearer's chest, designed to protect the eyes and face during welding operations.

*av. Hat.* A rigid device that is worn by the operator to provide protection to the head or portions thereof against impact, flying particles, or electric shock, or any combination thereof, and which is held in place by suitable means; brimless caps with peaks are included as hats.

*aw. Headband.* That part of the goggle, helmet, or hood suspension consisting of a supporting band that encircles the head.

*ax. Headgear.* That part of a protective helmet, hood, or face shield that supports the device on the wearer's head; it usually consists of headband and crown strap.

*ay. Head harness* A device for holding the facepiece securely in place on the wearer's head.

*az. Helmet.* A device that shields the eyes, face, neck, and other parts of the head.

*ba. Hood.* A device that completely covers the head, neck, and portions of the shoulders.

*bb. Hose mask with blower.* See respirator.

*bc. Hose mask without blower.* See respirator.

*bd. Infrared radiation.* Electromagnetic energy with wavelengths from 770 to 12,000 millimicrons.

*be. Inhalation valve.* A device that allows respirable air to enter the facepiece and prevents exhaled air from leaving the facepiece through the intake opening.

*bf. Interpupillary distance.* The distance in millimeters between the centers of the pupils of the eyes.

*bg. Irrespirable.* Unfit for breathing.

*bh. Lens.* The transparent glass or plastic device through which the wearer of the protective goggles or spectacles sees.

*bi. Lens, corrective.* A lens ground to the wearer's individual corrective prescription.

*bj. Lens, plano.* A lens which does not incorporate correction.

*bk. Lift front.* A type of mounting frame for welding helmets, hoods, or goggles which is made of two connected parts; the front part, which can be removed from the line of vision, contains the high-density filter plate with its cover plate; and the back part, which is fixed to the helmet, contains a low-density or clear impact-resistant plate.

*bl. Manufacturers' approval.* Refers to the manufacturer of "Head, Eye, and Respiratory" equipment and designates the quality of material and workmanship necessary in the manufacture, assembly and fabrication of "Head, Eye, and Respiratory" equipment to comply with these rules.

*bm. Millimicron.* The thousandth part of a micron, or the millionth part of a millimeter. (Also known as a nanometer.)

*bn. Mist.* A liquid condensation particle with sizes ranging from submicroscopic to visible or macroscopic.

*bo. Mounting plate or mounting frame.* The device that holds the filter and cover plate in their proper place on the helmet.

*bp. Nanometer.* (See Millimicron).

*bq. Parallelism.* The quality or state of being parallel (extending in the same direction everywhere equidistant and not meeting).

*br. Particulate matter.* A suspension of fine solid or liquid particles in air, such as dust, fog, fume, mist, smoke, or sprays. Particulate matter suspended in air is commonly known as aerosol.

*bs. Pneumoconiosis-producing dust.* Dust, which when inhaled, deposited, and

retained in the lungs, may produce signs, symptoms and findings of pulmonary disease.

*bt. Prefilter.* A low-resistance filter pad placed in front of and in series with a regular dispersoid filter to lessen the dust load on the latter by removing the larger dispersoids from the air drawn through it.

*bu. Protector.* A device that provides face or eye protection against the hazards of processes encountered in employment, education, or in the natural environment.

*bv. Radiant energy or radiation.* The energy of electromagnetic waves produced by the movement of molecules excited by the heat of an electric arc, or gas flame, or the passage of an electric current. Three kinds of radiant energy are pertinent to this rule: (1) Ultraviolet, (2) visible light, and (3) infrared.

*bw. Reasonable.* Rational, just, fair-minded, proper, sensible, probable, sane, moderate.

*bx. Resistance.* Opposition to the flow of air, as through a canister, cartridge, particulate filter, or orifice.

*by. Respirable.* Fit to be breathed.

*bz. Respirator.* A device designed to protect the wearer from inhalation of harmful atmospheres.

(1) *Abrasive-blasting respirator.* A supplied-air respirator, similar in principle to the air-line respirator, providing respiratory protection against dust and protection for the head and neck of the wearer against impact and abrasion by rebounding material during abrasive blasting operations.

(2) *Air-line respirator.* A supplied-air respirator designed to be connected by a small-diameter hose to a supply of respirable air under positive pressure sufficient to deliver an adequate flow of air to a half-mask facepiece, full facepiece, helmet, or hood.

(3) *Air-purifying respirator.* Half-mask, full facepiece, or mouthpiece respirator equipped with air-purifying units to remove gases, vapors, and particulate matter from the ambient air prior to its inhalation. Some air-purifying respirators are blower-operated and provide respirable air to the facepiece (or hood) under a slight positive pressure.

(4) *Chemical-cartridge respirator.* A non-emergency chemical-filter respirator usually having a half-mask facepiece and one or more cartridges to remove contaminants from the air drawn through them; it is designed for respiratory protection against low concentrations of gases and vapors or a combination of dispersoids, gases, and vapors.

(5) *Demand respirator.* An atmosphere-supplying respirator in which air or oxygen is admitted to the facepiece only when the wearer inhales, and in quantities governed automatically by his breathing.

(6) *Filter respirator.* A device designed for the wearer to inhale the surrounding atmosphere after it has passed through a filtering medium to remove contaminants. The filtering medium may chemically absorb or mechanically retain or obstruct the impurities.

(7) *Gas mask.* A filter respirator having a full facepiece, a canister containing the suitable granular material with or without dispersoid filter, and a canister-carrying harness, it is designed for respiratory protection against gases or vapors or a combination of dispersoids and gases and vapors.

(8) *Helmet respirator.* A rigid device that completely covers the head, neck, and portions of the shoulders of the wearer, and is provided with an air inlet and eyepiece.

(9) *Hood respirator.* A loose-fitting device that covers the head and neck of the wearer. It may be a nonrigid or a combination of a rigid head covering and nonrigid skirt for the head covering.

(10) *Hose mask with blower.* A supplied-air respirator having a full facepiece to which respirable air is forced through a large diameter hose by a hand- or motor-operated blower, and through which the wearer can inhale whether or not the blower is operated.

(11) *Hose mask without blower.* A supplied-air respirator having a full facepiece to which the supply of air is drawn from an inlet in respirable air through a large diameter hose by the wearer's breathing effort.

(12) *Self-contained breathing apparatus.* A respirator in which the supply of air, oxygen, or oxygen-generating material is carried by the wearer.

(13) *Supplied-air respirator.* A respirator that makes respirable air available to the wearer through a hose connected to a source of respirable air.

*ca. Self-contained breathing apparatus.* See respirator.

*cb. Shield.* A device to be held in the hand, or supported without the aid of the operator, whose predominant function is protection of the eyes and face.

*cc. Side shield.* A device of approved material fixed to the spectacle lens frame to protect the eye from side exposure.

*cd. Slow-burning.* See 4.6(2)*e.*—Flammability test.

*ce. Snood.* A flexible attachment to the back of a hood or helmet for protection against injury to the back of the head and neck.

*cf. Sorbent.* A material which removes toxic gases and vapors from air inhaled through a canister or cartridge.

*cg. Spectacle.* A device patterned after conventional-type spectacle eyewear but of more substantial construction, either with or without side shields, and with plano or corrective impact-resistant lenses of clear or absorptive filter glass or plastic.

*ch. Spray.* A liquid mechanically produced particle with sizes generally in the visible range.

*ci. Supplied-air respirator.* See respirator.

*cj. Supplied-air suit.* A one- or two-piece suit that is impermeable to most particulate and gaseous contaminants and is provided with an adequate supply of respirable air.

*ck. Suspension.* That part of a protective hat, cap, helmet, or face shield that supports the device on the wearer's head; it usually consists of headband and crown strap.

*cl. Temple.* That part of a spectacle or other protector extending to and dropping behind the ear of the wearer and intended to position the device before the eyes.

*cm. Temple length.* The measured length of a temple designated in inches (see Figs. 3 and 4).

*cn. Timer.* A device, operated by the wearer's respirations, that indicates the approximate length of time that a universal gas mask has been worn.

*co. Toxic dust.* Dust that may be harmful to the respiratory system or to other parts of the body through passing from the respiratory tract into the blood stream.

*cp. Ultraviolet radiation.* Electromagnetic energy with wavelengths from 50 to 390 millimicrons.

*cq. Valve (air or oxygen).* A device which controls the direction of air or oxygen flow or the rate and pressure at which air or oxygen is delivered, or both.

*cr. Vapor.* The gaseous state of a substance that is solid or liquid at ordinary temperature and pressure.

*cs. Visible light.* Electromagnetic energy having wavelengths within a range of 390 to 770 millimicrons.

*ct. Window indicator. A colori*metric indicator for gas mask canisters which denotes the service life for a particular gas.

**4.5(88A)T.IV Head protection.**

**4.5(1)** *Hats.*

*a. Types and classes.* Protective caps and hats shall provide clearance between the wearer's head and the shell of not less than 1¼ inches.

(1) Type 1—Hat, full brim.

(2) Type 2—Cap, brimless with peak (may have bill on the front).

(3) Class A—General service. Protection against impact and flying particles; limited dielectric strength.

(4) Class B—Utility service. Protection against impact and flying particles; high dielectric strength.

(5) Class C—Special service. Limited protection against impact; no dielectric strength (particular reference is made to metallic protective hats and caps).

(6) Class D—Fireman service. Protection against impact and flying particles; limited dielectric strength; Type 1 only.

*b. Materials.* Materials used in the construction of protective hat and cap

shells shall be water resistant, acid resistant, and fire resistant, and non-conductors of electricity (except for Class C which possesses no dielectric strength). All materials coming in contact with the wearer's head shall be non-irritating. Class B hats shall contain no metal parts, either in the shell, suspension, or accessories.

*c. General requirements.* Each hat or cap shall consist essentially of a shell, a headband, and crown straps for support on the wearer's head. Provision shall be made for adequate ventilation.

(1) *Shell.* The shell shall be dome-shaped of one-piece seamless construction, with smooth, hard surfaces. Where reinforcing ribs are used, they shall be so designed as to deflect a falling object. For Class B hats, there shall be no holes in any part of the shell.

(2) *Headband.* Unless otherwise specified, the headband shall be genuine vegetable-tanned leather, full grain and soft, or an artificial equivalent. The headband should be smoothly finished on the surface that will contact the head.

(3) *Crown straps.* Crown straps shall be of closely woven webbing or suitable material with high tensile strength and a low total elongation.

(4) *Accessories.* Accessories shall be suitable for the intended purpose. All accessories shall be made of suitable materials and shall show good workmanship.

*Chin strap.* Unless otherwise specified, the chin strap shall be closely woven webbing, elastic cotton webbing combination, or the equivalent.

*Winter liner.* The winter liner, unless otherwise specified, shall consist of two layers of closely woven fabric; if colored, the fabric shall be fast dyed. The outer layer shall be water repellent and the inside layer a non-water-repellent plain woven flannel with nap on the inside surface.

*Lamp bracket.* The lamp bracket shall be plastic or metal; if metal, it shall be insulated from the inside of the shell. The bracket shall be designed for proper beam angle when the hat is worn in the normal position.

*Welding helmet combination.* When used in conjunction with a cap, the welding helmet shall meet the requirements of 4.5(2).

*Face shield.* When worn in conjunction with a hat or cap, the face shield or eye shield shall meet the requirements of 4.5(3).

*Hoods.* Hoods shall meet the requirements of 4.5(1)*d*(5).

*d. Detailed requirements.*

(1) *Shell.* The Type 1 hat shall have a continuous brim as an integral extension of the dome; with the hat held in a horizontal position, the brim shall slope downward; the width of the brim shall be not less than 1¼ inches and not more than 3 inches measured from the inside edge of the shell, except for Class D shells. The Type 2 cap shell shall include a peak or brim extending forward from the crown not less than 1½ inches and shall be not less than 5½ inches in width. The Class B hat or cap shell shall contain no holes, either through the crown portion or the brim portion, for the support of the headgear or for any other purpose; no metal or electrical conducting material shall be permitted either inside or outside the shell for any purpose.

(2) *Headband.* The headband may be adjustable or nonadjustable. If adjustable, it shall cover the size range of commercial hat sizes 6⅝ through 7⅝. If nonadjustable, it shall be furnished in the specified head size. The surface of the headband in contact with the wearer's head shall be not less than 1 inch in width. Any padding or stiffener strips used shall be secured to the leather or artificial leather of the headband. Headband assemblies intended for the use in Class B hats or caps shall contain no metal or electrical conducting material.

(3) *Crown straps.* Crown straps may be adjustable or nonadjustable. These straps when properly laced or assembled shall form a cradle for supporting the hat or cap on the wearer's head. The crown straps shall be designed to permit a clearance between the top of the wearer's head and the shell of not less than 1¼ inchs. Crown-strap assemblies intended for use in Class B hats or caps shall contain no metal or electrical conducting material.

(4) *Accessories.*

*Chin strap.* The adjustable chin strap shall be made of not more than two pieces of webbing, leather, or elastic cotton webbing combination, or their equiv-

alent, not less than ½ inch in width and not less than 16 inches in length, excluding the attachments to the hat or cap. The means for adjusting the chin strap shall assure a secure hold of the hat or cap on the wearer's head and quick removal of the hat or cap by releasing the strap. The chin strap shall also be adjustable for wearing at the back of the head. The webbing shall have no frayed or loose edges that may unravel. Leather, if used in the chin strap, shall be of suitable thickness, full grained, and smoothly finished on the surface that will be in contact with the chin. All metal parts shall be free from sharp or rough edges or projections. Rivet heads shall be smooth. Chin-strap assemblies intended for use in Class B hats or caps shall contain no metal or electrical conducting material.

*Winter liner.* The winter liner shall be designed to cover the skull, neck and ears, or the skull and ears only, as specified. The earlug and neck part may be made either in one piece with the skull cap or may be attachable to it. The neck and earlug parts shall be made to fit snugly by means of a chin strap. Winter liners intended for use with Class B hats or caps shall contain no metal or electrical conducting material.

*Lamp bracket.* The lamp bracket shall be so designed as to permit adequate illumination directly in front of the wearer when the hat is positioned properly on the head. Caps for specific use in the mining industry may have metal brackets in place of plastic ones, provided insulating rivets are used to assemble the bracket to the shell.

*Face shield.* Material for face shields or eye shields shall be in accordance with 4.5(3). The method of attachment to the hat or cap shall be such as to permit easy replacement. A firm, sure fit shall be assured to provide adequate protection. Metal or plastic frames shall be provided to hold the shield firmly to the hat or cap shell. Snap-on or riveted attachments are permitted, provided the shield is held securely. Attachments may be rigid or swiveled; see 4.5(3)*f*(6).

*Welding helmet combination.* The welding helmet shall be attached to the protective cap in such a manner as to permit easy removal, yet offer a firm, positive method of attachment. The attachment shall be such as to permit ready lifting and lowering of the helmet as described in 4.5(2)*d*(1).

(5) *Hoods.*

*Acid type.* Materials used in this application shall be rubber, synthetic rubber, or plastic. When worn in conjunction with a protective hat or cap, the method of attachment and the design shall be such as to permit ease in movement, adequate visibility, proper ventilation, comfort, and safety. The window shall be attached so as to provide adequate vision with the hat or cap at any angle.

*Heat type.* Hoods and masks are available for protection against various degrees of heat. The mask type consists of a plastic or wire-screen face shield which can be attached by means of a bracket to the brim of a hat or cap. This combination is used where the wearer may come in contact with infrequent splashes of hot materials. Spectacles are frequently worn under the wire-screen mask. The hood shall be made from material such as chrome, leather, asbestos, or flameproof duck. The design shall be similar to that of the acid-type hood and shall incorporate the same details as noted therein.

*Abrasion type.* Material used for this type of hood shall be heavy rubberized fabric, chrome, leather, or similar abrasive-resistant material. The design shall be similar to the acid-type hood and shall incorporate the same details of construction.

*e. Physical requirements and methods of test.*

(1) *Preparation of samples.** All hats or caps shall be prepared in the following manner for the tests described in this section. Using No. 60 grit garnet paper, the entire exterior surface of the shell shall be abraded until the basic material is exposed. All samples shall then be conditioned in an oven for 96 hours at 50° ± 2°C, then cooled in a desicator and exposed for 96 hours in an atmosphere having 50 percent ± 2 percent relative humidity and a temperature of 25° ± 2°C.

(2) *Insulation resistance (Class A and Class D hats and caps).** When tested in accordance with the method specified in 4.5(1)*e*(4), Class A and Class D hats and caps shall withstand 2,200 volts, alternating current, 60 cycles per second (root-mean-square value) for one minute with leakage current not in excess of three milliamperes.

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(3) *Insulation resistance (Class B hats or caps).** When tested in accordance with the method specified in 4.5(1)*e*(4), Class B hats or caps shall withstand 15,000 volts, alternating current, 60 cycles per second (root-mean-square value) for one minute with leakage current not in excess of 8 milliamperes. Class B hats and caps when tested to breakdown shall not fail below 20,000 volts. Tests shall be made after first subjecting the hats or caps to the impact resistance test described in 4.5(1)*e*(5).

(4) *Electrical proof test.** The inside of the hat or cap shell (without suspension or accessories) shall be filled with fresh tap water to within ½ inch of the junction of the brim with the crown. If the shell contains holes in the crown near the brim, it shall be filled to within ½ inch of the holes. The hat or cap shall then be submerged in the same type of water to the same level as that of the water inside. One terminal from the current source shall be in contact with the water inside the shell, and the other terminal in contact with the water outside the shell. The circuit shall be provided with a voltmeter of sufficient capacity, and a millimeter of sufficient capacity and accuracy, to measure the specified current. For Class A and Class D hats and caps, 2,200 volts shall be applied for one minute and current leakage, if any, noted. For Class B hats or caps, 15,000 volts shall be applied continuously for one minute and current leakage, if any, noted; voltage shall then be increased momentarily to 20,000 volts to determine whether breakdown of the shell occurs. Care should be taken to keep the unsubmerged portion of the shell dry so that flashover on application of voltage does not occur. Suitable precaution should be taken to prevent accidental contact by persons with any part of the high-voltage circuit.

(5) *Impact resistance.**

*Classes A, B, and D hats and caps.* When mounted on the standard head form, as described in Federal Specification GGG-H-142, with a crown clearance of 1½ inches, the hat or cap shall not transmit an average force of more than 850 pounds from the impact of an eight-pound spherical steel ball approximately three and eight tenths inches in diameter dropped onto the center of the crown from a height of five feet. The force transmitted shall be determined by mounting the standard head form on a Brinell hardness penetrator apparatus as described in Federal Specification GGG-H-142. See Fig. 5. The impression bar shall be of a metal having a predetermined Brinell hardness of 18-30 as measured with a 500-kilogram load and a 10-millimeter ball, in accordance with the manufacturing procedures of American Society for Testing Materials Specification E10-54T.

*Class C hats and caps.* Requirement and test shall be the same as specified in paragraph above except that the height of drop shall be three feet.

(6) *Penetration resistance.** Hats and caps of all classes shall be neither dented nor pierced for more than ⅜ inch, nor shall the shell be pushed down so as to touch the standard head form, nor shall the crown straps pull out or break when mounted as specified in 4.5(1)*e*(5), par. 2, and subjected to a one-pound hardened steel plumb bob with a point having an included angle of 36 degrees dropped squarely onto the center of the crown from a height of 10 feet.

(7) *Weight.** Except for Class D, the weight of each hat or cap shall not exceed 15 ounces complete with suspension, but exclusive of winter liner or chin strap.

(8) *Flammability.** The thinnest section of the shell shall not burn at a rate greater than 3 inches per minute when tested by inserting one end of a 5-inch x ½-inch strip of the shell material in a blue-flame Bunsen burner. The strip of the shell material shall be inclined at 45 degrees with the 5-inch longitudinal axis horizontal. The burner flame shall be ¾ inch high. After 30 seconds, the burner shall be removed and the strip allowed to burn. Measurement of the rate of burning shall then be recorded.

(9) *Water absorption.** The shel material shall absorb not more than ! percent by weight of water when subject ed to the test specified in 4.6(2)*d*.

(10) *Edge strength.** Hats an caps in Classes A, C, and D shall show deflection under a 40-pound load of no more than ¾ inch and ultimate strengt of not less than 50 pounds when the pea or front brim is clamped in the supporte

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edge position to a T-jig, in accordance with Federal Specification GGG-H-142.

*f. Selection of head-protective devices.*

(1) *Class A.* Hats and caps under this classification are intended for protection against impact hazards encountered, for example, in mining, building construction, tunneling, timber work, and manufacturing. Dielectric strength is incorporated as an extra safeguard for protection against voltages not exceeding 600 volts.

(2) *Class B.* This class covers safety hats and caps for protection of the wearer's head against electrical contact with exposed conductors of high voltage and against impact hazards.

(3) *Class C.* The safety hat or cap in this class is designed specifically for lightweight comfort with some impact protection. This class is usually manufactured from aluminum and offers no dielectric protection.

(4) *Class D.* The firemen's helmet covered under this classification is designed for a specific use where additional requirements are: Wide brim (to give protection to ears and neck); heavy construction (to provide high-impact resistance and bump protection, with good abrasion qualities): dielectric strength (for protection against voltages not exceeding 600 volts).

*g. Marking.* Each hat or cap shall be identified on the inside of the shell with the name of the manufacturer and class of protection. For Class B, the hats and caps shall also be marked to indicate that each has been tested to meet the voltage test and breakdown requirements. Each hat or cap shall be accompanied by instructions explaining the proper method of adjusting the suspension.

**4.5(2)** *Helmets and hand shields.*

*a. Function.* The devices described in this section are designed to provide protection for the eyes, face, ears, and neck against intense radiant energy. Typical operations which require helmets or hand shields include various kinds of arc welding, heavy gas cutting, and scarfing.

*b. Types.* The helmet and the hand shield are the only permissible types.

*c. Styles.* The helmet and the hand shield are made to the same basic design and of the same basic materials—an opaque, bowl-shaped, or modified bowl-shaped, device containing a window with filter plate which allows the wearer to see the radiant object, yet prevents harmful intensities of radiation from reaching his eyes. The helmet is supported on the head by an adjustable headgear, while the hand shield has a handle attached to the bottom by which it is held in the hand. The basic designs may be modified to provide protection against special hazards, but modified equipment shall meet the same requirements as the basic design.

*d. Detailed requirements.*

(1) *Rigid helmet.*

*Helmet body.* The helmet body shall be of such size and shape as to protect the face, forehead, ears, and neck to a vertical line back of the ears. It shall have an opening or openings in the front for filter plates or filter lenses. The helmet body shall be attached to the headgear in such a way that it will not come in contact with any part of the head and that it can be lifted up from in front of the face and hold its position in front of the head. The helmet body shall be made of vulcanized fiber, reinforced plastic, or other suitable material which shall be thermally insulating, noncombustible or slow burning; opaque to visible, ultraviolet, and infrared radiations; and capable of withstanding disinfection. The inside of the helmet body shall have a low light-reflecting finish. Rivets or other metal parts, if terminating on the inside surface, shall be adequately separated from the wearer's head.

*Weight.* The helmet or hand shield, exclusive of filter or cover plates shall weigh not more than 28 ounces (793 grams).

*Headgear.* The helmet shall have a headgear or cradle that shall hold the helmet body comfortably and firmly on the wearer's head, but shall permit the helmet body to be tilted back over the head. The headgear shall be readily adjustable, for all head sizes from 6½ to 7⅝, without the use of tools. The headgear shall be made of materials which are thermally insulating, noncombustible, or slow burning, resistant to heat, and capable of withstanding disinfection. Where required, the headgear shall be fitted with a removable and replaceable sweatband covering at least the forehead portion of the headband. The sweatband shall be made of leather or other suitable

material which is slow burning, and non-irritating.

*Headgear substitutes.* The headgear may be replaced by an impact-resistant hat or cap, or other suitable device to which the helmet body is connected, provided that the helmet body can be lifted and adjusted to permit unobstructed vision or lowered to furnish complete protection, as required. The alternative device shall meet the requirements for disinfection and resistance to heat, and, in addition, shall meet the applicable requirements of any additional functions such as protection against falling objects as detailed under 4.5(1).

*Filter and cover-plate mounting.* The front of the helmet body shall be provided with a light-tight plate-mounting frame or frames made of metal, plastic, or other suitable material, which shall be attached securely to the body of the helmet or shall be an integral part of the helmet. The frame shall provide a window through which the welding or cutting operation may be seen by the wearer; the window shall be not less than 3⅞ inches wide and 1⅝ inches high, or equivalent in area and visual field. The frame shall permit the removal and replacement of filter and cover plates without the use of tools and without damage to the plates or frame. The mounting shall be so designed that the filter plate will be not less than 2 inches (50.8 mm) from the eyes of the wearer.

*Filter plate—dimensions.* The filter plate shall be of such dimensions as to fit suitably into the frame and to cover the window; the filter plate shall be not less than 0.080 inch (2 millimeters) nor more than 0.150 inch (3.8 millimeters) thick; shall measure not less than 2 inches ± 0.03 inch wide by 4.25 inches ±0.03 inch long.

*Optical qualities.* Both surfaces of filter plates shall be well polished, and shall be free from striae, waves, or other defects which would impair their optical quality. Filter-plate surfaces shall be flat and substantially parallel; prismatic effects shall not exceed ⅛ prism diopter (4 minutes of angular deviation).

*Transmittance.* Filter plates shall conform with the radiant-energy transmittance requirements shown in Table 1 for shades 4.0 through 14.0.

*Impact resistance.* When specified, filter plates shall be impact resistant and withstand the following impact test: The filter plate shall be supported on a suitable rigid frame having internal dimensions of 1.77 inches (4.5 centimeters) by 4.02 inches (10.2 centimeters). A washer of neoprene rubber packing of 40 ± 5 durometer reading, not more than ⅛ inch thick and of the same internal dimensions as the support, shall be placed between the plate and the support. A ⅝-inch (15.9 millimeter) steel ball, approximately 0.565 ounce (16 grains), shall be freely dropped from a height of 39 inches (1 meter) onto the center of the horizontal outer surface of the plate. The plate shall not fracture from the impact of the steel ball.

*Marking.* All filter plates shall be marked with the shade designation and a permanent and legible marking by which the manufacturer may be readily identified. In addition, all glass filter plates, when treated for impact resistance, shall be marked with the letter "H".

*Cover plate.* Cover plates, made of plain glass, of glass coated on one or on both sides with plastic, or of a slow-burning solid plastic sheet shall be used to protect the filter plates from damage. The cover plates shall be the same peripheral size and shape as filter plates, and the thickness of cover plates shall not be less than 0.050 inches. They shall transmit not less than 75 percent of the luminous radiation and shall be substantially free from optical imperfections. Cover plates shall not be heat treated for impact resistance.

(2) *Hand shield.* Hand shields shall be constructed of materials similar to those used for the helmet and in like manner. The materials, lens mounting arrangement, and filter and cover plates shall conform to the requirements for the corresponding parts of the helmet body with headgear. The handle shall be made of a material that is a non-conductor of electricity and is noncombustible or slow burning. It shall be of such size and shape as to be held easily by one hand and shall be firmly attached to the lower portion of the shield. Hand shields intended for use by others than welding operators shall have filter and cover plates suitable for the intended use.

(3) *Nonrigid helmet.** Helmets may be made of nonrigid materials where they are to be used in confined spaces,

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or may be collapsible for convenience in carrying or in storage. The helmets may be of the same general shape as the rigid helmet except that a more complete covering of the top of the head is necessary in order to maintain the face, side, and windows in proper position. The requirements for the filter plates, cover plates, and lens-mounting frame are the same as for the rigid helmet. A headgear may be used. The material shall be nonconducting and opaque to ultraviolet, visible, and infrared radiations. It shall withstand the test for resistance to flame described in Federal Test Methods Standard No. 406. Stitched seams shall be welted. No stitching shall be exposed.

(4) *Attachments and auxiliary equipment.*

*Lift front.* The lift front shall be fabricated from metal, plastic, or other suitable material. A snap hinge shall be provided so that the front part will stay up or down but will not remain in a partially opened position. The lift-front seal against the helmet shall be light tight. The lift front shall be designed to accommodate three plates: A clear impact-resisting plate in the back or fixed part, a filter plate (impact-resisting when specified), and a cover plate in the front part. The back or fixed-part plate shall be clear heat-treated glass, or plastic, not more than 3/16 inch thick and shall be capable of withstanding the impact tests specified in 4.5(2)*d*(1).

*Chin rest.* To avoid contact of the helmet with the face of the wearer, a chin rest may be provided. In lieu of a chin rest, an adjustable position stop may be provided to perform the same function. The chin rest shall be constructed of suitable, rigid material and shall be detachable from the body of the helmet or hand shield.

*Snood.* Snoods or back-of-head-and-neck protectors shall be of material that is flame resistant, that is a good insulator of heat and electricity, and that is capable of withstanding disinfection. Such devices shall be designed for easy attachment to the helmet, helmet headgear, or cradle.

*Apron.* Aprons or bibs for helmets shall be of nonflammable, nonconducting material that is flexible and capable of withstanding disinfection.

*Auxiliary magnifier or enlarger.* This may be made of glass or transparent plastic material of optical quality. If used, it shall be the same size as the filter plate.

*Attachments.* The characteristics and performance requirements herein provided for welding helmets shall in no way be altered through their attachment to protective hats and caps.

(5) *Special protective devices.* When respiratory protection is needed against airborne contaminants encountered during welding operations, the appropriate respiratory protective device shall be worn in conjunction with a helmet or hand shield.

(6) *Flammability.* The thinnest section of the rigid helmet or hand shield shall not burn at a rate greater than 3 inches per minute when tested by inserting one end of a 5-inch x ½-inch strip of the helmet material in a blue-flame Bunsen burner. The strip shall be inclined at 45 degrees with a 5-inch longitudinal axis horizontal. The burner flame shall be ½ inch high. After 10 seconds, the burner shall be removed and the strip allowed to burn. Measurement of the rate of burning shall then be recorded.

*e. Marking.* Helmets, shields, and filter plates shall bear a permanent and distinctive marking by which the manufacturer may be readily identified. In addition, all filter plates shall be marked with the shade number; if made of heat-treated glass, they shall be marked with the letter "H".

**4.5(3)** *Face shields.*

*a. Function.* The devices described in this section are designed to provide protection to the face (i.e., the front part of the head including forehead, cheeks, nose, mouth, chin) and neck, where required, from flying particles and sprays of hazardous liquids and, in addition, to provide antiglare protection where required. Such devices should be worn over suitable basic eye protection devices.

*b. Intended uses.* Some typical uses for face shields include, but are not limited to, the following:

(1) Woodworking operations where chips and particles fly;

(2) Metal machining causing flying particles;

(3) Buffing, polishing, wire brushing, and grinding operations where

flying particles or objects may strike the face;

(4) Spot welding;

(5) Handling hot or corrosive materials.

*c. Styles and types.* Face shields shall comprise three basic styles: Headgear without crown protector; headgear with crown protector; headgear with crown protector and chin protector.

(1) *Window.* Each of these styles shall accommodate any of the following styles of windows: Clear transparent; colored transparent; wire screen; combination of plastic and wire screen; and fiber window with filter plate mounting.

*d. Materials.* Materials used in the manufacture of face shields shall combine mechanical strength and lightness of weight to a high degree, shall be nonirritating to the skin when subjected to perspiration, and shall be capable of withstanding frequent disinfection. Where metals are used, they shall be resistant to corrosion. Plastic materials shall be slow burning. Clear or colored materials used in windows shall be of an optical grade. Plastic windows shall not be used in connection with welding operations unless they meet the requirements of 4.6(3)*d*(5).

*e. General requirements.*

(1) *Assembly.* Face shields shall consist essentially of a detachable transparent plastic window, wire-screen window, or opaque frame with window; a tilting support, and adjustable headgear, and, as required, a crown protector and chin protector.

(2) *Window shape.* The windows shall be designed to fit the contour of the window support.

(3) *Window support.* There shall be attached to the headgear a window-supporting or window-holding member which shall be a band or crown protector. The window support shall position the window in front of the face in such a manner as to provide clearance for the nose and eyeglasses of the wearer.

(4) *Window attachment.* The attachment of the window to the window support shall be such as to permit easy removal and replacement. The several sizes and types of windows for a particular face shield shall be interchangeable for attachment to the window support.

(5) *Headgear.* The headgear shall consist of at least a headband and a crown strap. The headgear shall be made from materials having low heat conductivity. The design shall be such as to hold the window and window support comfortably and firmly in place on the wearer's head, and shall provide for tilting the window away from the face.

(6) *Crown protector.* The crown protector shall be shaped to cover at least the frontal portion of the head and shall extend around each side at least to a vertical line at the front of the ears. It may be designed to be an integral part of the window support, or it may be a separate assembly. The design shall be such as to provide a comfortable clearance over the forehead and head of the wearer.

(7) *Chin protector.* The chin protector shall be shaped to cover at least the chin and upper part of the neck. The design shall be such as to provide a comfortable clearance under the chin of the wearer.

*f. Detailed requirements.*

(1) *Window dimensions.* Plastic or wire-screen windows without frames shall be not less than 9½ inches wide at the top and 8½ inches wide at the bottom, measured over their curved surfaces when attached and in position on the window support, and not less than 6 inches high. Windows, when used in frames, shall be not less than 4 inches wide and 2 inches high, and the frames shall conform to the dimensions specified for windows without frames. Plastic windows shall be not less than 0.040 inch nominal thickness.

(2) *Wire-screen window.* The exposed borders of wire-screen windows shall be suitably bound or otherwise finished in such a manner as to eliminate any sharp, rough or unfinished edges, using not less than 20-mesh screen.

(3) *Window support.* The window support shall be made of vulcanized fiber, plastic, or other suitable material. It shall be pivotally attached to the sides of the headgear to permit easy tilting, either upward or downward, of the supporting member and of the window attached thereto. The window shall be capable of being tilted sufficiently up-

ward so that the center of its bottom edge shall be out of the line of horizontal vision. The tension of the tilting mechanism shall be sufficient to hold the window without slippage in either the up or the down position.

(4) *Headgear.* The headgear shall be readily adjustable to head sizes 6½ to 7⅝ without the use of tools. Adjusting devices, if used, shall hold firmly in place after being so adjusted. The crown strap or band shall be attached to, and extend between, the front and rear centers or from the middle sides of the headband. It shall form an arc over the head to assist in positioning and holding the headgear in place. Adjusting devices, if used, shall be positive and shall hold firmly in place after being so adjusted. All mechanisms and movements shall be protected so that the wearer's hair cannot catch in the adjusting devices. If required, not less than the forehead portion of the headband shall be provided with a removable and replaceable cushioned sweatband that shall be non-irritating and nontoxic.

(5) *Crown protector and chin protector.* The crown protector and chin protector shall be made of vulcanized fiber, plastic, or other suitable material having an impact resistance not less than that of the plastic window. When the crown protector is used in conjunction with the chin protector for protection against sprays of hazardous liquids, the assembly of the crown protector and window support and the assembly of the chin protector and window shall be splash-proof, that is, shall not allow liquids to pass through any openings in the assembly and reach the face, forehead, or chin of the wearer.

(6) *Headgear substitutes.* For additional protection, the headgear may be replaced by an impact-resistant hat or cap or other suitable device to which the window support is connected. The attachment may be either rigid or swiveled. If swiveled, the design shall be such as to permit lifting and adjusting of the window to permit unobstructed vision or lowering to furnish protection, as required. The substitute device shall meet the requirements for low-heat conductivity and disinfection, and, in addition, shall meet the applicable requirements of any additional functions such as protection against falling objects, as detailed under 1.5(1).

*g. Marking.* Each headgear and each plastic window shall bear a permanent and legible marking by which the manufacturer may be readily identified. In addition, each window offered for protection against glare shall bear its shade designation.

*Marking for special operating conditions.* When face shields are to be used in atmospheres or working areas requiring special conditions of nonconductivity of nonsparking, then all materials used shall meet these requirements. Face shields shall be plainly and permanently labeled, identifying them as "nonconductive face shield" or "nonsparking face shield."

*h. Physical requirements and methods of test.*

(1) *Impact resistance, plastic-window face shield.** The face shield shall be mounted on a holder consisting of a standard wooden hat block, size 7, mounted vertically on a wooden support fastened securely to a base. The face shield shall be so mounted that the headband fits snugly around the periphery of the base of the block and the crown strap is in contact with the crown portion of the block. An additional supporting block, approximately one inch wide and curved to conform to the shape of the plastic window, shall be provided as a support for the window at its lower end or, if the face shield is provided with a chin rest, as a support under the chin rest. The face shield will then rest in a position such that the axis of the cylindrical window is horizontal and the outer surface of the window is uppermost. The impact test shall be made at room temperature (65°F to 85°F) under normal humidity conditions. A ⅞-inch-diameter steel ball, weighing approximately 1.56 ounces, shall be freely dropped from a height of 50 inches onto the apex of the window at a point approximately 3 inches below the point of attachment. The window shall not be fractured nor separated nor removed from any of its points of fastening to the headgear by the impact of the steel ball.

(2) *Penetration resistance, plastic-window face shield.** The face shield shall be mounted in the manner described in 4.5(3)*h*(1) and shall be tested under similar conditions. A pointed projectile

*For Manufacturers' approval.

of suitable size, consisting of a new Singer number 25, size 135 x 17 needle fastened into a holder, weighing approximately 1.56 ounces, shall be freely dropped, needle point downward, from a height of 50 inches onto the apex of the window at a point approximately 3 inches below the point of attachment. The projectile may be guided, but not restricted, in its fall by dropping it through a tube extending to within approximately 4 inches of the face-shield window. The window shall not be fractured, pierced through, nor separated or removed from any of its points of fastening on the headgear by the impact of the projectile.

(3) *Visible transmittance, plastic windows.** The total visible (luminous) transmittance of clear or colored windows shall be determined by any standard method recognized as suitable by the National Bureau of Standards. A suggested method is described in 4.6(2)*d*(5), par. 3. Clear windows shall transmit not less than 85 percent of the incident visible radiation. Colored windows shall transmit as follows:

| Shade | Percent Transmittance |
|---|---|
| Light | 50 ± 7 |
| Medium | 23 ± 6 |
| Dark | 14 ± 6 |

(4) *Flammability, plastic windows.** The clear or colored plastic windows shall not burn at a rate greater than 3 inches per minute when tested by inserting one end of a 5-inch x ½-inch strip of material in a blue-flame Bunsen burner. The strip shall be inclined at 45 degrees with the 5-inch longitudinal axis horizontal. The burner flame shall be ½ inch high. After 10 seconds, the burner shall be removed from the strip and the strip allowed to burn. Measurement of the rate of burning shall then be recorded.

(5) *Disinfection.* All face shield materials shall be such as to withstand, without discoloration or deterioration, the cleansing and disinfection procedure as follows:

*General.* When a person is assigned protective equipment, it is recommended that this equipment be cleaned and disinfected regularly, without sharing by another person unless disinfected as herein specified.

*Procedure.* Thoroughly clean all su faces with soap or suitable detergent, an warm water. Carefully rinse all traces o soap or detergent. Completely immers the protector for 10 minutes in a solutio of modified phenol, hypochlorite, o quaternary ammonium compounds, in strength specified by the manufacture at room temperature of 68°F. Remov protector from solution and suspend in clean place for air drying at room tem perature, or with heated air. Do not rins because this will remove the residua effect.

Ultraviolet disinfecting equipment ma be utilized in conjunction with the wash ing procedure above, when such equip ment can be demonstrated to provid comparable disinfection.

Protectors showing need for extensiv cleansing should be disassembled to th extent possible without tools, prior t the washing and disinfection procedure Replace defective parts with new ones.

*Storage.* The dry parts or items shoul be placed in clean, dustproof container to protect them.

**4.6(88A)T.IV Eye protection.**

**4.6(1)** ***Styles and functions of protectors.***

*a. Goggles, eyecup.*

(1) *Basic types.* Eyecup goggle shall comprise two basic types as fol lows: Cup-type goggles designed to b worn by individuals who do not wea corrective spectacles or cover-cup-typ goggles designed to fit over corrective spectacles.

(2) *Models.* The two basic type of eyecup goggles shall be subdivided int the following classes: Chipper's model providing impact protection against fly ing objects. Dust and splash models pro viding protection against relatively fin dust particles or liquid splashes and im pact. Welder's and cutter's models pro viding protection against glare, injurious radiations, and impact.

The basic designs may be modified t provide more protection against specia hazards, but the modified equipment shall meet the same requirements as the basic design.

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*For Manufacturers' approval.

(3) *General requirements.* All glass filter lenses intended for use under this section, employed in the foregoing models, shall be heat-treated and meet the impact-resistance requirements provided in section 4.6(3)*d*(2).

Eyecup goggles shall consist of two eyecups, with lenses and lens retainers, connected by an adjustable bridge, and a replaceable and adjustable headband or other means for retaining the eyecups comfortably in front of the eyes. Specific recommendations for the use of eyecup goggles will be found in Fig. 6.

(4) *Detailed requirements.**

*Eyecup material.* Eyecups shall be made from a plastic or other material of such composition as to withstand the heat deformation test outlined in 4.6(1)*a*(5) and the disinfection, water absorption, and flammability tests outlined in 4.6(2).

*Vision and fit. Cup-type goggles.* Eyecups shall be right and left in pairs and shall permit an effective angle of vision not less than 105 degrees, assuming that the pupil of the eye is located 17 millimeters behind the inner surface of the lens. The edge of the eyecup which bears against the face shall have a smooth surface free from roughness or irregularities which might exert undue pressure or cause discomfort to the wearer. The eyecups shall be of such shape and size as to protect completely the entire eye sockets.

*Cover-cup-type goggles.* Eyecups shall be right and left in pairs and shall permit an effective angle of vision not less than 90 degrees. The goggles shall be designed to provide ample clearance and will not interfere with the spectacles of the wearer. The edges of the goggles which bear against the face shall have a smooth surface free from roughness or irregularities which might exert undue pressure or cause discomfort to the wearer.

*Ventilation. Chipper's models.* Eyecups shall be ventilated in a manner to permit circulation of air. Ventilation openings shall be such as to exclude a spherical particle 0.040 inch (1 millimeter) in diameter.

The equivalent area of opening for ventilation in each eyecup through the side shall be not less than the area of a 5/8-inch (15.9 millimeter) diameter hole. The equivalent area of opening in each eyecup through or around a lens-retaining ring shall be not less than the area of a 5/16-inch (7.9 millimeter) diameter hole. The openings in the side shields shall be such as to exclude any particle that will not pass through an opening 0.040 inch (1 millimeter) in diameter. The openings in or around the lens-retaining rings shall be such as to exclude any particle that will not pass through an opening 0.080 inch (2.03 millimeters).

*Dust and splash models.* Eyecups shall be ventilated in a manner to permit circulation of air. The ventilation openings shall be baffled or screened to prevent the direct passage of dust or liquids into the interior of the eyecups.

The equivalent area of openings of ventilation in each eyecup shall be not less than the area of a 1/4-inch (6.35 millimeter) diameter hole.

*Welder's and cutter's models.* Eyecups shall be ventilated in a manner to permit circulation of air and shall be opaque from 1,900 to 12,000 angstrom units. The ventilation opening shall be baffled to prevent the passage of light rays into the interior of the eyecups.

The equivalent area of openings of ventilation in each eyecup shall be not less than the area of a 1/4-inch (6.35 millimeter) diameter hole.

*Lens-retaining ring.* Each eyecup shall be provided with a rigidly constructed lens-retaining ring of metal or of plastic designed to accommodate lenses and to permit their ready removal and replacement without damage to the eyecup or to the lenses and without the use of tools. The ring shall provide a complete clamping action against the lens. Lens retainers for welder's and cutter's models shall be such as to accommodate a filter lens, fiber gasket, and cover lens.

*Lens seat.* Each eyecup shall have a lens seat sufficiently wide to support the lens and to resist the falling inward of the broken lens when the lens is subjected to the impact test specified below:

*Lens impact resistance.* Chipper's models and dust and splash models. Clear and absorptive lenses for shades 1.7 through 3.0 shall be subjected to the impact test specified in 1.6(3)*d*(2).

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*For Manufacturers' approval.

*Welder's and cutter's models.* Filter lenses shall be subjected to the following impact test: The lens shall be removed from the eyecup and shall be placed flat on the end of a wooden tube having an internal diameter of 1.77 inches (45 millimeters) and a rim to fit the lens. A washer of neoprene rubber packing of a 40 plus or minus 5 durometer reading, not more than ⅛ inch thick, and of the same internal diameter as the tube, shall be placed between the lens and the tube. A ⅞-inch steel ball shall be freely dropped from a height of 50 inches (1.27 meter) onto the horizontal outer surface of the lens. The lens shall not fracture from the impact of the steel ball.

Glass cover lenses (circles) shall not be heat-treated for impact resistance.

*Marking.* All filter lenses shall be marked with the shade designation and a permanent and legible marking by which the manufacturer may be readily identified. In addition, all glass filter lenses, when treated for impact resistance, shall be marked with the letter "H".

(5) *Heat deformation test.* Eyecup goggles shall be tested for heat deformation by mounting the eyecup, with lenses and retaining ring in place, on a wooden block with a weight as shown in Fig. 3, and placing the whole aassembly in a forced draft oven for one hour. The temperature of the oven shall be maintained at 150°F (65.6°C) for chipper's models and dust and splash models, and at 180°F (82°C) for welder's and cutter's models. After one hour, the assembly shall be removed from the oven and shall be allowed to cool after which the dimensions (A), (B), and (D) shown in Fig. 2 shall be measured.

The maximum deviation from the original dimensions shall not exceed the following: For dimensions (A) and (B), ½ percent, and for dimension (D), 5 percent. After testing, the retaining ring and the cup of the eyecup shall fit in a snug but not tight manner. The eyecup shall be mounted on the wooden block as follows: With the facial edge of the cup down and the lens horizontal, the bridge size fastened to the block by means of a piece of wire, with the eyecup resting on the edge of the block, which has a 3/16-inch radius, and 680-gram weight suspended from the eyecup by means of a piece of wire, one end of which is attached to the weight and the other end fastened in the temple-side headstrap hole (Fig. 3).

*b. Spectacles, metal, plastic, and combination metal and plastic.**

(1) *Description.* Safety spectacles require special frames. Therefore combinations of street-wear frames with safety lenses meeting this rule are definitely not in compliance.

Spectacles shall consist of two lenses in a frame which supports the lenses around their entire periphery, of suitable size and shape for the purpose intended, connected by a nose bridge, and retained on the face by temples or other suitable means. The spectacles shall be furnished with or without sideshields depending upon their intended use. The frames, temples, and sideshields can be of metal or plastic construction and when made of plastic shall be of the slow-burning type.

*Protection.* Spectacles shall provide protection to the eye from flying objects, and when required, from glare and injurious radiations. Spectacles without sideshields are intended to provide frontal protection. Where side as well as frontal protection is required, the spectacles shall be provided with sideshields. Specific applications for use will be found in Fig. 6.

*Marking.* These frames shall be designed for industrial exposure and shall bear a trademark identifying the manufacturer on both fronts and temples. The frame front shall carry a designation of the eye size and bridge size (where applicable). Temples will be marked as to the overall length or fitting value.

*Frame and lens sizes.* Spectacle frame and lenses shall be of identical shape and configuration and of such dimensions to assure support of the lens by the lens frame around its entire periphery.

The frames and lenses may be available in 42-, 44-, 46-, 48-, and 50-millimeter eye sizes and the distance between the lenses (bridge size) measured at the nearest point of bridge gap shall range from 18 millimeters to 26 millimeters and shall be specified. A tolerance of the specified bridge size plus or minus 1-millimeter shall be permitted. A saddle or universal fitting bridge may be used.

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*For Manufacturers' approval.

Plano lenses shall be flat or 6.00 diopter curve, and corrective lenses are to be as specified on the individual prescription.

*Temples.* Temples may be of the cable or spatula type as specified, and shall be of such design as to permit adjustment and fit comfortably and securely on the wearer. The size of the temples shall be clearly marked.

(2) *Detailed requirements.*

*Type I—metal frame. Style A—without sideshields. Front.* The front member of the frame shall consist of two metal lens-frames connected by a nose-bridge member. The bridge shall be a single-bar bridge or a brace-bar bridge. In addition, there may be an upper-brace (brow) bar. All points of attachment of metal components shall be brazed (hard-soldered) or welded.

The lens frame shall consist of a rim with a lens groove designed to fit the lenses specified herein. Each lens frame shall be provided with a high-positioned endpiece or lens clamp, and in addition shall be of such construction as to permit the independent changing of lenses or temples.

*Temples.* Temples of the metal-cable type shall be prefitted to the average ear shape and the cable section or flexible portion shall be covered with a flexible plastic, the terminal ends of which shall be secured to prevent any tendency to slip off the metal core. Cable temples may be provided in 5¾-, 6-, 6¼-, 6½-, 6¾-, and 7-inch overall lengths, plus or minus ⅛ inch. Cable temples shall be similar to Fig. 3 in configuration.

Spatula temple for metal frames shall consist of a metal temple, the rear portion of which shall be covered by a plastic paddle and preformed to average ear conformance. Temple lengths shall be based upon fitting values and may be provided in 3¾-, 4-, 4¼-, 4½-, 4¾-, 5-, 5¼-, 5½-, and 5¾-inch lengths, plus or minus ⅛-inch length to bend (joint to ear length). Spatula temples shall be similar to Fig. 4 in configuration.

Fitting value is determined by obtaining the distance from the end piece of the glasses to a point approximately ¼ inch below the top of the ear, measured behind the ear.

*Nose pads.* Metal frame spectacles may be equipped with nose pads of the adjustable rocking-pad type or the rigid nonadjustable type. The plastic parts of the pads shall be made of noncombustible or slow-burning material.

Nose pads of the adjustable rocking-pad type shall be of metal reinforced plastic construction. The shaping and reinforcing elements of the pad shall consist of an inserted metal blade and the nose pads shall be securely attached to pad arms of the goose-neck type. The pad arms shall be sufficiently strong to prevent accidental maladjustment and shall be bendable by means of optician's pliers to permit adjustment to fit individual wearers.

Nose pads of the rigid type will consist of a suitable insert element of plastic or other material which shall be inserted into the bridge area of the metal frame and be securely held in place. This rigid pad element may be of the conventional keyhole-type construction or of the universal or saddle-bridge construction.

*Style B—with sideshields.* In addition to the general requirements of Style A, Style B frames shall be equipped with sideshields designed to prevent the entry of flying particles from the side of the wearer. The sideshields themselves shall consist of wire screen, perforated plastic, or nonperforated plastic. The sideshields shall not be easily detachable from the frame, and in particular snap-on or clip-on types of sideshields are not acceptable unless secured. Sideshields shall be pivoted to permit their folding when the spectacles are not in use. The sideshields shall be tapered with an anatomical periphery, extending at least half-way around the circumference of the lens frame, shall fit snugly without binding on the frame, and the edges of the sideshield which come in contact with the face shall be smooth and rounded.

*Wire-mesh sideshields.* Wire-mesh sideshields shall consist of a frame of metal or plastic which securely holds a 20- to 40-mesh wire screen. The wire section of the sideshield may have either a bright or dull finish. The metallic components shall be able to withstand the sterilization process as described in 4.5(3)*h*(5).

*Perforated plastic sideshields.* Perforated plastic sideshields shall consist of a frame of metal or plastic which securely holds the perforated plastic section. The perforated plastic section shall have a

minimum area of ventilation of from 0.02925 square inches to 0.0585 square inches, and perforations shall be of such size as to exclude a 1.5-millimeter diameter sphere.

*Nonperforated plastic sideshields.* Nonperforated plastic sideshields shall meet the same requirements as above except for the ventilating holes which will not be present. In addition, this type of sideshield, where used for glare protection, shall have transmission to incident visible light of not less than 25 percent and not more than 45 percent.

*Type II—plastic frame. Style A—without sideshield. Front.* The front member of plastic frames shall consist of two lens frames connected by a nose-bridge member. The plastic shall not have toxic effects on skin or offensive odors. Frames shall have an adequate polish and shall afford a reasonable degree of comfort to the wearer, and shall be readily fitted in the conventional manner. Lens frames shall contain grooves to fit accurately with lenses specified in the sizes outlined in 4.6(1)*b*, (Frame and lens sizes.) and shall be provided with high-positioned end-pieces. The perpendicular distance from the center of the temple hinge to a line connecting the geometric centers of the lens frames shall be not less than 6 millimeters. Construction and materials of the lens frames shall be such that lenses of identical size and shape may be readily removed and replaced.

Front and temple hinges shall be securely fastened, and shall mesh in a suitable manner and be joined in such a way as to eliminate accidental loosening while still providing interchangeability.

The frame front may consist of a single-color plastic or of the two-tone plastic type, and may or may not contain a reinforcing bar.

Plastic frame fronts may have a conventional keyhole-type bridge, a saddle bridge, or universal-type bridge.

*Temples.* Cable temples shall be prefitted to the average ear shape, and the cable section or flexible portion shall be covered with a flexible plastic, the terminal ends of which shall be secured to prevent any tendency to slip off the metal core. The temple itself may be of all-metal construction or of combination metal and plastic construction. Where metal-plastic construction is used, the rigid area of the temple shall be covered with plastic material similar to the material of the frame front. In the all-metal cable-temple construction, this forward area may or may not be covered. Cable temples may be provided in 5¾-, 6-, 6¼-, 6½-, 6¾-, and 7-inch lengths plus or minus ⅛ inch. Cable temples shall be similar to Fig. 3 in configuration.

Spatula temples for plastic frames may consist of suitable plastic, metal-reinforced plastic, or of all-metal construction. The rear portion of these temples shall be preformed to the average ear configuration. The metal-reinforced plastic-type temple shall consist of a central metal core and plastic material similar to that of the frame front. In the all-metal temple construction the terminal or back end of the temple shall be covered by plastic. Temple lengths shall be based upon fitting values and may be provided in 3¾-, 4-, 4¼-, 4½-, 4¾-, 5-, 5¼-, 5½-, and 5¾-inch lengths plus or minus ⅛-inch length to bend (joint to ear length). Spatula temples shall be similar to Fig. 4 in configuration.

All temple hinges shall be securely fastened to the temple (cable or spatula) and shall readily mesh with and match the hinge on the spectacle frame front.

Nose pads for plastic-frame-front spectacles may be of the rigid type (an integral part of the frame front) or may be of the adjustable plastic-covered rocking type which are securely attached to the frame front. The rocking pad (adjustable-pad type) shall consist of metal-reinforced slow-burning plastic-covered nose pads. The shaping and reinforcing elements of the pad shall consist of an inserted metal blade, and the nose pads shall be securely attached to pad arms of the goose-neck type. The pad arms shall be sufficiently strong to prevent accidental maladjustment and shall be bendable by means of an optician's pliers to permit adjustment to fit the individual wearer. The pad arms shall be securely attached to the frame front in such a manner that they will not work loose when the pad arms are adjusted.

*Style B—with sideshields.* In addition to the general requirements of Style A, Style B plastic frames shall be equipped with sideshields to prevent the entry of flying particles from the side of the wearer. The sideshields themselves shall con-

sist of wire screen, perforated plastic, or nonperforated plastic. The sideshields shall not be easily detachable from the frame, and, in particular, snap-on or clip-on types of sideshields are not acceptable unless secured. Sideshields shall be pivoted to permit their folding when the spectacles are not in use. The sideshields shall be tapered with an anatomical periphery extending at least halfway around the circumference of the lens frame, shall fit snugly without binding on the frame, and the edges of the sideshield which come in contact with the face shall be smooth and rounded.

*Wire-mesh sideshields.* Wire-mesh sideshields shall consist of a frame of metal or plastic which securely holds a 20- to 40-mesh wire screen. The wire section of the sideshield may have either a bright or dull finish to aid in peripheral vision. The metallic components shall be able to withstand the sterilization process as described in 4.5(3)*h*(5).

*Perforated plastic sideshields.* Perforated plastic sideshields shall consist of a frame of metal or plastic which securely holds the perforated plastic section. The perforated plastic section shall have a minimum area of ventilation of from 0.02925 square inches to 0.0585 square inches and perforations shall be of such size as to exclude a 1.5-millimeter diameter sphere.

*Nonperforated plastic sideshields.* Nonperforated plastic sideshields shall meet the same requirements as above except for the ventilating holes which will not be present. In addition, this type of sideshield, where used for glare protection, shall have transmission to incident visible light of not less than 25 percent and not more than 45 percent.

*Type III—combination metal and plastic frames. Style A—without sideshields.* The front member of the frame shall consist of two metal lens frames connected by a nose-bridge member. All points of attachment of metal components shall be brazed (hard-soldered) or welded. In addition, there shall be an overlay over each eye. The plastic material shall not have toxic effects on skin or offensive odors.

The lens-frame shall consist of a rim with a lens-groove designed to fit the lenses specified herein. Each lens-frame shall be provided with a high-positioned end-piece or lens-clamp, and in addition, shall be of such construction as to permit the independent changing of lens or temple.

*Temples.* Cable temples shall be prefitted to the average ear shape, and the cable section or flexible portion shall be covered with a flexible plastic, the terminal ends of which shall be secured to prevent any tendency to slip off the metal core. The temple itself may be of all-metal construction or of the combination metal and plastic construction. Where metal-plastic construction is used, the rigid area of the temple may be covered with plastic material similar to the plastic material of the frame front. In the all-metal cable temple construction this forward area may or may not be covered. Cable temples may be provided in 5¾-, 6-, 6¼-, 6½-, 6¾-, and 7-inch lengths plus or minus ⅛ inch. Temples shall be similar to Figs. 3 and 4 in configuration and sizes.

Spatula temples for combination frames may consist of suitable plastic of the metal-reinforced plastic type or of all-metal construction. The rear portion of these temples shall be preformed to the average ear configuration. The metal-reinforced plastic-type temple shall consist of a central metal core and plastic material similar to that of the frame front. In the all-metal temple construction the terminal or back end of the temple shall be covered by a plastic paddle. Temple lengths shall be based upon fitting values and may be provided in 3¾-, 4-, 4¼-, 4½-, 4¾-, 5-, 5¼-, 5½-, and 5¾-inch lengths plus or minus ⅛ inch length to bend (joint to ear length). Spatula temples shall be similar to Fig. 4 in configuration.

All temple hinges shall be securely fastened to the temple (cable or spatula) and shall readily mesh with and match the hinge on the spectacle frame front.

*Nose pads.* Combination frame spectacles may be equipped with nose pads of the adjustable rocking-pad type or the rigid nonadjustable type. The plastic parts of the pads shall be made of noncombustible or slow-burning material.

Nose pads of the adjustable rocking-pad type shall be of metal-reinforced plastic construction. The shaping and reinforcing elements of the pad shall consist of an inserted metal blade, and the nose pads shall be securely attached to pad arms of the goose-neck type. The

pad arms shall be sufficiently strong to prevent accidental maladjustment and shall be bendable by means of optician's pliers to permit adjustment to fit individual wearers.

*Style B—with sideshields.* In addition to the general requirements of Style A, Style B frames shall be equipped with sideshields designed to prevent the entry of flying particles from the side of the wearer. The sideshields themselves shall consist of wire screen, perforated plastic, or nonperforated plastic. The sideshields shall not be easily detachable from the frame, and, in particular, snap-on or clip-on types of sideshields are not acceptable unless secured. Sideshields shall be pivoted to permit their folding when the spectacles are not in use. The sideshields shall be tapered with an anatomical periphery, extending at least halfway around the circumference of the lens frame, shall fit snugly without binding on the frame, and the edges of the sideshield which come in contact with the face shall be smooth and rounded.

*Wire-mesh sideshields.* Wire-mesh sideshields shall consist of a frame of metal or plastic which securely holds a 20- to 40-mesh wire screen. The wire section of the sideshield may have either a bright or dull finish. The metallic components shall be able to withstand the corrosion-resistance process as described in 4.5(3)*h*(5).

*Perforated plastic sideshields.* Perforated plastic sideshields shall consist of a frame of metal or plastic which securely holds the perforated plastic section. The perforated plastic section shall have a minimum area of ventilation of from 0.02925 square inches to 0.0585 square inches, and perforations shall be of such size as to exclude a 1.5-millimeter diameter sphere.

*Nonperforated plastic sideshields.* Nonperforated plastic sideshields shall meet the requirements as above except for the ventilating holes which will not be present. In addition, this type of sideshield, where used for glare protection, shall have transmission to incident visible light of not less than 25 percent and not more than 45 percent.

(3) *Materials and methods of test.*

*General.* In addition to specific requirements outlined hereafter, materials used shall be capable of withstanding the disinfection, corrosion-resistance, water-absorption, and flammability tests in 4.6(2).

*Strength of lens containers.* That portion of the frame which supports the lenses shall be of sufficient strength to withstand, without breakage and without dislodging the lens, the fracture-resistance test for lenses specified in 4.6(3)*d*(2).

*Type I—metal frames. Strength of joints.* The soldered, brazed, or welded joints shall be given the following tests to demonstrate their strength and durability. The lens containers with lenses in place shall be gripped one in each hand, with the thumbs bearing on the outer surface near the bridge and the fingers on the inner surface of the lenses near the junction of the bridge and the lens container. The frame shall then be bent, the direction of motion being in a plane perpendicular to the surface of the lenses, until the outer surfaces of the lenses face each other, the outer ends of the frame touching. The frame shall then be bent back to its original shape and a careful inspection made for failure in the joints. All frames tested shall pass this test without developing visible joint fracture. Frames with upper-brace (brow) bars shall have the brace bar cut before performing test.

*Flat transverse test.* The right lens container of each frame tested shall be laid flat, with the outer surface of the lens downward, on a firm, level support so that the left lens and one-half of the bridge project beyond the edge of the support, and it shall be held in this position. A spring balance shall be attached to the outermost portion of the frame of the left lens, and a downward force of 8 ounces (227 grams) shall be applied while the right lens frame is rigidly held. After removal of the load no permanent deformation shall be apparent in the frame.

*Edge transverse test.* The right lens container of each frame tested shall be held vertically in one hand and the lower edge of the left lens container, as worn, shall be pressed against one of the platforms of an equal-arm balance having a weight of 3 pounds on the other platform. The pressure shall be increased until the weight is balanced, whereupon the frame shall be removed and examined. No per-

manent deformation shall be apparent in the frame.

*Type II—plastic frames. Flat transverse test.* Each frame tested shall have one lens container laid flat with the outer surface of the lens downward on a firm, level support so that the lens container and one-half of the bridge project beyond the edge of the support. It shall be held firm in this position. Suitable weights shall be attached to the outermost portion of the frames so that a downward force of 16 ounces (454 grams) shall be applied. Upon removal of the load, no deformation shall be apparent in the frame.

*Edge transverse test.* Each plastic frame tested shall contain the lenses and shall have the right lens container held vertically in one hand and the lower edge of the left lens container, as worn, pressed against one of the platforms of an equal-armbalance having a weight of 5 pounds on the other platform. The pressure shall be increased until the weight is balanced, whereupon the frame shall be removed and examined. No deformation shall be apparent.

*Type III—combination metal-plastic frames. Strength of joints.* The soldered, brazed, or welded joints shall be given the following tests to demonstrate their strength and durability. The lens containers with lenses in place shall be gripped one in each hand, with the thumbs bearing on the outer surface near the bridge, and the fingers on the inner surface of the lenses near the junction of the bridge and the lens container. The frame shall then be bent, the direction of motion being in a plane perpendicular to surface of the lenses, until the outer surfaces of the lenses face each other, the outer ends of the frame touching. The frame shall then be bent back to its original shape and a careful inspection made for failure in the joints. All frames tested shall pass this test without developing visible joint fracture.

*Flat transverse test.* The right lens container of each frame tested shall be laid flat, with the outer surface of the lens downward, on a firm, level support so that the left lens and one-half of the bridge project beyond the edge of the support, and it shall be held in this position. A spring balance shall be attached to the outermost portion of the frame of the left lens, and a downward force of 8 ounces (227 grams) shall be applied while the right lens frame is rigidly held. After removal of the load no permanent deformation shall be apparent in the frame.

*Edge transverse test.* The right lens container of each frame tested shall be held vertically in one hand and the lower edge of the left lens container, as worn, shall be pressed against one of the platforms of an equal-arm balance having a weight of 3 pounds on the other platform. The pressure shall be increased until the weight is balanced, whereupon the frame shall be removed and examined. No permanent deformation shall be apparent in the frame.

*c. Goggles, flexible, or cushioned fitting.*

(1) *Description.* Goggles shall consist of a wholly flexible frame, forming a lens holder, or with separable lens holder; or a rigid frame with integral lens or lenses, having a separate, cushioned fitting surface on the full periphery of the facial contact area. Materials used shall be chemical-resistant, nontoxic, nonirritating and slow-burning. There shall be a positive means of support on the face, such as an adjustable headband of suitable material or other suitable means of support to retain the frame comfortably and snugly in place in front of the eyes. When the frame is a lens holder or has a separable lens holder, it should be such that the lens or lenses are held firmly and tightly and may be removed or replaced without the use of tools. The goggles may be ventilated or not, as required by their intended use. Where chemical goggles are ventilated, the openings shall be such as to render the goggles splashproof.

(2) *Models.* Chipper's models shall provide protection against impact. Dust and splash models shall provide protection from fine dusts, fumes, liquids, splashes, mists, and spray, alone or with reflected light or glare, wind, and impact. Welder's and cutter's models shall provide protection against glare, injurious radiations, and impact. Eyecups and lens holders shall be opaque from 1,900 to 12,000 angstrom units.

(3) *Application.* Specific application for use of these goggles will be found in Fig. 6.

(4) *General requirements.* All glass filter lenses or plates intended for

use under this section, employed in the foregoing models shall be heat treated and meet the impact-resistance requirements in 4.5(2)*d*(1), 4.6(3)*d*(2), 4.6(1)*a*(4), whichever is applicable.

Goggles shall be so designed as to protect completely the eye sockets and the facial area immediately adjacent to and surrounding the eyes of the wearer to protect the eye from side exposure. Where required, the design shall be such that the goggles will fit over ordinary spectacles worn by the wearer. Goggles shall be so designed as to afford an effective angle of vision of not less than 90 degrees. Where the goggle consists of an opaque frame and is designed for protection against radiant energy, the angle of vision is not applicable. The methods of attachment to frame shall be such that the lens will not be inwardly dislodged from its seat when it is subjected to the impact resistance or penetration tests specified in 4.6(3)*d*(2) or 4.6(1)*a*(4), whichever is applicable. Where a rigid frame design is used, the cushioned fitting substance affixed for peripheral contact shall be of sufficient thickness or diameter to maintain a seal wth comfort and conformity to normal facial contours.

(5) *Materials and methods of test.* Plastic lenses used in flexible-fitting goggles and lens areas of cushioned-fitting goggles shall be not less than 0.050 inch in thickness. Materials used shall be capable of withstanding the disinfection, corrosion-resistance, water-absorption, and flammablity tests outlined in 4.6(2).

(6) *Marking.* Frames shall bear a trademark or name identifying the manufacturer. Each separate lens shall be distinctly marked in a manner by which the manufacturer may be identified. In addition, all heat-treated glass filter plates or lenses shall be marked with the shade designation and the letter "H". Such marking shall be clear cut and permanent and so placed as not to interfere with the vision of the wearer.

*d. Goggles, foundrymen's.*

(1) *Description.* Goggles shall consist of a mask made of a flexible, nonirritating and noncombustible or slow-burning material, such as leather or flexible plastic, suitable lens holders attached thereto, lenses, and a positive means of support on the face, such as an adjustable headband, to retain the masks comfortably and snugly in place in front of the eyes. The edge of the mask on contact with the face shall be provided with a binding of corduroy or other suitable material. The lens holders shall be so designed that the lenses are held firmly and tightly and may be readily removed or replaced. The lens holders shall be ventilated to permit circulation of air. Ventilation opening shall exclude a spherical particle 0.039 inch (1 millimeter) in diameter. For protection against heavy concentrations of dust, the use of a fine-mesh screen lining (100-mesh screen) is recommended. Such lining shall be suitably and permanently fastened to the inside surface of each lens holder assembly.

(2) *Protection.* The goggles shall provide protection against impact and hot-metal splash hazards encountered in foundry operations such as melting, pouring, chipping, babbitting, grinding, and riveting. Where required, they shall also provide protection against dusts.

(3) *Application.* Specific application for use of foundrymen's goggles will be found in Fig. 6.

(4) *Materials and methods of test.* Materials used shall be capable of withstanding the disinfection, corrosion-resistance, water-absorption, and flammability tests outlined in 4.6(2).

Impact and penetration-resistance tests shall be as specified in 4.6(3)*d*(2) and 4.6(3)*d*(3).

**4.6(2)** *Materials and methods of test of protectors.**

*a. Materials.* Materials used in the manufacture of eye protectors shall combine mechanical strength and lightness of weight to a high degree, shall be nonirritating to the skin when subjected to perspiration, and shall withstand frequent disinfection by the methods hereinafter prescribed. Where metals are used they shall be inherently corrosion-resistant. Where plastic materials are used, such materials shall be noncombustible or slow burning. Cellulose nitrate, or materials having flammability characteristics approximating those of cellulose nitrate, shall not be used.

*b. Disinfection.* All materials shall be such as to withstand, without deterioration or discoloration, the cleansing and disinfection procedure specified in 4.6(2).

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*c. Corrosion-resistance.* Metal parts shall be tested for corrosion-resistance by placing them in a boiling aqueous 10-percent (by weight) solution of sodium chloride for a period of 15 minutes. The parts upon being removed from this solution shall be immediately immersed in a 10-percent (by weight) aqueous solution of sodium chloride at a room temperature of 68°F. They shall then be removed from this solution and, without wiping off the adhereing liquid, allowed to dry for 24 hours at room temperature. The metal parts shall then be rinsed in lukewarm water and allowed to dry. On visual inspection, the metal parts shall show no signs of roughening of the surface resulting from corrosion.

*d. Water-absorption.* Plastic parts shall be tested for water-absorption. The amount of the water absorbed shall not exceed 5 percent.

*e. Flammability.* A section at least one inch long of the plastic components of the frame shall be exposed to a test for determining the flame-propagation rate. For this purpose the frame components (eye wire, temples, and sideshields) shall be ignited individually by holding one end of the specimen horizontally at the top of a luminous ¾-inch Bunsen burner flame in a draft-free room. The rate of propagation determined by a stop watch shall be 24 seconds per inch or less. A faster rate of propagation shall be cause for rejection.

**4.6(3) *Lenses.***

*a. Types of lenses.* Lenses intended for use in protectors covered by these rules shall comprise four basic types, as follows:

(1) *Clear lenses.* Impact-resisting, providing protection against flying objects.

(2) *Absorptive lenses (shades 1.7 through 3.0).* Impact-resisting, providing protection against flying objects and glare. Impact-resisting, providing protection against flying objects, and narrow-band spectral transmittance against injurious radiation.

(3) *Protective-corrective lenses.* Impact-resisting, either clear or absorptive, as specified for persons requiring visual correction.

(4) *Filter lenses.* Impact-resisting, providing protection against flying objects and injurious radiation.

*b. General requirements.*

(1) *Optical quality.* All lenses shall be made of material suitable for ophthalmic use and both surfaces of the lenses shall be well polished and free from visible surface defects. The lenses shall be free from striae, bubbles, waves, and other visible defects and flaws which would impair their optical quality.

(2) *Prismatic and refractive power.* The prismatic effect of a noncorrective lens shall not exceed 1/16 prism diopter (2 minutes of angular deviation). The refractive power, in any meridian, of any noncorrective lens shall not exceed plus or minus 1/16 prism diopter. The difference in refractive power of any two meridians shall not exceed 1/16 diopter.

(3) *Size tolerances.* Circumferential tolerances of lenses shall be held sufficiently close to permit interchangeability or replacement in their respective frames.

(4) *Edges.* The edges of the lenses shall be smooth and, where required, lenses shall be bevelled and such bevelled edges shall be dull-finished.

(5) *Haze.* Plastic lenses of all types shall exhibit not more than six percent haze.

(6) *Lenses for persons requiring visual correction.* Persons whose vision requires the use of corrective lenses in spectacles and who are required by these rules to wear protective goggles shall use protectors of one of the following types:

Safety spectacles whose protective lenses provide the proper optical correction and withstand the drop test specified in 4.6(3)*d*(2). (Such lenses are exempted from the requirements for parallelism of surfaces. Minimum thickness of prescription lenses shall be 3.0 millimeters, except in the case of lenses of strong plus power, when the edge thickness may be reduced to 2.5 millimeters, provided they meet the impact test specified in 4.6(3)*d*(2).)

Goggles which can be worn over corrective spectacles without disturbing the adjustment of the spectacles.

*c. Detailed requirements.*

(1) *Lens thickness.* Glass or plastic lenses for use in eyecup goggles, metal- or plastic-frame or metal-plastic combination-frame spectacles, or foundrymen's

goggles shall be not less than 3.0 millimeters, nor more than 3.8 millimeters in thickness. (For corrective lenses, see 4.6(3)*b*(6).)

(2) *Marking.* Each lens shall be distinctly marked in a permanent and legible manner with the manufacturer's monogram. Such marking shall be so placed as not to interfere with the vision of the wearer.

Each filter lens shall be marked with the shade designation. Each glass filter lens shall be marked with the letter "H" to indicate treatment for impact resistance.

(3) *Transmittance.*

*Absorptive lenses (shades 1.7 through 3.0).* Absorptive lenses shall meet the radiant-energy transmission requirements hereinafter specified (See Table 1). They shall be supplied in pairs. For shades 1.5 to 2, inclusive, both lenses of a pair shall have the same luminous transmittance within 10 percent; for shades 2.5 and darker, both lenses of a pair shall have the same luminous transmittance within 20 percent.

*Filter lenses (shades 4.0 through 14.0).* Filter lenses shall meet the radiant-energy-transmission requirements specified in Table 1. They shall be supplied in pairs and both lenses shall have the same luminous transmittance within 20 percent.

*Clear lenses.* Clear lenses shall transmit not less than 89 percent of the incident luminous radiation.

(4) *Lens strength.* All lenses shall be capable of withstanding the impact resistance test as specified in 4.6(3)*d*(2).

*d. Methods of test and examination of lenses.**

(1) *Tests for prismatic and refractive power and for definition.* Lenses of all types shall be tested for prismatic and refractive power and for definition by any standard methods which are of sufficient accuracy for the purpose and are equivalent to the following National Bureau of Standards methods:

*Prismatic power.* The lenses may be tested for prismatic power with an 8-power telescope which has an effective aperture of 0.75 inch and is equipped with cross hairs in the focal plane of the ocular. The telescope is to be focused on an illuminated target at a distance of 35 feet from the telescope objective, comprising a central dot and a concentric circle ½ inch in diameter. The telescope is to be so aligned that the image of the central dot falls on the intersection of the cross hairs in the focal plane of the ocular. The lens is to be held in front of the objective lens of the telescope and, if the intersection point of the cross hairs falls without the image of the circle, the prismatic power of the goggle lens exceeds 1/16 prism diopter.

*Refractive power.* The lenses may be tested for refractive power by any suitable instrument such as a vertometer, lensometer, or telescope. The lenses may be tested for refractive power with an 8-power telescope which has an effective aperture of 0.75 inch and is focused at a distance of 35 feet on an illuminated test chart. As a test chart, the resolving power chart pattern 20 National Bureau of Standards Circular C533 is recommended. An advantage in adopting this chart is that by its use it becomes possible to provide all inspectors with identical charts, whereas if charts are improvised at different places they are likely to be different. The lens to be tested shall be placed in front of the telescope objective which is then brought to the sharpest possible focus. The pattern marked 20 should be clearly resolved with the target placed at a distance of 35 feet from the telescope objective used for testing lenses. The telescope is calibrated by successively locating the position of best focus with first a standard lens of plus 1/16 diopter in front of the objective and then with a standard lens of minus 1/16 diopter in front of the objective. These positions are marked by scratches on the draw tube or by other suitable index marks, the refractive power is in excess of 1/16 diopter.

*Definition.* The lenses may be tested for definition with an 8-power telescope which has an effective aperture of 0.75 inch and is focused at a distance of 35 feet on an illuminated test chart. As a test chart the resolving power chart pattern 20 of National Bureau of Standards Circular C533 may be used. An advantage in adopting this chart is that by its use it becomes possible to provide all inspectors with identical charts, whereas if charts are improvised at different places

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they are likely to be different. The lens to be tested shall be placed in front of the telescope objective, which in turn is then brought to the sharpest possible focus. The pattern marked 20 should be clearly resolved with the target placed at a distance of 35 feet from the telescope objective used for testing lenses.

(2) *Impact resistance test.*

*Lens in frame—glass and plastic.* The frame eye, with inserted lens object side up, shall be supported, centered in relation to the test-block-shaped aperture, on the test block of an anvil composed of the part shown in Fig. 7, mounted in the hole of the base plate shown in Fig. 9, the whole assembly on a flat, horizontal work surface of convenient height. To assure uniform test support of the frame eye periphery on the test block the protruding frame nose pad and temple hinge shall be removed.

A 1.00-inch diameter steel ball, weighing approximately 2.4 ounces, shall be dropped in free fall from a height of 50 inches onto the horizontal upper surface of the lens, impinging the lens within a circular area of $\frac{5}{8}$-inch diameter centered at the lens mechanical center. The lens edge shall not be chipped and lens shall not be displaced from the frame eye in this test.

*Lens on block—glass and plastic.* The lens shall be removed from the frame and placed mechanically centered, object side up, on the test block of an anvil composed of the part shown in Fig. 8, mounted in the hole of the base plate shown in Fig. 9, the whole assembly on a flat, horizontal work surface of convenient height.

A 1.00-inch diameter steel ball, weighing approximately 2.4 ounces, shall be dropped in free fall from a height of 50 inches onto the horizontal upper surface of the lens, impinging the lens within a circular area of $\frac{5}{8}$-inch diameter centered at the lens mechanical center. The lens shall not fracture in this test.

*Breakage pattern—glass only.* As a test to determine the type of breakage pattern exhibited by a lens when subjected to a force sufficient to break it, a lens may be broken by increasing the height of drop of the 1-inch steel ball or by employing a heavier ball. If made of glass, the lens shall break predominately with radial cracks with a minor tendency toward concentric cracks. Any tendency to break with lines of cleavage parallel to the surface indicates an unsatisfactory heat treatment; and the lenses represented by that sample shall be considered as not conforming to these requirements.

(3) *Penetration resistance—plastic only.* The frame and lens shall be supported on a wooden block of such size and shape as to fit the frame securely. A pointed projectile of suitable size, consisting of a new Singer number 25, size 135 x 17 needle, fastened into a holder weighing approximately 1.56 ounces, shall be freely dropped, pointed downward, from a height of 50 inches onto the horizontal outer surface of the lens. The projectile may be guided, but not restricted, in its fall by being dropped through a tube extending to within approximately 4 inches of the lens. The lens shall not be pierced through from the impact.

(4) *Haze—plastic only.* Plastic lenses of all types shall exhibit not more than 6 percent haze.

(5) *Flammability—plastic only.* Where plastic materials are used in lenses, such materials shall be noncombustible or slow-burning. Cellulose nitrate, or materials having flammability characteristics approximating those of cellulose nitrate, shall not be used. Such plastic lenses shall be exposed to a test to determine the flame-propagation rate. The specimen shall be ignited by holding one end of the specimen horizontally at the top of a luminous $\frac{3}{4}$-inch Bunsen burner flame in a draft-free room. The rate of propagation determined by a stop watch shall be 24 seconds per inch or less. A faster rate of propagation shall be cause for rejection.

(6) *Ultraviolet, luminous, and infrared transmittance—plastic and glass.* The ultraviolet, luminous (total visible), and infrared transmittance of lenses of all types shall be determined by any standard method recognized as suitable by the National Bureau of Standards. The following methods are suggested:

*Ultraviolet transmittance—plastic and glass.* The source of radiant energy for determining the ultraviolet spectral transmittance shall be a quartz mercury arc or other source emitting an intense and preferably discontinuous spectrum. The intense emmission lines of the quartz mercury are at 313 millimicrons, 334 millimicrons, 365 millimicrons, and 405 millimicrons are conveniently distributed and

well adapted for making these measurements. If other sources are used, the wave lengths closest to the above values of the mercury arc may be used.

*Luminous transmittance—plastic and glass.* The standard source of radiant energy used in the measurement of the luminous transmittance of filter lenses shall be a Projection Type Lamp No. T-8 (or other high-powered gas-filled tungsten filament incandescent lamp) operated at the color temperature (2854°K). The luminous transmittance shall be determined by one of the following means:

Photometrically by an observer having normal color vision, as determined by recognized color vision chart tests such as those employing pseudo-isochromatic plates.

With a physical photometer consisting of a thermopile (or other radiometer) and a luminosity solution having a spectral transmittance curve which coincides closely with the luminous-efficiency curve of the average eye.

By measuring the spectral transmittance and calculating the luminous transmittance through the use of published data on the spectral radiant energy and the relative luminous efficiency of the average eye.

The standards of luminous transmittance maintained by the National Bureau of Standards are based on the latter method.

*Infrared transmittance—plastic and glass.* The same standard source or radiant energy used in determining the transmittance of luminous radiation shall be used also in the measurement of the transmittance of the total infrared radiation. One of the following methods shall be used for determining the total infrared transmittance:

By observing the infrared spectral-energy distribution curves of a gas-filled lamp, with and without the lens placed before the entrance slit of the spectrometer, and integrating the area under each of the two curves between the spectral limits of 700 millimicrons and 4,000 millimicrons.

By observing the integrated transmittance with a physical radiometer (e.g., a thermopile) covered with a deep red filter (such as Corning 2404) which has a high and uniform transmittance through the infrared spectrum and transmits less than 0.5 percent of the luminous radiation.

The latter method is employed at the National Bureau of Standards in the test of welding glass for government purchase.

**4.7(88A)T.IV Respiratory protection.**

**4.7(1)** *Classification of hazards.* Hazardous atmospheres fall into the following broad groupings:

Oxygen deficiency.

Gas and vapor contaminants:

Immediately dangerous to life or health.

Not immediately dangerous to life or health.

Particulate contaminants (dust, fog, fume, mist, smoke, and spray):

Immediately dangerous to life or health.

Not immediately dangerous to life or health.

Combination of gas, vapor, and particulate contaminants:

Immediately dangerous to life or health.

Not immediately dangerous to life or health.

*a. Oxygen deficiency.* The oxygen content of normal air is about 20.9 percent by volume. Atmospheres in confined spaces such as wells, mines, holds of ships, tanks, and burning buildings may contain a lower percentage of oxygen because of dilution or displacement of the air by other gases or vapors, or because of the loss of oxygen by its reaction with, or absorption by, other substances. When the oxygen content of the air is about 16 percent, the flame of a safety lamp will be extinguished. Below this concentration, a person breathing the air exhibits symptoms ranging from increased volume of breathing and acceleration of pulse rate of unconsciousness and death, depending on the oxygen content of the air and the degree of his physical activity.

*b. Gas and vapor contaminants.*

(1) *Asphyxiants*: Interfere with utilization of $O_2$ in the body.

*Simple asphyxiants*: Physiologically inert substances that dilute $O_2$ in the air

(for example, nitrogen, hydrogen, helium, methane).

*Chemical asphyxiants*: Low concentrations interfere with supply or utilization of $O_2$ in the body (for example, carbon monoxide, hydrogen cyanide, cyanogen and nitriles).

(2) *Irritants: Corrosive in action.* May cause irritation and inflamation of parts of the respiratory system (also skin and eyes) and pulmonary edema (for example, ammonia, hydrogen chloride, formaldehyde, sulfur dioxide, chlorine, ozone, nitrogen dioxide, phosgene, and arsenic trichloride).

(3) *Anesthetics*: Cause loss of feeling and sensation with unconsciousness and death possible (for example, nitrous oxide, hydrocarbons and ethers). Some anesthetics injure body organs; for example, carbon tetrachloride (liver and kidneys), chloroform (liver and heart), benzene (bone marrow), and carbon disulfide (nervous system).

(4) *Systemic poisons*: Damage organs and systems in the body; for example, mercury (nervous system and various organs), phosphorous (bone), hydrogen sulfide (respiratory paralysis), and arsine (red blood cells and liver).

The toxicity of gases and vapors for man varies over a wide range. For instance, a 10-minute exposure to a concentration of 120 parts per million (ppm) of phosgene may be fatal, whereas one may safely breathe 1,000 ppm of dichlorodifluoro-methan (freon) throughout a working day.

Gaseous contaminants immediately dangerous to life are gases present in concentrations that would endanger the life of a person breathing them for even a short period of time. For example, 400 to 500 parts of sulfur dioxide per million parts of air (0.04 to 0.05 percent) by volume is considered to be dangerous for a short exposure.

Gaseous contaminants not immediately dangerous to life are gases present in concentrations that could be breathed for a short period without endangering the life of a person breathing them, but which might produce discomfort and possible injury after a prolonged single exposure or repeated short exposures. For instance, the threshold limit value for sulfur dioxide has been set at 5 ppm, based primarily on the irritating effect of this gas on the nose, eyes, and throat.

*c. Particulate contaminants (dust, fog, fume, mist, smoke, and sprays).*

(1) *Relatively inert*: May cause discomfort and minor irritation, but generally without injury at reasonable concentrations (for example, marble, gypsum).

(2) *Pulmonary fibrosis-producing*: Produce nodulation and fibrosis in the lung, possibly leading to complications (for example, quartz, cristobalite, tridymite, asbestos).

(3) *Cancer-producing*: Produce cancer in some individuals after "laten" period of 20-40 years (for example, asbestos, chromates, radioactive particulates).

(4) *Chemical irritants*: Produce irritation, inflammation, ulceration, and so forth, in upper respiratory tract (for example, acid mists, alkalis).

(5) *Systemic poisons*: Produce pathologic reactions in various systems of the body (for example, lead, manganese, cadmium).

(6) *Allergy-producing*: Produce reactions such as itching, sneezing and asthma (for example, pollens, isocyanates, gums, spices).

(7) *Febrile reaction-producing*: Produce chills followed by fever (for example, fumes of zinc and copper).

Particulate contaminants may be classified according to their physical properties into three broad groups as follows: (1) solid, such as dusts and fumes; (2) liquid, such as mists and fogs; and (3) a combination of solid and liquid, such as silica-water sprays and paint sprays.

The majority of particulate contaminants are not immediately dangerous to life; that is, days, weeks, or even years of exposure may transpire before harmful effects are noted. Notable exceptions are dusts and mists containing the organic phosphorous insecticides which, if present in high concentrations, may incapacitate or even kill a man in a very short time. Other exceptions to this generalization are certain radioactive particulates and the toxic war smokes such as diphenylchloroarsine (DA) and diphenylaminechlorarsine (DM).

*d. Combination of gas, vapor, and particulate contaminants.* In addition to atmospheres containing gaseous or particulate contaminants, there are those in which both types occur simultaneously. The contaminants may be entirely different substances, such as carbon monoxide and oxides of nitrogen produced by blasting and the dust from blasted material, or they may be the same substance in the liquid and in the vapor form, such as slightly volatile liquids that are atomized. The simultaneous occurence of both gaseous and particulate contaminants in an atmosphere complicates the procedure for providing adequate respiratory protection against them.

**4.7(2)** *Classification of respiratory protective devices.* Respiratory devices fall into the following broad groupings on the basis of their mode of functioning:

*Atmosphere-supplying respirators*: Self-contained, hose-mask, air-line, combination self-contained and hose-mask or air-line.

*Air-purifying respirators*: Gas and vapor (gas mask and chemical cartridge), particulate (dust, fog, fume, mist, smoke, and sprays), combination gas, vapor, and particulate.

*Combination atmosphere-supplying and air-purifying respirators.*

*a. Atmosphere-supplying respirators.* A respirable atmosphere independent of the ambient air is supplied to the wearer.

(1) *Self-contained breathing apparatus.* Supply of air, oxygen, or oxygen-generating material carried by wearer. Normally equipped with full facepiece, but some with a mouthpiece for escape purposes.

*Closed-circuit SCBA (oxygen only):*

*Compressed or liquid oxygen type.* High-pressure $O_2$ from a gas cylinder passes through a high-pressure reducing valve and, in some designs, through a low-pressure admission valve to a breathing bag or container. Liquid oxygen is converted to a low-pressure gaseous oxygen and delivered to the breathing bag. The wearer inhales from the bag through a corrugated tube connected to a mouthpiece or facepiece and a one-way check valve. Exhaled air passes through another check valve and tube into a container of carbon dioxide removing chemical and reenters the breathing bag. Make up $O_2$ enters the bag continuously or as the bag deflates sufficiently to actuate an admission valve. A pressure relief system is provided and a manual bypass system and saliva trap may be provided depending upon the design.

*Oxygen-generating type.* Water vapor in the exhaled breath reacts with chemical in the canister to release $O_2$ to the breathing bag. The wearer inhales from the bag through a corrugated tube and one-way check valve at the facepiece. Exhaled air passes through a second check valve breathing tube assembly into the canister. The $O_2$ release rate is governed by the volume of exhalaed air. $CO_2$ is removed by the canister fill.

Open-circuit SCBA (compressed air, compressed oxygen, liquid air, or liquid oxygen):

Demand type (equipped with a demand valve that is activated on initiation of inhalation and permits the flow of breathing atmosphere to the facepiece. On exhalation, pressure in the facepiece becomes positive and the demand valve is deactivated.). The demand valve permits oxygen or air flow only during inhalation. Exhaled breath passes to ambient atmosphere through a valve(s) in the facepiece. A bypass system is provided in case of regulator failure except on escape-type units.

Pressure-demand type (a small positive pressure is maintained at all times in the facepiece by a spring-loaded or balanced regulator and exhalation valve.). Equipped with full facepiece only. Positive pressure is maintained in the facepiece at all times. The wearer usually has the option of selecting the demand or pressure-demand mode of operation.

(2) *Hose mask and air-line respirator.*

*Hose mask.* Equipped with full facepiece, nonkinking breathing tube, rugged safety harness and a large diameter heavy-duty nonkinking air supply hose. The breathing tube and hose are securely attached to the harness. A check valve allows airflow only toward the facepiece. The facepiece is fitted with an exhalation valve. The harness has provision for attaching a safety line:

*Hose mask with blower.* Air is supplied by a motor-driven or hand-operated blow-

er. The wearer can continue to inhale through the hose if the blower fails. Up to 300 feet of hose length is permissible.

*Hose mask without blower.* The wearer provides motivating force to pull air through the hose. The hose inlet is anchored and fitted with a funnel or like object covered with a fine mesh screen to prevent entrance of coarse particulate matter. Up to 75 feet of hose length is permissible.

*Air-line respirator.* Respirable air is suppled through a small diameter air-line from a compressor or compressed air cylinders. The air-line is attached to the wearer by belt and can be detached rapidly in an emergency. A flow-control valve or orifice is provided to govern the rate of airflow to the wearer. Exhaled air passes to the ambient atmosphere through a valve(s) or opening in the enclosure (facepiece, hood, suit). Up to 250 feet of air-line is permissible:

*Continuous-flow class.* Equipped with a half-mask or full facepiece, or a helmet (abrasive blasting) or hood covering the wearer's head and neck. At least four cubic feet of air per minute to tight-fitting facepieces and six cubic feet per minute to loose-fitting hoods and helmets shall be required.

Demand type (Equipped with a demand valve that is activated on initiation of inhalation and permits the flow of breathing atmosphere to the facepiece. On exhalation, pressure in the facepiece becomes positive and the demand valve is deactivated.). Equipped with a half mask or full facepiece. The demand valve permits flow of air only during inhalation.

Pressure-demand type (A small positive pressure is maintained at all times in the facepiece by a spring-loaded or balanced regulator and exhalation valve.). Equipped with a half-mask or full facepiece. A positive pressure is maintained in the facepiece at all times.

*Supplied air suit.* A form of continuous air-line respirator (see air-line respirator above). The suit is one or two piece and of leak-resistant material. Air is supplied to the suit through a system of internal tubes to the head, trunk, and extremities. Air exhausts through valves located in appropriate parts of the suit.

(3) *Combination self-contained and air-line respirators.* Normally a demand or pressure-demand type air-line respirator with full or half-mask facepiece, together with a small compressed-air cylinder to provide air if the normal supply fails. Wearer immediately returns to a respirable atmosphere if the normal air supply fails.

*b. Air-purifying respirators.* Half-mask, full facepiece, or mouthpiece respirator equipped with air-purifying units to remove gases, vapors, and particulate matter from the ambient air prior to inhalation. Some air-purifying respirators are blower-operated and provide respirable air to the facepiece (or hood) under a slight positive pressure.

(1) *Gas- and vapor-removing respirators.* Packed sorbent beds (cartridge or canister) remove single gases or vapors (for example, chlorine gas), a single class of gases or vapors (for example, organic vapors) or a combination of two or more classes of gases and vapors (for example, acid gases, organic vapors, ammonia, and carbon monoxide) by absorption, adsorption, chemical reaction or catalysis or a combination of these methods:

*Full facepiece respirator (gas mask).* Equipped with a single large chin canister or harness mounted canister with breathing tube and inhalation and exhalation valves. Canisters come in the "super" size, "industrial" size (regular), and chin style. The service life is approximately proportional to the canister size for a given type of canister.

Canisters for protecting against CO have an indicator or timer that shows when the canister shall be changed. Canisters are marked in bold letters with the contaminant against which they protect and are color coded for quick identification according to the American National Standard Identification of Gas Mask Canisters, K13.1-1967 (see Chart 2). The maximum concentration in which the canister can be safely used is indicated on the label.

*Half-mask respirator (chemical-cartridge respirator).* Equipped with one or more cartridge and exhalation and inhalation valves.

*Mouthpiece respirator.* A compact device designed for quick application when the atmosphere unexpectedly is contaminated with a hazardous material. Normally consists of a housing with a mouthpiece and a single cartridge, a nose clamp,

exhalation and inhalation valves, and a neckband.

(2) *Particulate-removing respirators.* Filter media in pads, cartridges, or canisters remove dust, fog, fume, mist, smoke or spray particles. Filters are designed to remove a single type of particle (silica dust) or classes of particles (dusts and fumes). Filters may be replaceable or a permanent part of the respirator. Some filters can be used only once; others are reusable and should be cleaned according to the manufacturer's instructions:

*Full facepiece respirator.* Normally equipped with a high-efficiency filter canister designed to protect against hazardous particulates. Equipped with inhalation and exhalation valves.

*Half-mask respirator.* Normally equipped with one or two dust, mist or fume filters designed to protect against nuisance and low to moderate toxicity dust, fumes, and mists, an exhalation valve, and (normally) inhalation valves. A knitted fabric cover is sometimes worn on dust respirators to decrease discomfort.

*Mouthpiece respirator. Infrequently used as a particulate respirator.*

(3) *Combination gas, vapor, and particulate-removing respirators.* Some canisters and cartridges contain both filters and sorbents to provide protection against contaminants. Some filters are designed to be attached to a sorbent cartridge as a prefilter (for example, for paint spray operation).

*c. Combination atmosphere-supply and air-purifying respirators.* These provide the wearer the option of using either of two different modes of operation. They may be an air-line respirator with an air-purifying attachment to provide protection in the event the air supply fails or an air-purifying respirator with a small air cylinder in case the atmosphere unexpectedly exceeds safe conditions for use of an air-purifying respirator.

*d. Atmosphere-supplying respirators capabilities and limitations.* Atmosphere-supplying respirators provide protection against oxygen deficiency and most toxic atmospheres. The breathing atmosphere is independent of ambient atmospheric conditions.

*General limitations*: Except for the supplied-air suit, no protection is provided against skin irritation by materials such as Ammonia HCl, or against sorption of materials such as HCN, tritium, or organic phosphate pesticides through the skin. Facepieces present special problems to individuals required to wear prescription lenses.

(1) *Self-contained breathing apparatus (SCBA).* The wearer carries his own breathing atmosphere. Use is permissible in atmospheres immediately dangerous to life or health.

*Limitations*: The period over which the device will provide protection is limited by the amount of air or oxygen in the apparatus, the ambient atmospheric pressure (service life is cut in half by a doubling of the atmospheric pressure), and work load. A warning device shall be provided to indicate to the wearer when the service life has been reduced to a low level. Some SCBA devices have a short service life (few minutes) and are suitable only for escape (self-rescue) from an irrespirable atmosphere. Chief limitations of SCBA devices are their weight or bulk or both, limited service life, and the training required for their maintenance and safe use:

*Closed-circuit SCBA.* The closed circuit operation conserves oxygen and permits longer service life.

*Open-circuit SCBA—demand and pressure-demand.* The demand type produces a negative pressure in the facepiece on inhalation whereas the pressure-demand type maintains a positive pressure in the facepiece and is less apt to permit inward leakage of contaminants.

(2) *Hose mask or air-line respirator.* The respirable air supply is not limited to the quantity the individual can carry, and the devices are light weight and simple.

*Limitations*: The wearer is restricted in movement by the hose or air-line and must return to a respirable atmosphere by retracing his route of entry. The hose or air-line is subject to being severed or pinched off:

*Hose masks*:

*Hose mask with blower.* If the blower fails, the unit still provides protection, although a negative pressure exists in the facepiece during inhalation. Use is permissible in atmospheres immediately dangerous to life or health.

*Hose mask without blower.* Limited to use in atmospheres from which the wearer can escape unharmed without aid of the respirator.

*Air-line respirators (continuous flow, demand and pressure-demand types).* The demand type produces a negative pressure in the facepiece on inhalation whereas continuous flow and pressure-demand types maintain a positive pressure in the facepiece at all times and are less apt to permit inward leakage of contaminants.

*Limitations*: Air-line respirators are limited to use in atmospheres not immediately dangerous to life or health except under conditions specified in immediately dangerous atmospheres and use in dangerous atmospheres. Air-line respirators provide no protection if the air supply fails.

*Supplied-air suit.* These suits protect against atmospheres that affect the skin or mucous membranes or that may be absorbed through the unbroken skin.

*Limitations*: Some contaminants, such as tritium, may penetrate the suit material and limit its effectiveness. Other contaminants such as flourine, may react chemically with the suit material and damage it. See absorption through or irritation of the skin.

These suits are limited in use to atmospheres not immediately dangerous to life or health except under the conditions specified in immediately dangerous atmospheres and use in dangerous atmospheres.

(3) *Combination self-contained and air-line respirators.* The equipping of an air-line respirator with a small cylinder of compressed air to provide an emergency air supply qualifies the respirator for use in immediately dangerous atmospheres. See immediately dangerous atmospheres.

*e. Air-purifying respirators capabilities and limitations.* General limitations: Air-purifying respirators do not protect against oxygen-deficient atmospheres nor against skin irritation by, or sorption through the skin of, airborne contaminants. See oxygen-deficient atmospheres and absorption through or irritation of the skin.

The maximum contaminant concentration against which an air purifying respirator will protect is determined by the designed efficiency and capacity of the cartridge, canister, or filter. For gases and vapors and for particles having a TLV of less than 0.1 mg/m$^3$, the maximum concentration for which the air purifying unit is designed is specified on the label. Respirators without a blower to maintain a constant positive pressure within the facepiece will not provide the maximum design protection specified unless the facepiece is carefully fitted to the wearer's face to prevent inward leakage. See facepiece fit tests and procedures. The time period over which protection is provided is dependent on canister, cartridge, or filter type, concentration of contaminant, and the wearer's respiratory rate.

The proper type of canister, cartridge, or filter shall be selected for the particular atmosphere and conditions. Air-purifying respirators generally cause discomfort and objectionable resistance to breathing although these problems are minimized in blower-operated units. Respirator facepieces present special problems to individuals required to wear prescription lenses. These devices do have the advantage of being small, light, and simple in operation.

(1) *Gas- and vapor-removing respirators.* Additional limitations: No protection is provided against particulate contaminants, unless specified on canister or cartridge label. A rise in canister or cartridge temperature indicates that a gas or vapor is being removed from the inspired air. This is not a reliable indicator of canister performance. An uncomfortably high temperature indicates a high concentration of gas or vapor and requires an immediate return to fresh air:

*Full facepiece respirator (gas mask).* Should avoid use in atmospheres immediately dangerous to life or health if the contaminant(s) lacks sufficient warning properties (that is, odor or irritation).

*Half-mask respirator (chemical-cartridge respirator).* Shall not use in atmospheres immediately dangerous to life or health and should be limited to low concentrations of gases and vapors. A fabric covering shall not be worn on the facepiece since it will permit gases and vapors to pass.

No protection is provided to the eyes.

*Mouthpiece respirator (chemical cartridge).* Shall not be used in atmospheres

immediately dangerous to life or health. Mouth breathing prevents detection of contaminants by odor. The nose clip shall be securely in place to prevent nasal breathing.

No protection is provided to the eyes.

*Self-rescue mouthpiece respirator.* Designed for self-rescue from immediately dangerous atmospheres of gases and vapors. Mouth breathing prevents detection of contaminants by odor. The nose clip shall be securely in place to prevent nasal breathing.

No protection is provided to the eyes.

(2) *Particulate-removing respirators.* Additional limitations: Protect against non-volatile particles only. No protection against gases and vapors.

The filter shall be replaced or cleaned when breathing becomes difficult due to plugging by retained particles.

These respirators shall not be used during shot and sand blasting operations. Abrasive-blasting respirators shall be used.

*Full facepiece respirator.* Should avoid use in atmospheres immediately dangerous to life or health if the contaminant(s) lacks sufficient warning properties (that is, odor or irritation).

*Half-mask respirator.* Shall not be used in atmospheres immediately dangerous to life or health. A fabric covering on the facepiece is permissible only in atmospheres of coarse dusts and mists of low toxicity.

No protection is provided to the eyes.

*Mouthpiece respirator (filter).* Shall not be used in atmospheres immediately dangerous to life or health. Mouth breathing prevents detection of contaminants by odor. The nose clip shall be securely in place to prevent nasal breathing.

No protection is provided to the eyes from irritating aerosols.

*Self-rescue mouthpiece respirator (filter).* Designed for self-rescue from atmospheres having immediately dangerous concentrations of toxic particles. Mouth breathing prevents detection of contaminants by odor. The nose clip shall be securely in place to prevent nasal breathing.

No protection is provided to the eyes from irritating aerosols.

(3) *Combination particulate and vapor- and gas-removing respirators.* The advantages and disadvantages of the component parts of the combination respirator as described above will apply.

*f. Combination atmosphere-supplying and air-purifying respirators capabilities and limitations.* The advantages and disadvantages, expressed above, of the mode of operation being used will govern. The mode with the greater limitations (air-purifying mode) will mainly determine the overall capabilities and limitations of the respirator since the wearer may for some reason fail to change the mode of operation even though conditions would require such change.

**4.7(3)** *Requirements for respirators.* Respirators of all types should be capable of providing an adequate degree of respiratory protection against given atmospheric contaminants when the proper type has been chosen and when it is maintained and used correctly. Specific requirements for most of the types of respirators used in industry in the United States of America have been set up by the Federal Bureau of Mines. These requirements are published as Bureau of Mines Schedules.

Each respirator that has been approved by the Bureau of Mines has met the requirements of the pertinent schedule that was in effect at the time of the approval. In general, each revision of the Bureau of Mines schedule makes these requirements more severe. A Bureau of Mines approval on a respirator remains in effect even though the schedule under which it was approved has been revised one or more times since then. Hence, if the user wishes to check on the minimum performance that he may expect from the respirator, he should consult the schedule or revision thereof which is shown in the list of schedules as being in effect when the approval was granted.

**4.7(4)** *Selection of respirators.*

*a. General considerations.* In choosing a respirator to be used for respiratory protection in any given situation, the following factors should be considered: (1) The nature of the hazard; (2) the severity of the hazard; (3) the type of contaminant; (4) the concentration of the contaminant; (5) the period for which respiratory protection must be afforded; (6) the location of the contaminated area with respect to a source of respirable air;

(7) the expected activity of the wearer; and (8) the operating characteristics and limitations of the available respirators. Chart I summarizes the hazards and the respirators that are designed specifically to afford respiratory protection against them. By reference to this and by considering the foregoing factors, the user can determine some types of the respirators that should be used. The self-contained breathing apparatus and the hose mask with blower would give respiratory protection against any of the hazards listed, but these devices are not included in the list of respirators that could be used in the less hazardous situations because their use would amount to "over-engineering."

Even though most of the factors in 4.7(4)*a* are interrelated, a brief discussion of each follows:

(1) *Nature of the hazard.* The user should determine whether or not the atmosphere is deficient in oxygen, and whether the contaminant is gaseous or particulate, or a combination of the two.

(2) *Severity of the hazard.* The user should determine whether or not the atmosphere is immediately dangerous to life. This is discussed under Classification of hazards in 4.7(1).

(3) *Type of contaminant.*

*Gaseous contaminant.* Where the contaminant is gaseous, the user should determine whether it is an acid gas, an organic vapor, ammonia, carbon monoxide, or a mixture of two or more of these gaseous contaminants. This information is essential to the choice of the proper gas mask or chemical-cartridge respirator because the different types of gases require different absorbents or combinations of absorbents to remove them from the inspired air.

*Particulate contaminant.* Where the contaminant is particulate, the user should know its physical form; that is, whether it is a dust, fume, or mist. Furthermore, he should know whether it is a toxic type (containing, for instance, arsenic, antimony, cadmium, or lead), a pneumoconiosis-producing type (containing, for instance, asbestos or free silica), or a type having a low order of toxicity and being nonbifrosis producing (containing, for instance, flour or wood). This information is essential to the choice of the proper dispersoid respirator, as a respirator designed to protect against one type of particulate matter does not necessarily afford adequate protection or service life against the other types.

(4) *Concentration of contaminant.*

*Gaseous contaminant.* Where the contaminant is gaseous, the maximum expected concentration of the gas should be known. Where this is above 3 percent by volume of ammonia gas, or 2 percent by volume of other gases, a gas mask is not adequate and should not be used. If it is above 0.1 percent by volume (1,000 ppm) of organic vapors, and organic-vapor chemical-cartridge respirator is not adequate and should not be used.

*Particulate contaminant.* Where the contaminant is particulate, the proper type of dispersoid respirator may give an adequate degree of protection, yet its service life may be too short to be practicable or economical. That is, the filter may plug too readily with a rapid increase in the inhalation resistance, thus necessitating frequent changing or cleaning of the filter material. Where practicable, an air-line respirator should be used in high concentrations of particulate matter.

(5) *Period of required respiratory protection.* The period of respiratory protection required has considerable bearing on the decision about which type of respirator to use in any given situation. The self-contained breathing apparatus, the gas mask, and the chemical-cartridge respirator provide respiratory protection for a limited period, whereas the hose mask with blower, the air-line respirator, and the abrasive-blasting respirator do so for an unlimited period; thus, for protracted periods of use, the latter types offer some advantages.

(6) *Location of contaminated area with respect to source of respirable air.* This is a factor that is frequently overlooked when choosing a respirator. In using a hose mask, air-line respirator, or abrasive-blasting respirator, the distance that the wearer can go into a contaminated atmosphere is limited by the length of the hose connected to the source of respirable air. Furthermore, the presence of the hose requires that he enter and leave the area by the same route. When wearing a self-contained breathing apparatus or a gas mask, a person may leave the contaminated area by another exit, but

he should make certain that the device will afford protection for a period adequate for him to reach fresh air, taking into account possible delays. For instance, in mine-rescue work, the maximum distance from fresh air that a crew wearing 2-hour self-contained breathing apparatus should cover is 1,000 feet (2,000 feet round trip) under ideal conditions. This distance is decreased to not more than 50 feet from fresh air if the crew has to crawl in a low passage.

(7) *Activity of the wearer.* In many instances, the respirator that would be first choice from the standpoint of respiratory protection or period of protection cannot be used because it would limit the activity of the wearer. For instance, a hose mask would not be practicable for use where the wearer has to weave in and out of a series of obstructions such as pipes because of the difficulty of pulling the heavy hose after him and his inability to escape quickly to fresh air in event of danger. An air-line respirator would likewise be rather impracticable for use where the wearer must be moving about constantly in the contaminated area, or going from one room to another, because of the inconvenience and tripping hazard of the air-supply hose.

The activity of the wearer has a marked effect on the life to be expected from a self-contained breathing apparatus, gas mask, chemical-cartridge respirator, or dispersoid respirator. The volume of air breathed by a man walking at a rate of 4 miles per hour is more than three times that breathed when he is standing still. Hence, the supply of oxygen in a self-contained breathing apparatus is used up faster, the absorbent capacity of a gas-mask canister or a chemical cartridge is exhausted faster, and the filter of a dispersoid respirator would be plugged faster while the wearer is exercising than when he is at rest.

(8) *Operating characteristics and limitations of the available respirators.* The operating characteristics and limitations of respirators have been discussed in 4.7(2).

**4.7(5)** *Use and maintenance of respirators.*

*a. General considerations.* Respirators are used to supplement other methods of control of air-borne contaminants rather than to substitute for them. Every effort should be made to prevent the dissemination of contaminants into the breathing zones of the workers. In some instances, it is necessary to use respirators only until these control measures have been taken; in others, such measures are impracticable, and the continued use of respirators is necessary.

*b. Precautions to be taken in the use of respirators.*

(1) *Precautions to be taken in the use of a self-contained breathing apparatus.* The wearer of a self-contained breathing apparatus should be physically sound and fit and should be thoroughly trained in the construction, testing, use, care, and limitations of the apparatus before he attempts to wear such apparatus in a hazardous situation.

Make certain that the self-contained breathing apparatus is in good operating condition.

Make certain that the apparatus is capable of supplying air or oxygen for the period that the wearer must remain in the contaminated area.

Adjust the apparatus to the wearer and test for tightness according to the manufacturer's instructions.

If the wearer is to enter a confined space containing an atmosphere that is extremely hazardous, connect a strong life line to his body. This will serve (*a*) as a means of guiding him to the exit; (*b*) as a means of transmitting prearranged signals between him and the men at the fresh-air base; and (*c*) as a means of aiding in rescue operations in case of an accident or emergency. This life line should be held by two attendants, at least one of whom is wearing a similar apparatus.

Enter the contaminated area cautiously, and, if the contaminant is detected by odor, taste, or eye, nose, or throat irritation, return to fresh air immediately and ascertain the cause.

Bear in mind the time limitations of the apparatus and allow an adequate margin of time for the return to fresh air.

The mouthpiece and nose clip, or the facepiece, should not be removed until the wearer is certain that he is in respirable air.

(2) *Precautions to be taken in the use of a gas mask.*

Make certain that the gas mask is in good operating condition.

Adjust the canister harness on the body so that, when the facepiece is put on, there is some slack in the breathing tube when the wearer's head is in the normal position.

Adjust the facepiece to make a gastight fit on the wearer's face. There are two means of testing a facepiece for a gastight fit: (*a*) Close off the exhalation valve and exhale gently into the facepiece. If a slight positive pressure can be built up in the facepiece without any indication of outward leakage of air between the facepiece and the face, it is adjusted properly. (*b*) Close off the breathing tube, inhale so that the facepiece starts to collapse, and hold the breath for about ten seconds. If the facepiece stays in its partially collapsed condition and no inward leakage of air is detected, it is adjusted properly.

Test the complete gas mask for gastightness by closing off the air-intake at the bottom of the canister, either with the palm of the hand or with the bottom canister seal, and inhaling as in "*b*" above.

This test checks the gas-tightness of the canister or timer gaskets and of the connection between the breathing tube and the canister or timer.

Make certain that the contaminated atmosphere is not defficient in oxygen.

Enter the contaminated area cautiously. If the odor of the contaminated is noted, return to fresh air immediately and ascertain the cause of leakage.

Make certain that the canister has enough residual life to give respiratory protection for the period that the wearer expects to be in the contaminated area. It is good practice to attach a fresh canister to the mask before entering an extremely hazardous atmosphere, especially one containing a gas that has poor warning properties, such as methyl bromide.

The facepiece should not be removed or fresh canisters attached until the wearer is certain that he is in respirable air.

After leaving the contaminated area, replace the bottom seal on the canister to prevent deterioration of the canister contents. This is particularly important in the case of universal gas-mask canisters.

Where the contaminant is a single gas or vapor, or a mixture of two or more gases or vapors of the same type, longer service time will be obtained if a canister is used that is designed especially for protection against the contaminant than would be obtained if a universal gas-mask canister were used. Firemen generally use the universal gas-mask canister because they are never certain what gases they might encounter.

(3) *Precautions to be taken in the use of a hose mask with blower.* Make certain that the hose mask is in good operating condition. Set the blower in an assured source of respirable air.

Connect the proper length of hose (not over 150 feet) to the blower and to the facepiece, making sure that all gaskets are in place and that the connections are tight. Where more than one hose is to be used, each should originate at the blower.

Before entering a confined space such as a tank or sewer containing an atmosphere that is extremely hazardous, connect a strong life line to the D-ring of the body harness. This life line should be held by two attendants so that the wearer can be removed from the contaminated atmosphere in case of accident or emergency.

Operate the blower for a minute or two at a rapid rate to blow any dust out of the hose and to make sure that air is being delivered to the facepiece.

Adjust the body harness securely to the wearer.

Adjust the facepiece to the wearer so that it makes a gastight fit with his face. There are two means of testing for a satisfactory facepiece fit: (*a*) Close off the exhalation valve and exhale gently into the facepiece. If a slight positive pressure can be built up in the facepiece without any indication of outward leakage of air between the facepiece and the face, it is adjusted properly. (*b*) Close off the breathing tube or tubes, inhale so that the facepiece starts to collapse, and hold the breath for about 10 seconds. If the facepiece stays in its partially collapsed conditions and no inward leakage of air is detected, it is adjusted properly.

Operate the blower, and adjust the flow of air to the wearer's satisfaction. The

blower should be operated continuously during the use of the mask.

Check on the prearranged signals between the wearer and the blower operator.

Enter the contaminated area cautiously.

Be careful that the hose is not endangered by sharp edges or falling objects, and remember that the wearer must retrace his steps and leave by the same route that he entered.

If the continuous flow of air to the facepiece is interrupted, the wearer should return to fresh air and ascertain the cause.

The facepiece should not be removed until the wearer is certain that he is in respirable air.

(4) *Precautions to be taken in the use of a hose mask without blower.* Make certain that the hose mask is in good operating condition.

Securely fasten the air-intake of the respirator in an assured source of respirable air.

Connect the proper length of hose (not over 75 feet) to the air-intake and to the facepiece, making sure that all gaskets are in place and that the connections are tight.

Adjust the body harness to the wearer.

Adjust the facepiece to the wearer so that it makes a gastight fit with his face.

There are two means of testing for a satisfactory facepiece fit: (*a*) Close off the exhalation valve and exhale gently into the facepiece. If a slight positive pressure can be built up in the facepiece wthout any indication of outward leakage of air between the facepiece and the face, it is adjusted properly. (*b*) Close off the breathing tube or tubes, inhale so that the facepiece starts to collapse, and hold the breath for about 10 seconds. If the facepiece stays in its partially collapsed condition and no inward leakage of air is detected, it is adjusted properly and is gastight.

Make certain that the atmosphere to be entered is not so hazardous that the wearer cannot escape unharmed without the aid of the respirator.

Enter the contaminated area cautiously and leave by the same route.

(5) *Precautions to be taken in the use of an air-line respirator.* Make certain that the air supply is respirable. Close attention should be paid to the location of the intake to the air-supply device to make certain that the entering air is not contaminated. A suitable filter should be provided to remove objectionable odors, oil and water mist, and rust particles from the air delivered to air-supply lines. A suitable reducing type or demand-type valve and an excess-pressure relief valve should also be provided. For supplying respirable air, the use of low-pressure externally lubricated blowers is preferable to high-pressure internally lubricated compressors, since the latter may add objectionable odors to the air and may produce carbon monoxide upon overheating. Internally lubricated compressors should be equipped with an automatic shut-off which is actuated if they become overheated.

Make certain that the air-line respirator is in good operating condition.

Attach the proper length of air-supply hose to the source of compressed air and to the breathing tube.

Adjust the pressure of the air at the inlet to the air-supply hose so that it is within the proper pressure range.

Adjust the facepiece, helmet or hood to the wearer according to the manufacturer's instructions. A full facepiece or half-mask facepiece should be adjusted so that all the excess air leaves the facepiece through the exhalation valve and none is felt leaking out under the edge of the facepiece.

When the rate of flow of air into the facepiece, helmet, or hood seems to be excessive, the wearer may decrease the flow of air by means of the air-regulating valve with which most air-line respirators are equipped. However, to prevent the contaminant in the surrounding air from reaching the wearer's breathing zone, the flow of air should not be decreased below 4 cubic feet per minute for facepieces, or below 6 cubic feet per minute for helmets or hoods. Hence, the air-regulating valve should be used judiciously on an air-line respirator.

Enter the contaminated area cautiously and leave by the same route.

Each air-line respirator is equipped with a quick-acting detachable coupling by means of which the wearer can quickly disconnect the respirator from the air-

supply line to facilitate escape in an emergency such as fire. The wearer should practice using this coupling before wearing the respirator in a contaminated atmosphere.

(6) *Precautions to be taken in the use of an abrasive-blasting respirator.* The precautions to be taken in the use of an abrasive-blasting respirator are the same as those given for the air-line respirator, with the following additional precautions.

Make certain that the shatterproof eyepiece and the protective coverglass (if furnished) are in place. Under no circumstances should regular window glass be used in place of the shatterproof eyepiece. Clean the inner and outer surfaces of all eyepieces.

Make certain that the protective wire screen or perforated-metal eyepiece is clean and in place.

(7) *Precautions to be taken in the use of a chemical-cartridge respirator.* Make certain that the atmosphere to be entered is not dangerous to life.

Make certain that the respirator is in good operating condition, that the gaskets are in place, and that the proper chemical cartridges are securely mounted in the respirator.

Adjust the respirator to the wearer's face so that it makes a gastight fit with his face. There are two means of testing for a gastight fit: (*a*) Close off the exhalation valve and exhale gently into the facepiece. If a slight positive pressure can be built up in the facepiece without any indication of outward leakage of air between the facepiece and the face, it is adjusted properly. (*b*) Close off the inlets to the facepiece by cardboard discs or stoppers usually furnished by the manufacturer, inhale so that the facepiece starts to collapse, and hold the breath for about 10 seconds. If the facepiece remains in its partially collapsed condition and no inward leakage of air is detected, it is adjusted properly. If the second method is used, the cardboard discs or stoppers must be removed and the cartridges assembled with the facepiece without disturbing the fit of the facepiece on the wearer's face.

Enter the contaminated area cautiously. When leakage of the contaminant is noted by the wearer, he should discard the used cartridges and replace them with fresh ones.

Knitted cotton cloth must never be used to cover the face-contacting edges of chemical-cartridge respirators, since the cloth cover is not gastight.

(8) *Precautions to be taken in the use of a dispersoid (dust, mist, or fume) respirator.* Make certain that the respirator is in good operating condition and that the proper filters are securely fastened in place.

Adjust the respirator to the wearer's face so that it makes a dust-tight fit with his face. There are two means of testing for a satisfactory facepiece fit: (*a*) Close off the exhalation valve and exhale gently into the facepiece. If a slight positive pressure can be built up in the facepiece without any indication of outward leakage of air between the facepiece and the face, it is adjusted properly. (*b*) Close off the inlets to the facepiece by cardboard discs or stoppers usually furnished by the manufacturer, inhale so that the facepiece starts to collapse, and hold the breath for about 10 seconds. If the facepiece remains in its partially collapsed condition, and no inward leakage of air is detected, it is adjusted properly. If the second method is used, the cardboard discs or stoppers must be removed and the filters assembled with the facepiece without disturbing the fit of the facepiece on the wearer's face.

As the total amount of solid particulate matter removed from the inspired air by the filter increases, the resistance to inhalation increases and finally reaches a value such that the wearer is conscious of increased difficulty in breathing. At this time, disposable-type filters should be discarded and replaced by fresh filters, and recleanable-type filters should be cleaned in accordance with the manufacturer's instruction. Under no circumstances should respirator filters be washed or dry cleaned.

In atmospheres containing particulate matter that is irritating to the skin, or where excessive perspiration may occur, a knitted cotton cloth, furnished by the manufacturer, may be used over the edge of the facepiece to prevent contact between the rubber portion of the facepiece and the wearer's face. This must not be used on fume respirators.

When the facepiece is removed, the wearer may obtain visual evidence of the dust-tightness of the facepiece fit by looking at his reflection in a mirror and noting the presence or absence of dust streaks on that portion of his face that was covered by the facepiece.

*c. Instruction in the use of respirators.*

(1) *General considerations.* For the safe use of any device, it is essential that the user be properly instructed in its selection, use, and maintenance. This is particularly important with respect to respirators. Competent persons should give such instruction to the supervisors of all groups who may be required to wear respirators at their work. The supervisors, in turn, should instruct their men. No person should be allowed to wear a respirator of any type until he has received such instruction. Such instruction should cover:

An explanation of the need for using the respirator.

Its operating principle.

Steps to be taken to assure that it is in good operating condition.

Proper adjustment of the respirator to the wearer.

Proper use and maintenance of the respirator.

The very presence of self-contained breathing apparatus, hose masks with blowers, or gas masks on the property of any organization is an indication that they are expected to be used in an emergency situation or in one that is dangerous to life. All persons who may have occasion to use these respirators, or cause them to be used, should be properly trained in their use before circumstances require that they use them to protect their lives and the property of their employer. In addition to this, efforts should be made to foresee possible emergencies and plans of action should be formulated so that when respiratory protection is needed, rescue or repair operations will proceed smoothly and safely.

Merely talking about such respirators as the self-contained breathing apparatus, the hose mask with blower, and the gas mask is not enough. The men should be given an opportunity to handle the respirator, have it fitted to them properly, test the gastightness of the facepiece fit, wear it in normal air for a period long enough for them to become familiar with it, and finally, they should actually wear it in an irrespirable atmosphere. Such an atmosphere may be created by burning a half-ounce formaldehyde candle in a room of about 4,000 cubic foot capacity. Not only would this atmosphere be irrespirable, but it would be irritating to the eyes. This atmosphere is similar to that used by the Bureau of Mines in the training of men in the use of the self-contained breathing apparatus. After a person has worn one of these devices for a prolonged period in this formaldehyde-air mixture without any ill effect, he need only remove the facepiece or nose clip momentarily to be convinced of the efficiency of the respirator. Such training breeds confidence in the trainees that should stand them in good stead in an emergency situation.

A less severe training atmosphere that can be built up in any room without damage to its contents, or to other people in the same building, may be prepared by vaporizing isoamyl acetate to the amount of 173 cubic centimeters per 1,000 cubic foot capacity of the room. The liquid isoamyl acetate is vaporized from a cloth wick placed in front of a fan in the room. This produces a concentration of about 1,000 parts of isoamyl acetate per million parts of air (0.1 percent) by volume. If the odor of isoamyl acetate is detected by a person wearing an emergency-type respirator, he would be able to detect the odor of phosgene or chlorine if he entered a 2-percent concentration of either of these gases while wearing the device. Isoamyl acetate vapor in this concentration is used by the Bureau of Mines as a preliminary means of testing the gastightness of gasmask facepieces before actually wearing them in highly toxic concentrations of gases.

*d. Maintaining, cleaning, disinfecting, and storing respirators.*

(1) *General considerations.* It is especially important that respirators be properly maintained and stored. The life of the wearer may be dependent on their proper functioning and ready availability. Adequate attention to cleaning and disinfecting is also required because the respiratory inlet coverings are worn on the face. Whenever possible, a centralized maintenance, cleaning, and storage station should be established to care for equipment of this type. It should be equipped adequately and manned by trained personnel.

(2) *Procedures applicable to all respirators.*

*Inspection.* All respirators should be inspected at regular intervals to make sure that they are ready for use. For respirators that are used and maintained daily, inspection becomes a rather automatic function; however, is often neglected for respirators that are stored throughout a plant to use in emergency situations. These devices should be checked as regularly as fire extinguishers; as a matter of fact, it is good practice to integrate these inspection and maintenance programs.

All rubber parts such as facepieces, mouthpieces, exhalation valves, breathing tubes, and headbands should be inspected carefully for signs of deterioration such as hardening, checking, or tackiness. During the inspection, time should be given to "working" the rubber between the fingers with a stretching and massaging action. This will reveal defects in rubber parts and prolong the life of non-defective parts.

A check should be made to see that all gaskets are present and that they are held in place tightly.

Metal parts should be checked for signs of corrosion, and plastic and glass parts for breakage.

*Maintenance.* When it is necessary to replace worn or deteriorated parts, only those made specifically for the device should be used and the repair work should be accomplished by experienced personnel. Makeshift repairs for respiratory protective equipment cannot be tolerated. After equipment that is used frequently is cleaned and disinfected, it should be repaired routinely; emergency equipment should be repaired immediately after inspection reveals the need for repairs.

Repairs to intricate parts should not be attempted unless adequate facilities and trained personnel are available. For most users, it is preferable that parts of this type be replaced as a unit or returned to the manufacturer for repair.

*Cleaning and disinfecting.* Respiratory protective equipment should be cleaned and disinfected after each use. However, because of the wide variety of materials used in these devices, the manufacturer should be consulted for the cleaning and disinfecting method best suited to his products.

In general, facepieces and mouthpieces for respiratory protective devices are made from rubber or rubber-like compounds. Usually, these can be cleaned with detergent and lukewarm water by handbrushing or agitation in a washing machine. Formaldehyde, modified phenolics, hypochlorite, or quaternary ammonium compounds in the proper strength can be used to disinfect the parts. Normally all detergent is rinsed from the protective device before disinfecting; however, there are several combination cleaning and disinfecting materials available in both liquid and powder form which contain a detergent and quaternary ammonium salts and this permits combining the washing and disinfecting operations. After cleaning and disinfecting, the parts should be rinsed in clean water and dried quickly for most disinfectants. It may be desirable to rinse parts treated with quaternary ammonium compounds since their disinfectant properties will continue indefinitely and may not produce a skin irritation. After reassembly, the device should be placed in a clean and dust-tight container.

Hot water, steam, solvents, and ultraviolet light should be avoided in the cleaning and disinfecting of rubber parts because all have deterioratng effects. If paint or other difficult-to-remove substances are encountered, it is preferable that they be removed by mild caustic cleaners rather than by solvents.

*Storage.* All types of respirators should be stored in clean and dry compartments under conditions of moderate temperature. Most devices of this type are received in re-usable cartons or cases and should be kept in these containers during the period of storage. Exposure to heat, sunlight, extreme cold, and excessive moisture is harmful to respiratory protective devices if the exposure continues over extended periods.

In some cases, it is necessary to locate respiratory protective devices at convenient stations throughout the work area for ready availability in the event of an emergency. Special care must be taken to insure adequate storage under these conditions. In some instances, it is necessary to construct special compartments to protect the equipment from the process materials as well as from the elements.

Additional emergency-type respiratory protective devices should be stored just outside the immediate danger area so

that men can retreat to them and don them for judicious re-entry into the contaminated area to carry out rescue or repair operations.

No respirator can be adequately stored outside its carrying case or carton in a tool box or clothing locker.

(3) *Special procedures for maintaining, cleaning, disinfecting, and storing respirators.*

*Self-contained breathing apparatus.* In compressed-oxygen recirculating apparatus make sure the carbon dioxide removing chemical is replaced after use and that the oxygen cylinder is refilled to rated capacity in order to insure full service life. The cylinder pressure should be checked periodically and brought to rated pressure if necessary. The tightness of the high pressure and low pressure sides of the apparatus should be checked periodically following the manufacturer's instructions. In self-generating apparatus, periodic tightness tests as outlined by the manufacturer should be followed.

*Hose masks.* Check the blower periodically for proper operation. Check hose for wear and tear after each use and steam clean when necessary. Keeping hose capped when not in use will prevent entrance of dust or other contaminants.

*Air-line respirators.* The facepiece should be serviced after each use just as for all other respiratory protective equipment. The flow-control valves should be inspected after each use and cleaned and repaired if necessary. Chemical cartridges in the continuous-flow control-valve assemblies should be changed when necessary. Air-line hose should be checked for wear and tear after each use and be steam cleaned when necessary.

The air-supply system should be inspected routinely to insure continued proper functioning. Air compressors, air-cylinder manifold systems, pressure reducers, pressure-release valves, air-line filters, air-line instrumentation, and permanent piping and outlet fittings must be kept in good repair to assure satisfactory condition of the air reaching the breathing zone of the wearer.

*Gas masks.* Check the facepiece to be sure that (1) the eyepieces are not broken and that they are held firmly in place; (2) the rubber portion of the facepiece is flexible and free from cracks; (3) the head harness is flexible and that the straps and buckles are in good condition; (4) the exhalation valve is in place, works freely, and has no dirt on its contact surfaces; (5) the breathing tube is flexible and free from cuts and that it is securely fastened to the canister neck or to the outlet of the timer; (6) the canister is of the proper type, is free from dents and rust spots, and is securely attached to the canister harness. If a timer is used, check to be sure that the gaskets are in place and are making proper contact, and that the timer is reset when a new canister is attached. Universal gas-mask canisters should be replaced after one year from date of breaking seal if not exhausted before this time. Canisters should be stored in a cool, clean, dry location and the stock rotated so that no canister remains in storage for more than four years before it is used.

*Self-rescuers.* Frequent inspections is the most important phase of the maintenance program with this type of equipment because the equipment is seldom used but must always be ready. The type which offers protection against carbon monoxide utilizes hopcalite in the chemical fill and must be protected from moisture to remain effective. Follow the manufacturer's recommendations for checking the moisture seal at regular and frequent intervals.

*Dispersoid and chemical-cartridge respirators.* Mechanical filters of the "throwaway" type should be discarded when the breathing resistance becomes bothersome to the wearer. In most plants with centralized maintenance stations, the filters are destroyed and discarded at the time the respirator is serviced.

Some respirators employ re-cleanable filters, in which case the filters are cleaned when the respirator is being serviced.

Chemical cartridges should be changed when the wearer detects the odor or irritating effect of the contaminant. In plants with centralized maintenance stations, cartridges are sometimes discarded after a given period of use (based on group experience), but in most cases the wearer is responsible for discarding and replacing cartridges in his respirator.

Particular care should be exercised in the storage of chemical cartridges because they usually deteriorate if exposed to excess moisture and to gaseous air contaminants. Cartridges should not be stored in the area where it is necessary for the workmen to use chemical-cartridge respirators.

## CHART I

## GUIDE FOR SELECTION OF RESPIRATORS

| Hazard | Respirator |
|---|---|
| Oxygen deficiency | Self-contained breathing apparatus.<br>Hose mask with blower.<br>Combination air-line respirator with auxiliary self-contained air supply or an air-storage receiver with alarm. |
| Gas and vapor contaminants<br>Immediately dangerous to life or health | Self-contained breathing apparatus.<br>Hose mask with blower.<br>Air-purifying, full facepiece respirator with chemical canister (gas mask).<br>Self-rescue mouthpiece respirator (for escape only).<br>Combination air-line respirator with auxiliary self-contained air supply or an air-storage receiver with alarm. |
| Not immediately dangerous to life or health | Air-line respirator.<br>Hose mask without blower.<br>Air-purifying, half-mask or mouthpiece respirator with chemical cartridge. |
| Particulate contaminants<br>Immediately dangerous to life or health | Self-contained breathing apparatus.<br>Hose mask with blower.<br>Air-purifying, full facepiece respirator with appropriate filter.<br>Self-rescue mouthpiece respirator (for escape only).<br>Combination air-line respirator with auxiliary self-contained air supply or an air-storage receiver with alarm. |
| Not immediately dangerous to life or health | Air-purifying, half-mask or mouthpiece respirator with filter pad or cartridge.<br>Air-line respirator.<br>Air-line abrasive-blasting respirator.<br>Hose mask without blower. |
| Combination gas, vapor, and particulate contaminants<br>Immediately dangerous to life or health | Self-contained breathing apparatus.<br>Hose mask with blower.<br>Air-purifying, full facepiece respirator with chemical canister and appropriate filter (gas mask with filter).<br>Self-rescue mouthpiece respirator (for escape only).<br>Combination air-line respirator with auxiliary self-contained air supply or an air-storage receiver with alarm. |
| Not immediately dangerous to life or health | Air-line respirator.<br>Hose mask without blower.<br>Air-purifying, half-mask or mouthpiece respirator with chemical cartridge and appropriate filter. |

## CHART II

## COLOR CODE FOR GAS-MASK CANISTERS

| Atmospheric Contaminants to be Protected Against | Colors Assigned* |
|---|---|
| Acid gases | White |
| Hydrocyanic acid gas | White with ½-inch green stripe completely around the canister near the bottom |
| Chlorine gas | White with ½-inch yellow stripe completely around the canister near the bottom |
| Organic vapors | Black |
| Ammonia gas | Green |
| Acid gases and ammonia gas | Green with ½-inch white stripe completely around the canister near the bottom |
| Carbon monoxide | Blue |
| Acid gases and organic vapors | Yellow |
| Hydrocyanic acid gas and chloropicrin vapor | Yellow with ½-inch blue stripe completely around the canister near the bottom |
| Acid gases, organic vapors, and ammonia gases | Brown |
| Radioactive materials, excepting tritium and noble gases | Purple (Magenta) |
| Particulates (dusts, fumes, mists, fogs, or smokes) in combination with any of the above gases or vapors | Canister color for contaminant, as designated above, with ½-inch gray stripe completely around the canister near the top |
| All of the above atmospheric contaminants | Red with ½-inch gray stripe completely around the canister near the top |

*Gray shall not be assigned as the main color for a canister designed to remove acids or vapors.

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NOTE: Orange shall be used as a complete body, or stripe color to represent gases not included in this table. The user will need to refer to the canister label to determine the degree of protection the canister will afford.

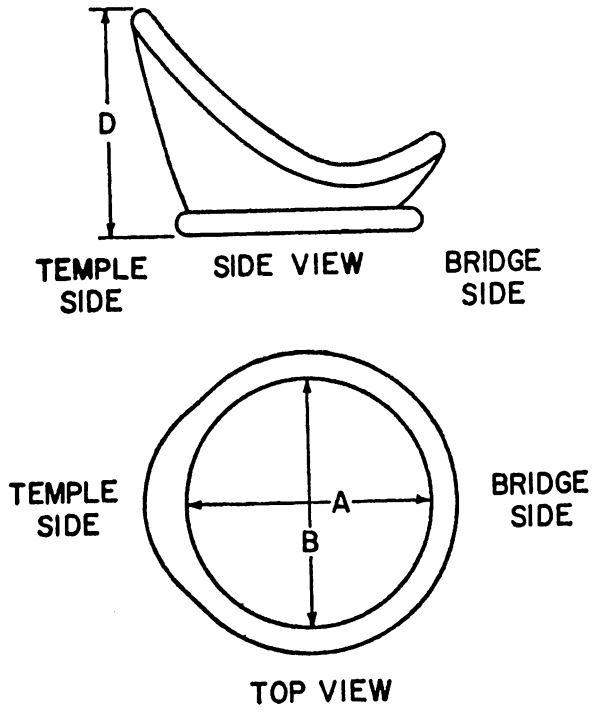



**Fig. 1**
**Dimensions To Be Measured in Heat Deformation Test**

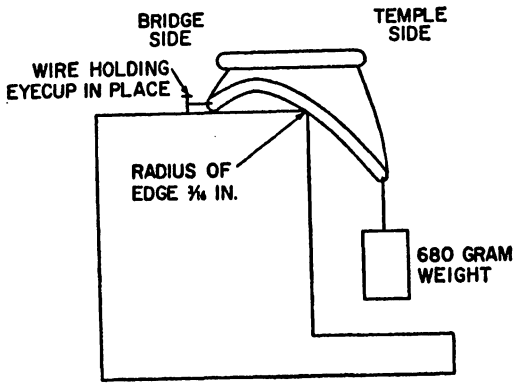
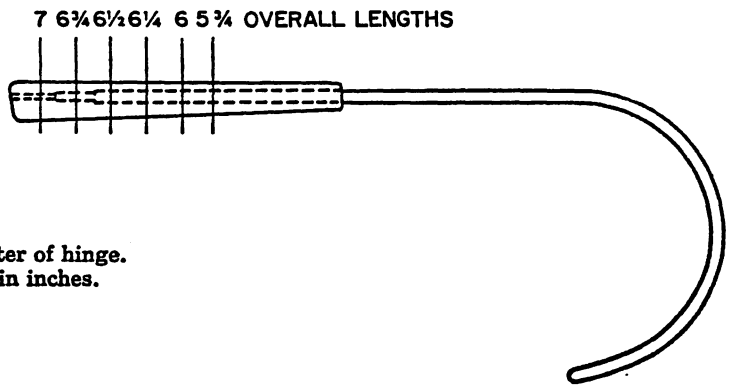
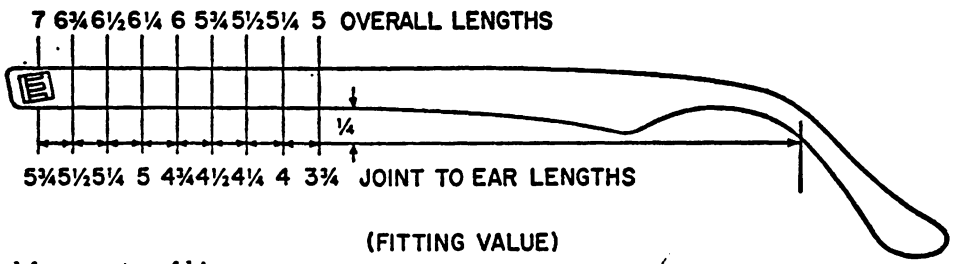



**Fig. 2**
**Apparatus for Heat Deformation Test**




NOTE: Measured from center of hinge.
All dimensions are in inches.

**Fig. 3**
**Cable Temples**




NOTE: Measured from center of hinge.
All dimensions are in inches.

**Fig. 4**
**Spatula Temples**

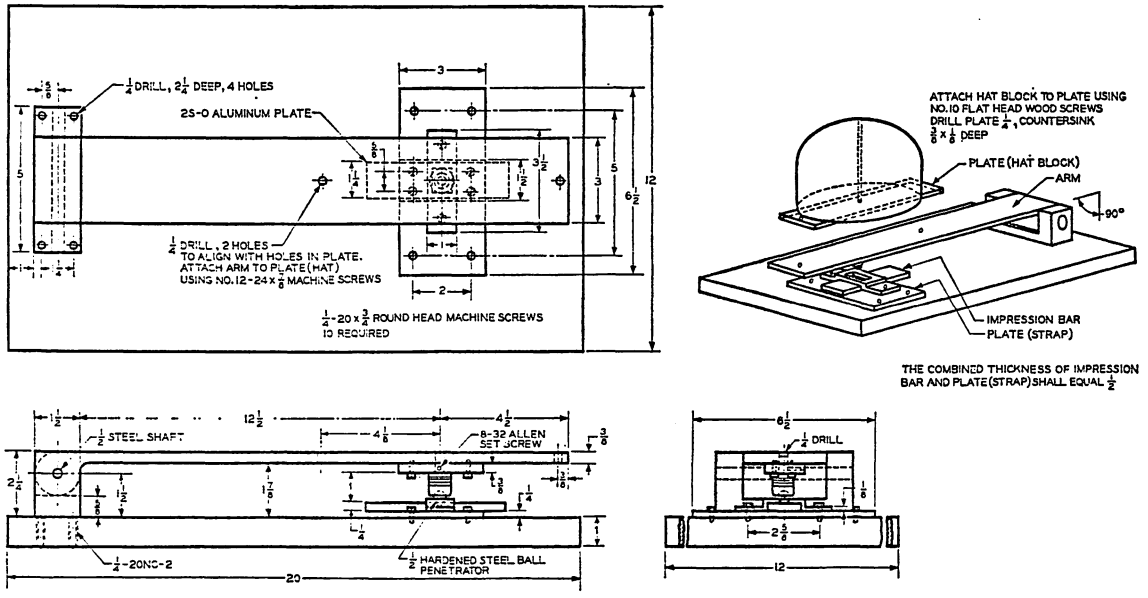
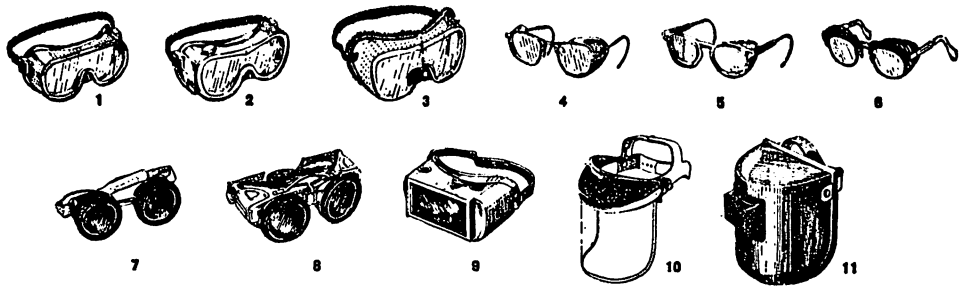



**Fig. 5**
**Brinnell Hardness Penetrator Assembly**

# Fig. 6
## Selection Chart

**Recommended Eye and Face Protectors for Use in Industry, Schools, and Colleges**




1. **GOGGLES,** Flexible Fitting, Regular Ventilation
2. **GOGGLES,** Flexible Fitting, Hooded Ventilation
3. **GOGGLES,** Cushioned Fitting, Rigid Body
*4. **SPECTACLES,** Metal Frame, with Sideshields
*5. **SPECTACLES,** Plastic Frame, with Sideshields
*6. **SPECTACLES,** Metal-Plastic Frame, with Sideshields
** 7. **WELDING GOGGLES,** Eyecup Type, Tinted Lenses (Illustrated)
7A. **CHIPPING GOGGLES,** Eyecup Type, Clear Safety Lenses (Not Illustrated)
** 8. **WELDING GOGGLES,** Coverspec Type Tinted Lenses (Illustrated)
8A. **CHIPPING GOGGLES,** Coverspec Type, Clear Safety Lenses (Not Illustrated)
** 9. **WELDING GOGGLES,** Coverspec Type, Tinted Plate Lens
10. **FACE SHIELD** (Available with Plastic or Mesh Window)
**11. **WELDING HELMETS**

*Non-sideshield spectacles are available for limited hazard use requiring only frontal protection.
**See appendix chart "Selection of Shade Numbers for Welding Filters."

| APPLICATIONS | | |
|---|---|---|
| **OPERATION** | **HAZARDS** | **RECOMMENDED PROTECTORS:** Bold Type Numbers Signify Preferred Protection |
| ACETYLENE–BURNING<br>ACETYLENE–CUTTING<br>ACETYLENE–WELDING | SPARKS, HARMFUL RAYS, MOLTEN METAL, FLYING PARTICLES | **7, 8, 9** |
| CHEMICAL HANDLING | SPLASH, ACID BURNS, FUMES | **2**, 10 (For severe exposure add 10 over 2) |
| CHIPPING | FLYING PARTICLES | **1, 3, 4, 5, 6, 7A, 8A** |
| ELECTRIC (ARC) WELDING | SPARKS, INTENSE RAYS, MOLTEN METAL | **9, 11** (11 in combination with 4, 5, 6, in tinted lenses, advisable) |
| FURNACE OPERATIONS | GLARE, HEAT, MOLTEN METAL | **7, 8, 9** (For severe exposure add 10) |
| GRINDING–LIGHT | FLYING PARTICLES | **1, 3, 4, 5, 6, 10** |
| GRINDING–HEAVY | FLYING PARTICLES | **1, 3, 7A, 8A** (For severe exposure add 10) |
| LABORATORY | CHEMICAL SPLASH, GLASS BREAKAGE | **2** (10 when in combination with 4, 5, 6) |
| MACHINING | FLYING PARTICLES | **1, 3, 4, 5, 6, 10** |
| MOLTEN METALS | HEAT, GLARE, SPARKS, SPLASH | **7, 8** (10 in combination with 4, 5, 6, in tinted lenses) |
| SPOT WELDING | FLYING PARTICLES, SPARKS | **1, 3, 4, 5, 6, 10** |

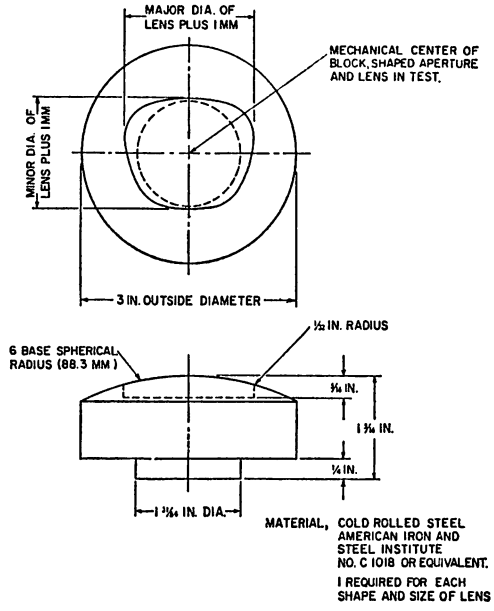



Fig. 7
"Lens in Frame" Test Block

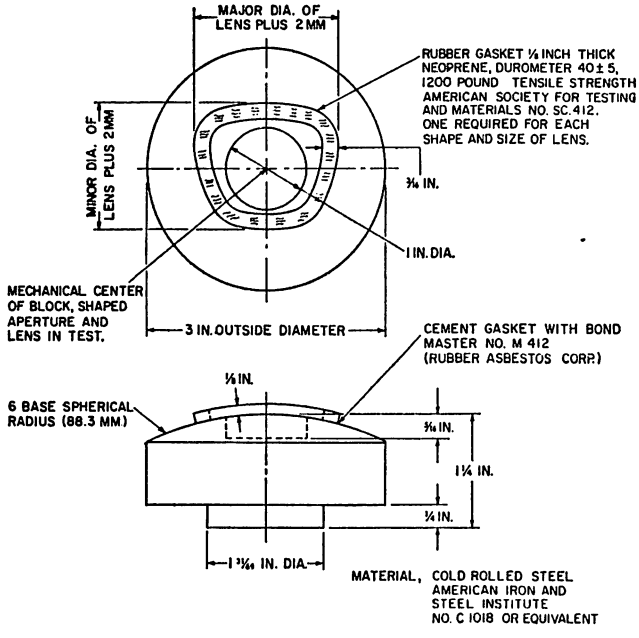
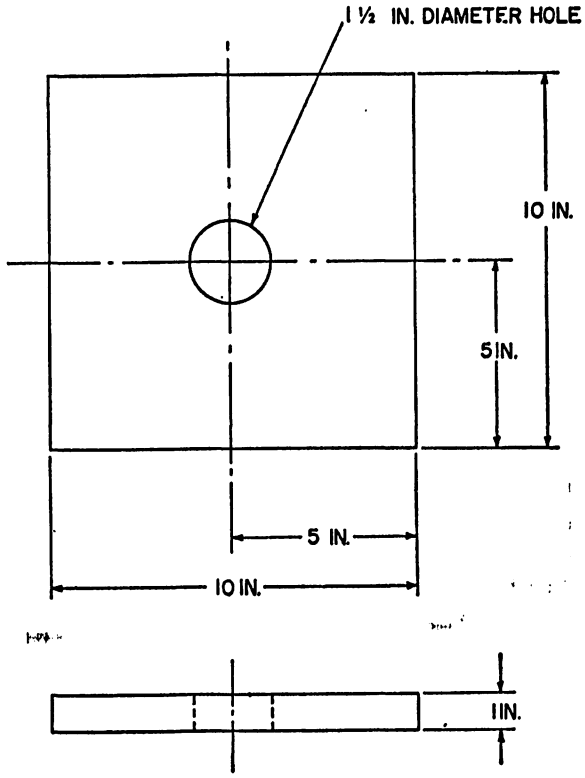



Fig. 8
"Lens Only" Test Block

Fig. 9
Base Plate—One Required




MATERIAL, COLD ROLLED STEEL (GROUND STOCK)
AMERICAN IRON AND STEEL INSTITUTE
NO. C1018 OR EQUIVALENT.

Table 1

Transmittances and Tolerances in Transmittance of Various Shades of Absorptive Lenses, Filter Lenses, and Plates

| Shade Number | Optical Density | | | Luminous Transmittance | | | Maximum Infrared Transmittance | Maximum Spectral Transmittance in the Ultraviolet and Violet | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Maximum | Standard | Minimum | Maximum | Standard | Minimum | | 313 mu | 334 mu | 365 mu | 405 mu |
| | | | | Percent | Percent | Percent | Percent | Percent | Percent | Percent | Percent |
| 1.5 | 0.26 | 0.214 | 0.17 | 67 | 61.5 | 55 | 25 | 0.2 | 0.8 | 25 | 65 |
| 1.7 | 0.36 | 0.300 | 0.26 | 55 | 50.1 | 43 | 20 | 0.2 | 0.7 | 20 | 50 |
| 2.0 | 0.54 | 0.429 | 0.36 | 43 | 37.3 | 29 | 15 | 0.2 | 0.5 | 14 | 35 |
| 2.5 | 0.75 | 0.643 | 0.54 | 29 | 22.8 | 18.0 | 12 | 0.2 | 0.3 | 5 | 15 |
| 3.0 | 1.07 | 0.857 | 0.75 | 18.0 | 13.9 | 8.50 | 9.0 | 0.2 | 0.2 | 0.5 | 6 |
| 4.0 | 1.50 | 1.286 | 1.07 | 8.50 | 5.18 | 3.16 | 5.0 | 0.2 | 0.2 | 0.5 | 1.0 |
| 5.0 | 1.93 | 1.714 | 1.50 | 3.16 | 1.93 | 1.18 | 2.5 | 0.2 | 0.2 | 0.2 | 0.5 |
| 6.0 | 2.36 | 2.143 | 1.93 | 1.18 | 0.72 | 0.44 | 1.5 | 0.1 | 0.1 | 0.1 | 0.5 |
| 7.0 | 2.79 | 2.571 | 2.36 | 0.44 | 0.27 | 0.164 | 1.3 | 0.1 | 0.1 | 0.1 | 0.5 |
| 8.0 | 3.21 | 3.000 | 2.79 | 0.164 | 0.100 | 0.061 | 1.0 | 0.1 | 0.1 | 0.1 | 0.5 |
| 9.0 | 3.64 | 3.429 | 3.21 | 0.061 | 0.037 | 0.023 | 0.8 | 0.1 | 0.1 | 0.1 | 0.5 |
| 10.0 | 4.07 | 3.857 | 3.64 | 0.023 | 0.0139 | 0.0085 | 0.6 | 0.1 | 0.1 | 0.1 | 0.5 |
| 11.0 | 4.50 | 4.286 | 4.07 | 0.0085 | 0.0052 | 0.0032 | 0.5 | 0.05 | 0.05 | 0.05 | 0.1 |
| 12.0 | 4.93 | 4.714 | 4.50 | 0.0032 | 0.0019 | 0.0012 | 0.5 | 0.05 | 0.05 | 0.05 | 0.1 |
| 13.0 | 5.36 | 5.143 | 4.93 | 0.0012 | 0.00072 | 0.00044 | 0.4 | 0.05 | 0.05 | 0.05 | 0.1 |
| 14.0 | 5.79 | 5.571 | 5.36 | 0.00044 | 0.00027 | 0.00016 | 0.3 | 0.05 | 0.05 | 0.05 | 0.1 |

This rule is intended to implement Chapter 88A of the Code of Iowa.

[Effective April 10, 1970]

[Note attached by department]

These rules were filed pursuant to section 17A.8 of the Code, without the approval of the attorney general or the departmental rules review committee.

# HEALTH DEPARTMENT

Pursuant to the authority of section 156.10 of the Code as amended by chapter 1086, Acts 63 GA, Second Session, the following rules relating to places where dead human bodies are prepared for burial or entombment are adopted.

[Filed June 9, 1970]

TITLE XVI

## DEAD HUMAN BODIES

## CHAPTER 1

## PLACES WHERE DEAD HUMAN BODIES ARE PREPARED FOR BURIAL OR ENTOMBMENT

**1.1(156)T.XVI Certificate of inspection.** A certificate of inspection valid for a period of two years of places where dead human bodies are prepared for burial or entombment will be issued in the name of the funeral establishment and the current certificate shall be posted in a conspicuous place therein.

**1.2(156)T.XVI Preparation room.** Any premises operated as a funeral establishment in which any licensed funeral director or embalmer prepares dead human bodies for burial or entombment shall contain a preparation room for that purpose.

**1.3(156)T.XVI Preparation room standards.** The preparation room shall meet the following standards:

**1.3(1)** It shall be of such size and dimensions to accommodate and shall contain an embalming table, an appropriate sink or other liquid waste receptacle with sewer and water connections, instrument table, suitable cabinet or shelves, and handwashing facilities to include hot water, soap and towels.

**1.3(2)** Walls shall run from floor to ceiling and be covered with tile, plaster or sheet rock and finished so that the surface is washable and can be kept in a clean and sanitary condition at all times.

**1.3(3)** The floor of said room shall be of concrete with a glazed surface, or tile, or, if wooden, the floor shall be covered with intact linoleum that will prevent any fluid seepage into the floor. The seam between the wall and floor shall be impermeable.

**1.3(4)** The preparation room shall be private. It shall not be used as a passageway from room to room. No toilet or commode shall be located within the preparation room. Only equipment necessary for use in preparation of bodies for burial or shipment shall be permitted in the preparation room. A supply of a suitable odorless disinfectant shall be kept on hand at all times.

**1.3(5)** There shall be a toilet and handwashing facility accessible elsewhere in the building.

**1.3(6)** Ventilation shall be provided by an exhaust fan vented to the outside of the building.

**1.3(7)** Doors and windows of the preparation room shall be so installed and constructed as to obstruct view from outside and to prevent fumes and odors from entering any other part of the building. All exterior doors and windows shall be screened.

**1.3(8)** There shall be adequate lighting. Light fixtures shall be easily cleanable and be kept clean.

**1.3(9)** The preparation room shall be provided with an adequate water supply. The building drainage system must be discharged into the municipal sewerage system where such a system is available. Where a municipal sewerage system is not available, the building drainage system must be discharged into a private system of waste disposable acceptable to the state department of health. Every plumbing fixture shall be provided with a proper air gap or other acceptable device to prevent flowback into the water supply.

**1.3(10)** The embalming table shall have a top composed of stainless steel, porcelain or other rustproof material and the edges shall be raised at least three-fourths inch around the entire table. There shall be a drain opening in the table. The drain opening shall be properly vented and connected to the building drainage system.

**1.3(11)** Each preparation room shall have a covered, water tight receptacle for solid refuse. All such waste materials shall be disposed of by incineration immediately at the conclusion of each embalming case so that all disease producing organisms will be destroyed and the public health thereby protected.

**1.3(12)** All preparation rooms shall be maintained in a clean and sanitary condition. All embalming tables, sinks, receptacles, instruments and other appliances used in embalming dead human bodies shall be at least thoroughly cleaned with hot water and detergent or soap immediately after use. There shall be available a suitable means to sterilize instruments.

**1.4(156)T.XVI Correction of deficiencies.** Any preparation room found to be deficient in meeting these standards shall not be used for the preparation of dead human bodies for burial or entombment until such deficiencies are corrected.

[Effective July 9, 1970]

# HIGHWAY COMMISSION

Pursuant to Authority of Chapter 285 of the Acts of the 62nd General Assembly of the State of Iowa, the followed numbered rule is adopted.

[Filed April 30, 1970]

## CHAPTER 2

## SPECIAL PERMITS OPERATION AND MOVEMENT OF VEHICLES AND LOADS OF EXCESS SIZE AND WEIGHT

[Amendment to rule 2.1(62GA, Ch.285) appearing in July 1969 Supplement]

**2.1(15)** *Movements on the Interstate system (as defined in section* 306.2(7) *of the Code of Iowa.)*

*a.* Subject to the provisions of "*b*", "*c*" and "*d*" below, annual or single trip permits will be issued for movements on the Interstate system provided the Interstate system is free from maintenance and construction work or other hazardous conditions on the specific permit route and abnormally high traffic volumes due to special events are not present on the specific permit route and where:

(1) An alternate primary route with a roadway width of 24 feet is not available, or

(2) The average daily traffic exceeds 3000 vehicles on the alternate primary route, or

(3) The travel distance is equal for both systems or is greater for the alternate primary route.

*b.* Annual permits may be issued for movements on the Interstate system not to exceed 25 miles except that the movement of road construction machinery, equipment or material and agricultural machinery, equipment and materials may be for a distance exceeding 25 miles if such machinery, equipment and materials are to be used within the state of Iowa or are manufactured or assembled in the state of Iowa provided:

(1) A minimum speed of 40 miles per hour can be maintained.

(2) The vehicle with load does not exceed 11 feet 9 inches in width, 13 feet 6 inches in height, 70 feet 0 inches in overall length and total gross weight of 73,280 pounds (18,000 pounds per axle according to the schedule in 2.1(16)).

*c.* Single trip permits may be issued for movement, or a portion of a move, on the Interstate system where in the opinion of the director of traffic weight operations the move proposed on the Interstate system will be to the best interests of the safety of the traveling public provided:

(1) A minimum speed of 40 miles per hour can be maintained.

(2) The vehicle with load does not exceed 11 feet 9 inches in width, height limited to underpasses, power lines and other established height restrictions, 70 feet 0 inches in overall length and total gross weight of 73,280 pounds (18,000 pounds per axle according to the schedule in 2.1(16)).

(3) The vehicle with load does not exceed 80 feet 0 inches in overall length and the width does not exceed 8 feet 0 inches, the height does not exceed 13 feet 6 inches and the total gross weight does not exceed 73,280 pounds (18,000 pounds per axle according to the schedule in 2.1(16)) in special or emergency situations and only at the discretion of the permit issuing authority. In such cases the provisions of 2.1(15)*a*(1), (2) and (3) may be waived.

*d.* Single trip or annual permits may be issued for mobile homes to make a portion of a move on the Interstate system: (1) at either the point of entry

or exit from this state and then only for such distance necessary to make connection with the nearest primary highway route, or (2) to bypass urban areas over specified routes provided:

(1) The vehicle with load does not exceed 11 feet 9 inches in width, 13 feet 6 inches in height, 70 feet 0 inches in overall length, and total gross weight of 73,280 pounds (18,000 pounds per axle according to the schedule in 2.1(16)).

*e.* Permits for movement on the Interstate system shall be issued by the Traffic Weight Operations Office, Ames, Iowa or by the Resident Maintenance Engineer's Office provided the proposed Interstate system movement is approved by a telephone call to the Traffic Weight Operations Office, Ames, Iowa.

[Effective April 30, 1970]

# HIGHWAY COMMISSION

**(continued)**

Pursuant to House File 394, Second Session, 63rd General Assembly, as amended by House File 1103, Second Session, 63rd General Assembly, the following rules are adopted.

[Filed July 14, 1970]

## CHAPTER 3

## FUNCTIONAL CLASSIFICATION OF HIGHWAYS

**3.1(63G.A.,Ch1126) Roads and streets to be classified.** All roads and streets in legal existence as of January 1, 1970, shall be classified. All roads and streets in the category of "proposed" will be excluded from this classification study.

**3.2(63G.A., Ch1126) Meeting dates for county classification boards.** Following the selection of the classification board members for each county, the three-member board shall meet as soon as practical for the purpose of organization and establishment of schedules. Subsequent meeting dates will be set at the discretion of the board but shall include one meeting annually in all subsequent years following the initial classification process.

**3.3(63G.A., Ch1126) Recording Secretary.** The designation of a recording secretary, who shall provide the minutes for each Board meeting, will be the responsibility of each individual Classification Board.

**3.4(63G.A., Ch1126) Public hearing.** Each respective county shall be responsible for the publishing of hearing information, for providing the place of the hearing and for recording the proceedings of the hearing.

**3.5(63G.A., Ch1126) Transcripts of hearings.** Transcripts of hearings, tape recorded or typed, shall be the responsibility of the Classification Boards and will be retained in their files.

**3.6(63G.A., Ch1126) Order of classification.** To achieve proper and logical functional classification it is necessary to select the highest order systems first and proceed from that point down through the hierarchy to the lowest order systems. System selection shall be carried out in the following order.

**3.6(1)** *Rural systems.*

(*a*) Freeway-Expressway
(*b*) Arterial
(*c*) Arterial Connector
(*d*) Trunk
(*e*) Trunk Collector
(*f*) Area Service

**3.6(2)** *Municipal systems.*

(*a*) Freeway-Expressway Extensions
(*b*) Arterial Extensions
(*c*) Arterial Connector Extensions
(*d*) Trunk Extensions
(*e*) Trunk Collector Extensions
(*f*) Municipal Arterial
(*g*) Municipal Collector
(*h*) Municipal Service

**3.7(63G.A., Ch1126) Classifications of county line roads.** When classifying county line roads, each county shall classify only the roads that border the county on the north and west. This procedure is for the purpose of eliminating confusion in record-keeping and for providing uniform classification plans.

**3.8(63G.A., Ch1126) Classification of roads on corporation lines.** To eliminate double reporting of mileage, and provide uniform classification plans, all roads on corporation lines shall be classified as

municipal streets and considered to be within the corresponding municipality. Where streets occur on corporation lines common to two municipalities the street classification shall be reported by the municipality on the south or east.

**3.9(63G.A., Ch1126) State park and institutional road system classification.** This classification involves only identifying and tabulating the miles of road within each park or institution. The Highway Commission presently possesses all information necessary for this determination and will, therefore, complete this classification. To provide continuity of other systems the County Classification Boards shall, however, determine the location of Extensions of Freeway-Expressways, Arterials, Arterial Connectors, Trunks, Trunk Collectors, Municipal Arterials, and Municipal Collectors within these areas.

**3.10(63G.A., Ch1126) Data submittal.** Each County Classification Board shall submit the following data to the Highway Commission at the time they complete their initial classification and at any future time when adjustments in the classification are necessary.

**3.10(1)** *Letter of transmittal.*

**3.10(2)** *Network maps.* Each Board shall submit a map of their county and one map of each municipality in the county showing the selected classifications by the following color codes. When future adjustments are required only maps of the effected area are required.

(*a*) *County map showing rural systems.*

| | |
|---|---|
| Freeway-Expressway | Red |
| Arterial | Orange |
| Arterial Connector | Green |
| Trunk | Blue |
| Trunk Collector | Brown |
| Area Service | Black |

(*b*) *Municipal maps.*

| | |
|---|---|
| Freeway-Expressway Extensions | Red |
| Arterial Extensions | Orange |
| Arterial Connector Extensions | Green |
| Trunk Extensions | Blue |
| Trunk Collector Extensions | Brown |
| Municipal Arterial | Purple |
| Municipal Collector | Yellow |
| Municipal Service | Black |

**3.10(3)** *Mileage summary forms.* These forms will be furnished to the County Classification Boards by the Highway Commission with the requirement that each Board fill in the following data.

(*a*) Summary of mileage making up each functional class within the appropriate county and the cities and towns therein.

(*b*) Listing of each segment of road contained in the individual classes except for the Area Service System and the Municipal Service System.

[Effective August 14, 1970]

# MERIT EMPLOYMENT DEPARTMENT

The rules appearing in the July, 1969 IDR Supplement [pages 32 to 72, inclusive] are amended by adding the following chapters 1, 13, and 17.

[Filed June 9, 1970]

## CHAPTER 1

## DEFINITIONS

1. "*Absence without leave*" means any absence of a classified employee from duty without specific authorization, either before or after such absence.

2. "*Act or merit employment Act*" means the law creating the merit system of personnel administration (chapter 95, Laws of the Sixty-second General Assembly) and any amendments thereto.

3. "*Agency*" means any legally constituted board, commission, office, authority, agency, department or other branch of state government in which all positions are under the same appointing authority.

4. "*Agency promotional list*" means an eligible list of permanent employees of the agency, or duly established organizational unit thereof, established by examination from which promotions are made.

5. "*Allocation*" means the original assignment of a position to an appropriate class on the basis of duties and responsibilities assigned and performed.

6. "*Appointing authority*" means the officer, board, commission, person or group of persons having the power by

virtue of a statute, or lawfully delegated authority, to make appointments to, or remove from employment in the state classified service.

7. *"Certification"* means the act of submitting the required number of available names on an appropriate eligible list to an appointing authority for the purpose of his making a selection in accordance with these rules.

8. *"Class"* or *"class of position"* means one or more positions, which are sufficiently similar in duties and responsibilities, that each position in the group can be given the same job title, require the same minimum qualifications as to education and experience, can be filled by substantially the same test of ability or fitness, and that the same schedule of pay can be applied with equity to all positions in the class under the same or substantially the same employment conditions.

9. *"Class specification"* means a descriptive and explanatory guide reflecting distinct characteristics of duties and responsibilities normally assigned to positions allocated to the class and the minimum qualifications requisite thereto.

10. *"Classification plan"* means the orderly arrangement of positions within the classified service into separate and distinct classes, so that each will contain those positions which involve substantially similar or comparable skills, duties and responsibilities.

11. *"Classified employee"* means an employee occupying a position in the classified service, or an employee currently on leave in accordance with established leave regulations.

12. *"Commission"* means the Iowa merit employment commission (ref.95.2.3, 62nd G.A.).

13. *"Demotion"* means a change of a classified employee from a position in a given classification to a position in a lower classification. Normally, the lower classification will have a lower entrance salary. Demotion may be voluntary or involuntary.

14. *"Department"* means the Iowa merit employment department (ref. 95.2.1., 62nd G.A.).

15. *"Detail to special duty"* means the temporary assignment of a classified employee to perform the duties and responsibilities of a position other than the ones to which he is regularly assigned without prejudice to his rights in and to his regularly allocated position.

16. *"Director"* means the director of the Iowa merit employment department (ref. 95.2.2, 62nd G.A.).

17. *"Eligible list"* means an officially promulgated list of eligibles for a class of position in the order of their final rating in an examination as provided herein.

18. *"Established position"* means a position duly approved by statute or the Executive Council which is funded and allocated to an appropriate class.

19. *"Examination"* means all the tests of fitness that are applied to determine eligibility of applicants for positions in any class in the classified service.

20. *"Geographic list"* means an officially established list of eligibles residing in a county, or other designated administrative area, in the order of their final rating in an examination.

21. *"Grievance"* means any expressed difference, dispute or controversy between an employee and the appointing authority or his representative with respect to circumstances and conditions which concern their working relationship in the agency.

22. *"Minimum qualifications"* means the requirements of training and experience and other qualifications, including those to be measured by an appropriate examination, as prescribed in the job specification for the class of position.

23. *"New position"* means a position not previously existing.

24. *"Open-competitive examination"* means an examination which permits the competition of persons who meet the minimum requirements of the official announcement for the class of position, and is not restricted to persons currently employed in the classified service.

25. *"Part-time position"* means a position requiring the services of an employee for less than a standard or nonstandard work week on a continuing basis.

26. *"Pay plan"* means a schedule of salaries or hourly wages established for the several classes recognized in the State classification plan.

**27.** *"Permanent employee"* means an employee who has completed the required probationary period or who has acquired permanent status in conformity with the Merit Employment Act.

**28.** *"Position"* means a group of specific duties, tasks and responsibilities assigned by the appointing authority to be performed by one employee; a position may be part-time or full-time, temporary or permanent, occupied or vacant.

**29.** *"Probationary employee"* means a person certified from a list of eligibles or employed through a work test appointment and serving a probationary period.

**30.** *"Probationary period"* means a working test period and is a part of the examination process following an original appointment, during which the employee is required to demonstrate his fitness for the position to which he is appointed by the satisfactory performance of the duties and responsibilities of the position to which appointed.

**31.** *"Promotion"* means a change in status of a permanent employee from a position in a lower classification to a position in a higher classification. Normally the higher classification will have a higher entrance salary.

**32.** *"Reallocation"* means the reassignment or change in the allocation of a position by raising it to a higher, reducing it to a lower, or moving it to another class of the same level on the basis of significant changes in the kind or difficulty of the tasks, duties and responsibilities in such position, or because of an amendment to the classification plan, and officially assigning to that position the class title for such appropriate class of position.

**33.** *"Reinstatement"* means the re-employment of a permanent employee as provided in these rules, or the placing of a probationary or permanent employee's name back on a list of eligibles as provided herein.

**34.** *"Statewide list"* means a list of eligibles for a class position, who have indicated their willingness to accept employment wherever a particular vacancy exists, ranked in the order of their examination scores.

**35.** *"Transfer"* means a change of a classified employee from one classified position to the same or a comparable classified position of equal rank, from one geographical location to another geographical location; from one agency to another agency.

## CHAPTER 13

## SERVICE RECORDS (PERFORMANCE EVALUATION)

[Filed June 9, 1970]

**13.1** The commission shall establish and make effective a system of service records designed to give a fair and impartial evaluation of the quality and quantity of the work performed by classified employees. Insofar as practicable, the system of service records in the agencies shall be uniform, but the commission may approve an agency service record form which is in accordance with the service records established by the commission.

**13.2** Such service records shall be prepared at least once per year for each classified employee. Service records shall be considered in determining salary advancement, in making promotions, demotions, transfers, reinstatements, dismissals, in the reduction-in-force formula and shall serve as a counseling device.

**13.3** Service records shall be discussed with the classified employee and each classified employee shall have a right to make his comments thereon. The signing of the service record by the classified employee does not signify his agreement with the service record, but only that he has seen the service record, it has been discussed with him and he has been afforded the opportunity to make comments to be attached to or placed in the service record.

**13.4** Each classified employee shall receive a copy of his service record or records and a copy of all service records shall be sent to the merit employment department for inclusion in the classified employee's file as a permanent record.

**13.5** For any period in which a service record has not been made as to the performance of a classified employee, or for which a service record is not made in accordance with this chapter, service shall be considered as satisfactory.

[Effective June 9, 1970]

## CHAPTER 17
## RECORDS AND REPORTS

[Filed June 9, 1970]

**17.1** *Agency attendance records.* Each agency shall maintain an adequate set of classified employee records for the purpose of recording attendance. These records shall include attendance on official duty; vacation and sick leave earned, used and accrued; compensatory time earned, used and accrued; overtime earned, used and accrued.

**17.2** *Roster.* The director shall establish and maintain a roster of all employees in the classified service, showing for each classified employee the class title, salary, date of employment and such other data as the commission deems pertinent.

**17.3** *Reports of personnel transactions in the classified service.* The commission shall prescribe the necessary official forms for the report of all personnel transactions and procedures. Classified employees shall receive a copy of all personnel status changes by which they are affected.

**17.4** *Records of the merit employment department.* The records of the merit employment department, except for examination materials, service records, personal histories, and such other records as may be specified in the rules or by official action of the commission as confidential, may be inspected at the department's offices during working hours. Any classified employee shall have the right to examine his personal file during regular working hours of the department.

[Effective June 9, 1970]

# MERIT EMPLOYMENT DEPARTMENT
**(continued)**

[Filed May 13, 1970]

The rules appearing in the July, 1969 IDR Supplement [pages 55 to 62] are amended by adding the following subsection:

**8.1(12)** *Work test appointment.* In accordance with subrule 5.7(4), the appointing authority, who has under his jurisdiction positions involving unskilled or semiskilled domestic, attendant or custodial work, as so designated by the commission, may appoint persons to such positions on the basis of a competitive working test performance for the length of the probationary period. Any such person appointed shall serve a probationary period in accordance with these rules and shall acquire permanent status and be subject to the same rules as other classified probationary employees.

Rule 5.2(1) is amended by striking from the second paragraph, lines 2 through 7, the following: "announcements on the department and other official bulletin boards, and in such other places as the director deems advisable, including at least one newspaper in general circulation in the state." and inserting in lieu thereof, the following: "throughout the state and copies sent to newspapers, radio stations, educational institutions, Iowa employment security offices, state agencies, professional and vocational societies and associations, public officials and such other organizations and individuals as the commission may deem expedient."

Rule 5.8(2)*f* is amended as follows:

1. By striking from lines 2 and 3, the following: "at the discretion of the director" and adding to line 3, after the word "examination," the following: "for classes which are announced".

2. By striking from lines 3 through 6, the following: "except that an applicant may not take the same form of a written test more than once in any six-month period" and inserting in lieu thereof, the following: "In such examination program, no person may be scheduled nor tested at less than thirty calendar days following his initial examination in the class of position, and subsequently at sixty calendar days and then at ninety calendar day intervals thereafter. The same provisions shall apply to promotional examinations."

3. By striking from line 12, the following: "typing or shorthand".

4. By striking from lines 15 and 16, the following: "provided the performance test is scheduled".

5. By striking from line 21, the following: "one-month" and inserting in lieu thereof, after the word "than" in line 21, the following: "thirty-day".

Rule 5.9 is amended by striking from lines 14 and 15, the following: "Ratings shall be based on a scale of one hundred."

[Effective May 13, 1970]

# MERIT EMPLOYMENT DEPARTMENT
(continued)

[Filed June 9, 1970]

The rules appearing in the July, 1969 IDR Supplement [pages 47 to 55] are amended by inserting in Rule 4.5(2), *b*(3), line 2, after the words "twenty-four months" the following: ", except employees occupying highway engineer-in-training positions may be considered for merit pay increase progression from step F to G in twelve months prior to required registration as a professional engineer".

Rule 4 is amended by adding the following subsection:

**4.7(62G.A., Ch.95) Pay differential.** The commission may authorize a pay differential for a position within a class due to special duty requirements related to the position, but not to the class as a whole or for a class as a whole within an agency structure where such class is performing under duty requirements not normally required to the class in general state service. This differential shall be over and above the pay within the pay grade for the class of position and shall be paid only as long as the employee occupies the particular position or the class is used under the circumstances which have necessitated the differential. The request shall be submitted in writing and shall outline all facts as to the particular need. Such differential payment shall be subject to the approval of the state comptroller that funds are available for such differential payment.

[Effective June 9, 1970]

# NURSING BOARD

Pursuant to authority of Section 147.109 of the Code the following rules are adopted.

[Filed May 12, 1970]

## CHAPTER 1

## ACCREDITATION OF NURSING EDUCATION PROGRAMS

**1.1(152) Definition of terms.**

**1.1(1)** *Approval/accreditation—used interchangeably.* Terms refer to those programs and clinical facilities which have met requirements of the Iowa board of nursing. Also includes approval granted by voluntary, regional and other state agencies.

**1.1(2)** *Board.* Iowa board of nursing.

**1.1(3)** *Baccalaureate program.* A program in nursing leading to a baccalaureate degree which is conducted by an educational unit in nursing (department, division, school, or college) and is an integral part of a college or university and organized and controlled in the same way as similar units in the institution. The graduate is eligible to write the registered nurse licensing examination.

**1.1(4)** *Diploma program.* A program in nursing leading to a diploma which is conducted by a single purpose school under the control of a hospital or other authority. The graduate is eligible to write the registered nurse licensing examination.

**1.1(5)** *Associate degree program.* A program in nursing leading to an associate degree which is conducted by an educational unit in nursing (department or division) and is an integral part of a school system or a college and organized and controlled in the same way as similar units in the institution. The graduate is eligible to write the registered nurse licensing examination.

**1.1(6)** *Practical nurse program.* A program in nursing leading to a diploma or certificate in practical nursing, which is part of a larger controlling institution, either a department of a hospital or a school system. The graduate is eligible to write the practical nurse licensing examination.

**1.1(7)** *Controlling agency.* The single agency or institution that administers the school in its entirety.

**1.1(8)** *Co-operating agencies.* Those outside the framework of the controlling agency which offer facilities that contribute to the educational program. This includes institutions used as the clinical laboratory for students in nursing.

**1.1(9)** *Co-ordinator.* The individual immediately responsible for a nursing program in the vocational-technical system.

**1.1(10)** *Counseling and guidance.* Personnel services available to the student to assist in his adjustment.

**1.1(11)** *Course.* A subject area within the curriculum.

**1.1(12)** *Curriculum.* The course of studies organized in a systematic manner.

**1.1(13)** *Dean/chairman.* The individual immediately responsible for a nursing program controlled by a college or university.

**1.1(14)** *Director.* The individual immediately responsible for a nursing program. This title is usually used in hospital controlled schools.

**1.1(15)** *Educational climate.* An environment in which effective learning can take place and in which attitudes that recognize the student as a learner are fostered.

**1.1(16)** *Faculty.* Individuals employed to administer and to teach in the educational program. In this document, *nurse faculty* refers to the faculty members who are registered nurses or licensed practical nurses. *Nursing faculty* refers to all individuals employed to carry out the educational program.

**1.1(17)** *Learning experience.* Interaction between the student and his environment.

**1.1(18)** *Legal finishing date.* Legal finishing date is interpreted by the board to mean the date on which the student has completed all theory and clinical practice required for graduation. In accordance with this interpretation:

*a.* The diploma and the student final record shall bear this legal finishing date.

*b.* The effective date of the work permit will be the legal finishing date.

**1.1(19)** *Observational experience.* A planned and supervised experience of two weeks or less.

**1.1(20)** *Objectives.* Statements developed by the faculty which identify the behavioral changes which are expected to occur in the student during his educational experience.

**1.1(21)** *Organization.* The administrative framework within which the program exists.

**1.1(22)** *Philosophy.* A statement which identifies the beliefs accepted by the faculty about education and nursing.

**1.1(23)** *Principle.* Accepted or professed rule or guide for action.

**1.1(24)** *Program.* Used interchangeably with school.

**1.1(25)** *Purpose.* A statement which identifies the reason for the existence of the school of nursing.

**1.1(26)** *Recommendations.* Desirable standards for development of quality schools and programs are those strongly urged by the board although they are not mandatory. The words "should", "it is desirable" and "it is suggested" designate the statement of recommendations.

**1.1(27)** *Requirements.* Mandatory standards with which schools must comply in order to be approved. The words "shall" and "must" designate the statements of requirements.

**1.1(28)** *School.* A division or department of nursing offering a basic course of study preparing individuals for licensure as a registered nurse or a licensed practical nurse.

**1.1(29) to 1.1(50)** *Reserved for future use.*

**1.2(152) Purposes of accreditation.**

**1.2(1)** To insure the safe practice of nursing by setting minimum requirements for schools preparing the practitioner.

**1.2(2)** To assure the graduates of these schools of their eligibility for admission to the licensing examination.

**1.2(3)** To encourage within each school self-evaluation and study of its program for growth and improvement.

**1.2(4)** To provide on request, a list of schools of nursing accredited by the board for the use of prospective students and counselors in the selection of a school of nursing.

**1.3(152) Types of accreditation.**

**1.3(1)** *Interim.* Granted to a newly established school which is demonstrating that it can meet requirements established by the board. This accreditation will be continued until the first class of students is graduated. However, there must be evidence through reports and survey visits

that minimum requirements are being met.

**1.3(2)** *Provisional.* Accorded for one year to any school previously having interim or full accreditation if minimum standards as established by the board are not being met. Before a school is placed on provisional status, representatives from the school will be asked to meet with the board of nursing. At periodic intervals, progress reports and survey visits will be required. If standards are not met within the defined period, the board may either extend provisional accreditation or remove the school from accreditation status.

**1.3(3)** *Full.* Granted to a school that has met the requirements set by the board and has demonstrated its ability to provide an educational program which meets the standards of the board. Full accreditation is granted for three years unless there is evidence that the school is not progressing satisfactorily.

**1.4(152) Accreditation.**

**1.4(1)** *New and reopened schools.* Any agency wishing to establish or reopen a school of nursing shall inform the board by writing to the executive director during the initial planning. Early consultation and planning with the board is essential for the development of all types of sound programs in nursing.

*a. Advisory committee.* An advisory committee to the controlling agency may be utilized. If an advisory committee is formed:

(1) Membership shall be representative of the community and nursing.

(2) Functions shall be purely advisory.

(3) Relationships to the controlling agency and faculty shall be clearly defined in writing. Minutes of meetings shall be on file.

*b. Proposal.* Written proposal (8 copies) shall be submitted to the executive director one month prior to a regular meeting for board action. Proposal must include:

(1) Request for permission to open a school, signed by appropriate officials of the controlling agency.

(2) Classification of proposed school.

(3) Evidence of community interest.

(4) Financial support.

(5) Accreditation status of the controlling agency.

(6) Evidence of availability of clinical resources.

(7) Evidence of availability of physical facilities.

(8) Provision for qualified faculty.

(9) Educational philosophy of controlling agency.

(10) Availability of qualified applicants. This should be realistically projected for a five-year period.

*c. Survey visits.*

(1) A survey of the controlling agency and clinical resources to be used for student experience will be made by a representative of the board.

(2) Written reports of survey will be submitted to the board for action simultaneously with proposal. This will necessitate early notification of intention to open a school so that survey visits can be arranged.

(3) Representatives from the controlling agency will meet with the board at the time the proposal and reports of survey are discussed. This meeting will serve as a means of clarification and communication.

*d. Report of board action.*

(1) Written report of board action accompanied by the board survey reports will be sent to the administrative official of the controlling agency.

(2) The controlling agency will receive a copy of all reports.

(3) The co-operating agencies will receive only the copy of the report of their agency.

*e. Faculty requirements—all programs.*

(1) Educational requirements are outlined in subrule 2.4(2).

(2) The head of the nursing program shall be employed for a sufficient period of time prior to the admission of students to organize and develop the program.

(3) The instructors of the nursing program shall be employed for a sufficient period of time prior to the beginning of their teaching assignment to become oriented to the school and facilities and prepare for teaching assignment.

*f. Progress reports.*

(1) Monthly progress reports (8 copies) must be submitted to the executive director for review by the board of nursing.

(2) These reports will start one month after the head of the nursing program is employed and continue until otherwise notified by the board. These reports are to reflect the accomplishments in the development of the program.

*g. Publicity.* Publicity released relative to opening a new program should be carefully stated during the interim before approval is granted. Words such as "planning", "tentative opening date", etc., should be used.

**1.4(2)** *Established schools.*

*a. Survey visits.* All schools regardless of accreditation status will be visited by a qualified representative of the board at regular intervals as determined by the board. The purpose of the visit is to examine educational objectives, review courses, programs, administrative practices, services and facilities and to prepare a written report for review and action by the board. All visits will be conducted under impartial and objective conditions.

(1) The tentative written report of survey visit to the educational program is submitted to the dean/chairman, director, co-ordinator for review prior to typing in final form for board action.

(2) The final survey report accompanied by a written report of board action is sent to the administrative official of the controlling agency. A copy is sent simultaneously to the dean/chairman, director, co-ordinator of the program.

*b. Survey of clinical facilities.* All institutions used as a clinical laboratory for students will be visited by a qualified representative of the board as part of the school survey. The purpose of the visit is to review administrative practices, patient care practices, facilities and programs for patient care and personnel and to prepare a written report for review and action by the board.

(1) The tentative written report of survey visit to each clinical facility is submitted to the director of nursing service for review prior to typing in final form for board action.

(2) The final survey report accompanied by a written report of board action is sent to the chief administrative officer of the institution. A copy is sent simultaneously to the director of nursing service.

**1.4(3)** *Withdrawal of accreditation.*

*a.* Withdrawal of accreditation will be made only after the school has been on provisional status.

*b.* Accreditation will not be withdrawn until a survey has been made.

*c.* Representatives of the school will meet with the board to discuss problems and status of the school.

*d.* Final action will be communicated to the controlling agency in writing.

**1.4(4)** *Change of ownership or control.*

*a.* The board shall be notified in writing of any changes in ownership or control of a school.

*b.* Information shall include the official name of the school, organizational chart of the controlling agency and names of administrative officials.

## CHAPTER 2
## CRITERIAN FOR ACCREDITATION

**2.1(152) Accreditation of controlling institution.**

**2.1(1)** *Baccalaureate programs.*

*a.* North Central Association of Colleges and Secondary Schools.

**2.1(2)** *Diploma programs.*

*a.* Community health facilities services, state department of health.

*b.* Joint Commission on Accreditation of Hospitals.

*c.* If appropriate, bureau of professional education, American Osteopathic Association.

**2.1(3)** *Associate degree programs.*

*a.* Department of public instruction, or

*b.* North Central Association of Colleges and Secondary Schools.

**2.1(4)** ***Practical nursing programs.***

*a.* Department of public instruction, or

*b.* Joint Commission on Accreditation of Hospitals.

*c.* If appropriate, bureau of professional education, American Osteopathic Association.

**2.2(152) Organization and administration of the program.**

**2.2(1)** ***Authorization.*** Authorization for conducting a school of nursing is granted:

*a.* By the charter or articles of incorporation of the controlling institution, or by resolution of its board of control, or

*b.* By the school's own charter or articles of incorporation.

**2.2(2)** ***Administrative responsibility.*** The authority and administrative responsibility of the school are vested in the dean/chairman, director or co-ordinator who is responsible to the controlling board either directly or through proper administrative channels.

**2.2(3)** ***Organization chart.*** The organization chart shall indicate responsibilities and lines of communication. It will show:

*a.* Relationship of school to the controlling body.

*b.* Relationship of school to the co-operating agencies, advisory committee and nursing service.

*c.* Such relationships may be direct, advisory, contractual or co-operative in nature.

*d.* A legend shall describe various lines used on the chart.

**2.2(4)** ***Finances.***

*a.* There shall be adequate funds allocated by the controlling agency to carry out the purposes of the program.

*b.* The faculty through the head of the nursing program (dean/chairman, director, co-ordinator) will assist in the preparation and supervision of the budget within the administrative framework for the controlling institution.

**2.2(5)** ***Ethical practice.***

*a.* The controlling agency of each school of nursing will establish a well-defined set of standards regarding the school's ethical practices, including recruitment and advertising.

*b.* These standards shall appear in writing and be available to students.

**2.2(6)** ***Contractual agreements.***

*a.* If clinical resources are located outside the framework of the controlling agency, written contractual agreements shall be initiated by the school.

*b.* The agreement shall be developed jointly with the co-operating agency and reviewed periodically according to policies of the controlling institution.

*c* The agreement shall insure full control of student education by the faculty. Faculty shall have freedom to teach and guide students. Selection of learning experiences shall be the responsibility of the faculty. Planning of clinical experience shall be done in co-operation with the director of nursing service and appropriate head nurses.

*d.* There shall be joint planning when more than one program uses the same facility for student experience. Representation shall be from nursing service and each nursing program. Meetings shall be scheduled for planning and subsequent evaluation. Minutes shall be written and disseminated to representatives.

**2.2(7)** ***Philosophy and objectives.***

*a.* The philosophy and objectives of the nursing program shall be in writing and in accordance with currently accepted educational, social and nursing standards.

*b.* The philosophy shall be consistent with the philosophy of the controlling institution.

*c.* The philosophy and objectives developed and adopted by the faculty shall serve as a guide in the development, implementation and evaluation of the program.

*d.* The philosophy and objectives shall be reviewed periodically and revised as necessary by the faculty.

*e.* Students shall receive a copy of the philosophy and objectives of the program soon after admission.

**2.3(152) Curriculum.**

**2.3(1)** *General requirements—all programs.* The curriculum shall:

*a.* Reflect the philosophy and objectives of the program.

*b.* Follow an organized pattern in which the sequence of learning is from the simple to the complex and from the known to the unknown with each learning experience built upon previous ones.

*c.* Be organized to provide for regular terms.

(1) Courses shall be designed in keeping with those terms.

(2) There shall be a general plan of the total curriculum.

(3) There shall be a reasonable distribution of courses throughout the program.

*d.* Identify the terminal behavioral outcomes expected of students.

*e.* Be developed by the faculty and include plans whereby growth of students is promoted by:

(1) Understanding roles and responsibilities of the practitioners of nursing.

(2) Applying principles of sciences which are basic to nursing practice and to the understanding of plans for medical care.

(3) Recognizing physical and emotional needs of patients and making appropriate application of these learnings.

(4) Understanding effective human relations and demonstrating ability to use these principles in nursing situations.

(5) Understanding manifestations of diseases and abnormal conditions and initiating and applying the principles underlying the nursing care.

(6) Preparing the particular practitioner for his accepted role.

(7) Learning experiences which will develop skills and abilities in observation, communications, problem solving and working relationships and an understanding of related legal and professional responsibilities.

*f.* Provide learning experiences for both men and women in which there is no gross differentiation.

**2.3(2)** *General requirements—baccalaureate programs only.*

*a.* The curriculum shall be consistent with the quality of other degree programs in the college or university.

*b.* The program shall be planned within the college calendar and meet the requirements for a degree.

*c.* The program shall include courses in general and nursing education.

*d.* Required general education courses shall contribute in breadth and depth to student development.

*e.* Credit hours for lecture and clinical experience shall be consistent with the college pattern.

**2.3(3)** *Instructional requirements—baccalaureate, diploma and associate degree programs.*

*a. Biological and physical sciences.* Courses in biological and physical sciences may be planned separately or combined. The ability to use scientific principles in individualized patient care shall be the goal set for student achievement.

*b. Behavioral sciences.* Experience shall be provided for students to improve abilities in observation, communication, interviewing, problem solving and interpersonal relationships.

*c. Nursing content.* Content including theory and guided clinical practice must be provided in medical nursing, surgical nursing, obstetric nursing, nursing of children, psychiatric nursing and, for baccalaureate programs, community nursing.

*d. Supporting courses.* Supporting courses such as nutrition, diet modification, growth and development, etc., may be separate or integrated courses.

*e. Clinical experience.* Students shall have experience in the care of men, women and children. Experience should include preventive aspects, care during acute illness, chronic illness and rehabilitation.

**2.3(4)** *Instructional requirements—practical nursing programs.*

*a. Natural sciences.*

(1) Selected facts and principles of the natural sciences and related terminology.

(2) General gross aspects of body structure and function.

(3) Elementary microbiology.

(4) Nutrition.

*b. Behavioral sciences.*

(1) Elementary psycho-social facts and principles.

(2) Gross signs of emotional and mental health and development in all age groups.

(3) Elementary principles of human relations.

*c. Nursing content.* Content including theory and guided clinical practice must be provided in the following areas:

(1) Nursing care of adults.

(2) Nursing care of children.

(3) Nursing care of mothers and infants.

*d. Clinical experience.* Students shall have experience in the care of men, women and children. This experience shall be within the accepted role of the practical nurse.

**2.3(5)** Students in all programs shall receive copies of course outlines at the appropriate time.

**2.4(152) Faculty—all programs.**

**2.4(1)** Some factors to be considered in determining the number of faculty needed are:

*a.* Number of students enrolled.

*b.* Frequency of admissions.

*c.* Level of students taught.

*d.* Preparation and experience of the faculty member.

*e.* Formal class or clinical laboratory.

*f.* Number and location of the clinical resources.

*g.* Total responsibilities of the facutly.

**2.4(2)** *Faculty requirements—all programs.*

*a.* General requirements for nurse faculty.

(1) Current nurse licensure in Iowa.

(2) Competent practitioner with knowledge and skills of current practice.

*b.* Educational requirements for faculty.

(1) Senior colleges and universities shall establish educational qualifications for the faculty of the program in nursing comparable to all other faculty. The baccalaureate degree shall be the minimum qualification.

(2) Hospitals conducting programs in nursing shall establish educational qualifications for the nursing faculty. It is recommended that the baccalaureate degree be the minimum qualification.

(3) Community, junior colleges and area schools shall establish educational qualifications for the faculty of a program in nursing as required for other comparable programs leading to a like diploma and degree. It is recommended that the baccalaureate degree be the minimum qualification.

**2.4(3)** *Functions of faculty.* The principal functions of the faculty are to:

(1) Develop the philosophy and objectives of the program.

(2) Participate in construction, implementation, evaluation and revision of the curriculum.

(3) Develop policies for the selection of nursing students within the framework of the policies of the controlling agency.

(4) Participate in counseling and guidance of the nursing students.

(5) Organize and develop nursing courses and their sequence in the program, select and organize learning experiences and guide students in attaining the objectives.

(6) Establish policies consistent with those of the institution as a whole, for progression and completion of the program in nursing.

(7) Evaluate student achievement on the basis of determined policies, assign earned grades for the courses in

nursing and recommend successful candidates for degree, diploma and other forms of recognition.

(8) Participate in appropriate activities of the controlling agency.

**2.4(4)** *Organization of the nursing faculty.*

*a.* There shall be a nursing faculty organization.

(1) All members of the faculty shall participate in the activities of this organization.

(2) Meetings shall be held on a regular basis.

(3) Minutes, which include faculty action, shall be recorded and available for reference.

(4) Committees, as needed, shall be established.

(5) Minutes of meetings shall be recorded and kept on file.

(6) Standard format shall be used to include resume of discussion and action taken.

*b.* The conditions under which the faculty work will contribute stability as well as continuous professional growth.

(1) Qualifications and responsibilities are defined for each faculty position.

(2) There is an inservice education program designed to further the competence of individuals as well as that of the faculty as a whole.

(3) The teaching assignments and other responsibilities allow time for class and laboratory preparation, program revision, improvement of teaching methods, guidance of students, participation in the faculty organization and committees, and attendance at professional meetings and participation at workshops, institutes and special courses.

(4) There are written personnel policies that provide for orientation, promotion, leave of absence, sick leave, vacation, holidays and salary increments. The salary should be commensurate with preparation, responsibility and performance.

*c.* Provision for clerical staff.

(1) There shall be a sufficient number of personnel for secretarial and clerical work.

(2) There should be provision for continuity in the clerical service.

**2.5(152) Students—all programs.**

**2.5(1)** *Selection of students.*

*a.* Students shall be selected without discrimination on the basis of the philosophy and objectives of the program and the ability of the student to carry the program to completion.

*b.* Admission policies shall be developed in writing by the faculty.

*c.* There shall be adherence to these written policies.

**2.5(2)** *Admission of students.*

*a.* There shall be dates set for the beginning of each term.

*b.* In order to provide some flexibility, each school shall determine the date for close of registration. Close of registration is defined as the time after which a student will not be allowed to begin the program.

*c.* Any student leaving the school after close of registration shall be reported to the board as a withdrawal when submitting statistics on enrollment.

*d.* All students admitted during the registration period shall be considered as having been admitted on the same date.

*e.* There shall be a well-defined refund policy governing all fees and tuition paid by students.

**2.5(3)** *Transfer and readmission.*

*a.* The faculty shall establish and adhere to written policies for transfer and readmission of students.

*b.* Students admitted by transfer from another approved school of nursing or readmitted for completion of the program shall meet standards required of those currently enrolled.

*c.* The admission date of a student shall be determined by the term in which the required courses that he needs will be given.

*d.* When a school accepts a transfer student (student with advanced standing), that school assumes the responsibility for recommending the individual for

the state board test pool licensing examinations.

*e.* The transcript from the original school becomes part of the final record (official transcript) of the school graduating the applicant. The complete transcript shall be filed with the board of nursing when application for the state board test pool examination is made.

*f.* The school shall determine the time necessary for the student to meet the above criteria.

**2.5(4)** *Advanced standing.*

*a.* Individuals with previous experience or course of study related to nursing may be admitted to a registered nurse program or a practical nursing program with advanced standing after satisfactory evaluation has been made.

*b.* Whether or not a school wishes to participate in such programs shall be the prerogative of the individual school.

*c.* If a school elects to participate, the board shall be notified in writing. The board of nursing "Guide to the Development of a Program for Advanced Placement in a Nursing Program" shall be followed.

*d.* Approval of the board is required before program is initiated.

**2.5(5)** *Progression and graduation.*

*a.* The faculty shall establish and adhere to written policies regarding progression and graduation of the student.

*b.* These written policies shall be shared with the student.

*c.* These policies must include:

(1) Grading system.

(2) Suspension or dismissal policy.

(3) Requirements for graduation.

*d.* The board does not require nor recommend that students be retained in a program to "make up days". A student should be retained only if he has not fulfilled the objectives of the program.

*e.* Prerequisites must be determined for each course.

*f.* Signed diplomas shall be granted only to students who complete the prescribed program.

*g.* The graduate shall have the privilege of writing the first scheduled state board test pool examination following completion of the program.

**2.5(6)** *Health and welfare.*

*a.* There must be written policies that safeguard the health and well being of students. These will include:

(1) Vacation.

(2) Health policies.

(3) Leave of absence.

(4) Holidays.

(5) Employment.

(6) Class attendance required.

(7) Provision of counseling and guidance.

*b.* The board recommends that each student be covered by liability and malpractice insurance.

*c.* Copies of these policies shall be distributed to the students.

**2.6(152) Records and school bulletin.**

**2.6(1)** *School records.*

*a.* A nursing program shall maintain a meaningful and useful system of records. These should include:

(1) Current course outlines.

(2) Current faculty and committee minutes.

(3) Faculty personnel records.

(4) Pertinent correspondence.

(5) Pertinent reports.

(6) School bulletins.

*b.* All printed materials shall have a heading and a date. Dates shall be added as materials are reviewed and revised.

**2.6(2)** *Student records.*

*a.* The nursing program shall maintain an individual record for each student.

*b.* School policy will determine contents necessary to serve the purpose intended. These may include:

(1) Application.

(2) Health summary.

(3) Student final record or transcript.

(4) Summary of evaluations and achievement.

(5) Results of state board test pool licensing examination.

(6) Verification of change of name if change occurs while enrolled in the school.

*c.* Student final record or transcript. The student final record submitted to the board of nursing:

(1) Must carry the correct dates of admission to and completion of the program.

(2) Must include the name and location of school of previous enrollment and dates of that enrollment.

(3) Must include legal name of student.

(4) Must be signed by the proper school official.

(5) Must have the school seal affixed. If there is no school seal, the signature must be notarized.

(6) Must be legible.

*d.* The student final record retained in the permanent file of the school should be signed by the proper official and have the school seal affixed.

**2.6(3)** Provision shall be made for the protection of records against loss, destruction and unauthorized use.

**2.6(4)** *School catalog.*

*a.* Information about the school shall be published periodically (at least every two years).

*b.* The publication shall be dated and include:

(1) Philosophy and objectives of the school.

(2) A general description of the program.

(3) Curriculum plan.

(4) Brief course descriptions.

(5) Facilities and conditions provided for student learning and welfare.

(6) Faculty.

(7) Statement of tuition, fees and refund policies.

(8) Statement regarding ethical practices, including recruitment and advertising.

(9) Housing and residence facilities.

**2.7(152) Evaluation.**

**2.7(1)** Evaluation shall be a planned, ongoing activity of the school of nursing directed toward the improvement of the program, faculty and students.

**2.7(2)** The plan for evaluation shall be in writing and take into consideration the following:

*a.* Program evaluation should assist the faculty in determining accomplishments, setting new goals and making a blueprint for action.

*b.* Evaluation of the individual faculty member is part of the total evaluation process.

*c.* The faculty shall make provision for the evaluation of student performance at specified intervals. Since the student is the direct object of the evaluation process, provision must be made for him to participate actively.

**2.8(152) Physical facilities of the program.**

**2.8(1)** Physical facilities shall be appropriate to the type of program and size of the student body and include:

*a.* Classrooms.

*b.* Offices for faculty and clerical staff.

*c.* Library.

(1) Holdings shall be commensurate with the needs of the program. Library hours shall provide for maximum usage by students.

(2) Audio-visual equipment should be provided so that a multi-media approach to learning can be used.

*d.* Conference rooms.

*e.* Residence facilities, if provided, should provide healthful and pleasant surroundings.

**2.9(152) Clinical resources.**

**2.9(1)** The clinical resource (hospital, extended care facility, nursing home) to which the student is assigned for clinical

practice is considered an integral part of the nursing program.

**2.9(2)** The following criteria must be met:

*a.* There shall be a well organized and directed nursing service department.

*b.* There shall be an environment in which effective learning can take place and in which the student is recognized as a learner.

*c.* There shall be an adequate number of qualified professional and other nursing personnel to insure safe care of the patient.

*d.* There shall be a sufficient number of patients to provide adequate learning experiences.

**2.9(3)** Clinical resources used for student experience shall be selected so that the best experience in each major area of nursing can be secured. Community resources outside of hospitals should be investigated.

**2.9(4)** The clinical resource must be surveyed and approved by the board of nursing before it can be used for student experience.

**2.9(5)** *Accreditation.*

*a. Hospitals.*

(1) Community health facilities service, state department of health.

(2) Joint Commission on Accreditation of Hospitals.

(3) If appropriate, bureau of professional education, American Osteopathic Association.

*b. Nursing homes and extended care facilities.* Community health facilities service, state department of health.

**2.10(152) Reports.**

**2.10(1)** The head of the nursing program should make at least an annual written report to the controlling agency.

**2.10(2)** The head of the nursing program shall submit an annual report to the board of nursing on forms provided. This report will provide current data on:

*a.* Progress toward achievement of its stated objectives in nursing education.

*b.* Qualifications and major responsibilities of the dean/chairman, director, co-ordinator and of each faculty member.

*c.* Policies used for selection, promotion and graduation of students.

*d.* Practices followed in safeguarding the health and well being of students.

*e.* Current enrollment by class and student-teacher ratios.

*f.* Number of admissions to school per year for past five years.

*g.* Number of graduations from school per year for past five years.

*h.* Performance of students on state board test pool examinations for past five years.

*i.* Currimulum plan.

*j.* Brief course descriptions.

*k.* Descriptions of resources and facilities, clinical areas, and contractual arrangements which reflect upon the academic program.

*l.* Copy of audited fiscal reports, including a statement of income and expenditures.

*m.* Achievements of past year.

*n.* Goals for present year.

**2.10(3)** Forms for reporting the following information to the board will be sent to schools at the appropriate time:

*a.* Legal name and address of students admitted.

*b.* Legal name of candidates for state board test pool examinations.

**2.10(4)** *Special reports.*

*a.* The board shall be informed in writing regarding:

(1) Change in ownership or administrative control of the school.

(2) Changes in administrative personnel in the school and the controlling agency.

(3) Dismissal of a student for reasons outlined under sections 147.55 and 147.56. *Revocation of Licenses* in the "Law of Iowa as it Pertains to the Practice of Nursing".

**2.11(152) Board approval requirements.**

**2.11(1)** Board approval is required before the following can be instituted:

*a.* Major curriculum change to include:

(1) Alteration of the present curriculum which increases or shortens the program, exclusive of vacation days.

(2) Changes in use of co-operating agencies.

(3) Major change in course offering.

*b.* Experimentation which represents a deviation from these rules and regulations. The board of nursing "Guide to Experimentation in Nursing Education" shall be followed.

*c.* Schools with interim or provisional accreditation shall request board approval to increase the number of students admitted to a program.

*d.* All schools regardless of accreditation status must have board approval to admit additional classes during a given school year.

*e.* Eight copies of all above proposed changes shall be submitted to the executive director one month prior to a regular board meeting.

## CHAPTER 3

## LICENSURE TO PRACTICE—REGISTERED NURSE

### 3.1(152) Licensure by examination.

### 3.1(1) *Official examination.*

*a.* The state board test pool examination constructed by the evaluation service of the National League for Nursing shall be the official licensing examination of the Iowa board of nursing.

*b.* The passing score for each series of the Iowa licensing examination shall be determined by the Iowa board of nursing.

*c.* The Iowa certificate to practice nursing will not be issued until the final record (transcript) has been received.

*d.* The licensing examination shall be administered in Des Moines three times a year.

*e.* State board test pool examination statistics:

(1) Compiled once a year and include all graduates of all Iowa schools for the year.

(2) Identity of schools other than the one to which the report is sent is not revealed.

(3) Scores achieved by individual applicants are personal information and hence will be released only on permission of the applicant.

*f.* Licensed practical nurse graduating from a school preparing the registered nurse.

(1) The board shall be notified on list of eligible candidates submitted for the state board test pool examination of any candidates already licensed as a licensed practical nurse.

(2) When the candidate is issued a registered nurse license to practice nursing, his licensed practical nurse license will be put on inactive status.

### 3.1(2) *Application.*

*a.* The application form and instructions for filing are provided by the Iowa board of nursing.

*b.* The completed application, accompanied by the statutory fee and identification picture, shall be submitted in advance of the published deadline for the desired examination date.

*c.* Only a person who has filed the required application and been notified of acceptance by the Iowa board of nursing will be permitted to write the examination.

*d.* Prior to the examination date each accepted applicant will be sent an admission card which shall be presented by the applicant for admission to the examination center.

### 3.1(3) *Qualifications.*

*a.* Requirements set forth in the Code of Iowa must be met.

*b.* All requirements for graduation from an accredited school of nursing, including theory and clinical experience, must be completed before examination date.

*c.* Accredited school of nursing means one approved by the Iowa board of nursing or by a similar board in another jurisdiction to prepare persons for registered nurse licensure.

*d.* Previous conviction of a felony does not automatically bar an individual from eligibility for licensure. In order to determine eligibility, the applicant must be reviewed by the board of nursing to

determine that qualification of good moral character is met.

**3.1(4)** *Work permit.*

*a.* A work permit to practice nursing for compensation at the general staff level will be issued to new graduates of Iowa programs by the board of nursing upon receipt of proof of graduation from an approved school of nursing.

(1) A letter from the director or the official transcript shall be considered proof of graduation.

*b.* The work permit shall be effective on the legal finishing date.

*c.* The graduate must appear for the first scheduled examination following graduation unless a written valid excuse is submitted to the board of nursing.

*d.* A second permit may be issued to a candidate who fails no more than two areas of the examination upon application for the next scheduled examination.

*e.* No more than two work permits will be issued.

*f.* Any candidate who fails three or more areas on the examination must return his work permit to the board of nursing. No further work permit will be issued.

*g.* A work permit may be issued by the board of nursing to graduates of approved schools of nursing in other states who submit documentary evidence to the Iowa board of nursing that they have either applied for or written the licensing examination in that state. All of the above regulations (*a-f*) apply in these cases.

*h.* Work permits must be signed by the permittee to be valid.

*i.* A holder of a work permit shall not use the title registered nurse or use the abbreviation R.N. in Iowa until his certificate is issued although he may be employed in nursing while the permit is valid.

**3.1(5)** *Re-examination.*

*a.* Any applicant who fails three or more areas of the examination shall be required to rewrite the entire examination (all five areas).

*b.* An applicant who fails one or two areas of the examination shall be required to write only the area or areas failed.

*c.* An applicant who fails to pass the Iowa licensing examination may rewrite the area or areas as above until a passing score is attained.

After the first failure, candidate may repeat the required areas of the examination without further preparation than what they wish to pursue on their own initiative.

*d.* Application for re-examination shall be a letter of intent accompanied by the statutory fee and identification picture. Application shall be submitted in advance of the published deadline for the desired examination date.

**3.1(6)** *Nurses educated in another country.*

*a.* Standardized tests may be used as an evaluation device.

*b.* If the individual was graduated in 1950 or thereafter, he must have taken the state board test pool examination and achieved at least a score of 350 in each area.

*c.* The transcript from the school of nursing must show theory and practice in all five areas (medical, surgical, obstetrics, nursing of children and psychiatric nursing) if required in Iowa at the time of his graduation.

*d.* The board will accept midwifery in lieu of obstetrical nursing.

*e.* The candidate will be required to enroll in an approved school of nursing to make up deficiencies.

*f.* Individuals writing the state board test pool examination will follow the same schedule as other first time candidates.

**3.2(152) Licensure without examination by interstate endorsement.**

**3.2(1)** *Application.*

*a.* The application form and instructions for filing are provided by the Iowa board of nursing.

*b.* The completed application accompanied by the statutory fee and proof of licensure elsewhere shall be filed with the Iowa board of nursing.

**3.2(2)** *Qualifications.*

*a.* Applicants for licensure in Iowa as a registered nurse must meet the qualifications for licensure in effect at the time of their graduation from their school of nursing.

*b.* A person licensed as a registered nurse in another United States jurisdiction by waiver shall be accepted for Iowa licensure only if the waiver period corresponds to that in Iowa.

*c.* An applicant must have written the same licensing examination as that administered in Iowa and achieved scores established as passing for that series by the Iowa board of nursing unless he graduated and was licensed by examination prior to September, 1946.

*d.* An applicant whose licensing examination scores do not meet the Iowa requirements shall rewrite the current Iowa examination in order to raise his scores to meet Iowa standards.

*e.* A registered nurse who is based and currently licensed in another state does not need an Iowa license to perform consultant services in Iowa.

*f.* High school equivalency shall be the high school equivalency certificate issued by the state department of public instruction.

**3.2(3)** *Work permit.*

*a.* A work permit to practice nursing in Iowa for a period up to thirty days shall be issued by the Iowa board of nursing to an applicant who is a graduate of an approved United States school of nursing and is licensed by examination in another United States jurisdiction upon submission of the current, valid license from another state or completed endorsement form.

*b.* Such permit allows employment in nursing in Iowa while application credentials are being assembled and Iowa certificate issued. The work permit does not entitle the individual to use the abbreviation R.N. or the title registered nurse.

*c.* If the permit expires and the certificate has not been issued, a second permit may be issued for a period not to exceed fifteen days.

*d.* A work permit shall not be issued to an applicant educated in a foreign country until all credentials are on file and eligibility for licensure has been determined.

**3.3(147) Annual renewal.**

**3.3(1)** The application form and instructions for renewal of license to practice nursing as a registered nurse will be mailed to the licensee at least ninety days prior to expiration of his license.

**3.3(2)** In order for a change of name to appear on the renewal license, the board of nursing must be notified. Name can be changed by:

*a.* Submitting marriage certificate, or

*b.* Submitting notarized change of name card supplied by the board of nursing.

**3.3(3)** An applicant for renewal of license, except if on inactive status, shall pay the statutory penalty fee plus the statutory renewal fee if the application for renewal is postmarked after June 30.

**3.4(147) Reinstatement.**

**3.4(1)** A delinquent letter will be sent each year after July 1 to those licensees who fail to renew their license or fail to ask for inactive status.

**3.4(2)** Licensees who fail to notify the board of nursing of change of address as provided by statute shall pay statutory reinstatement fees.

**3.5(147) Enforcement.**

**3.5(1)** *Discipline of licensees.*

*a.* All complaints regarding licensees or those purporting to be registered nurses shall be investigated by the staff or inspector of the board of nursing.

*b.* In investigating such complaints the licensee may be asked to appear at a board meeting for consultation by board members.

*c.* The board may accept the voluntary surrender of a license.

*d.* Any person whose license has been revoked or suspended may apply to the board for reinstatement at any time. Upon submission of documentary evidence of rehabilitation of the licensee, the board may reinstate the license or remove the license from suspension. The board may impose reasonable terms and conditions in conjunction with such action.

*e.* An Iowa license to practice nursing as a registered nurse will not be issued by endorsement to an individual whose license to practice is under revocation, suspension, or if applicable, probation, in another state.

## CHAPTER 4

## LICENSURE TO PRACTICE— LICENSED PRACTICAL NURSE

### 4.1(152) Licensure by examination.

**4.1(1)** *Official examination.*

*a.* The state board test pool examination constructed by the evaluation service of the National League for Nursing shall be the official licensing examination of the Iowa board of nursing.

*b.* The passing score for the Iowa licensing examination shall be determined by the Iowa board of nursing.

*c.* The Iowa certificate to practice nursing will not be issued until the final record (transcript) has been received.

*d.* The licensing examination shall be administered in Des Moines twice a year.

*e.* State board test pool examination statistics:

(1) Compiled once a year and include all graduates of all Iowa schools for the year.

(2) Identity of schools other than the one to which the report is sent is not revealed.

(3) Scores achieved by individual applicants are personal information and hence will be released only on permission of the applicant.

*f.* The board shall be notified when an individual licensed by waiver as a licensed practical nurse enrolls in a practical nurse program. Upon successful completion of the program, the status of the individual's license will be changed to graduate of an approved program. The state board test pool examination need not be repeated.

**4.1(2)** *Application.*

*a.* The application form and instructions for filing are provided by the Iowa board of nursing.

*b.* The completed application, accompanied by the statutory fee and identification picture, shall be submitted in advance of the published deadline for the desired examination date.

*c.* Only a person who has filed the required application and been notified of acceptance by the Iowa board of nursing will be permitted to write the examination.

*d.* Prior to the examination date each accepted applicant will be sent an admission card which shall be presented by the applicant for admission to the examination center.

*e.* Those individuals who apply for the licensing examination by virtue of one year in a school preparing registered nurses must submit an official transcript for review to determine eligibility.

*f.* Nursing content required for a licensed practical nurse shall include successful completion of theory and clinical experience in four basic areas, i.e. medical nursing, surgical nursing, obstetric nursing and nursing of children.

*g.* An individual who does not meet requirements may enroll in an approved school of practical nursing with advanced standing and complete the program in practical nursing.

**4.1(3)** *Qualifications.*

*a.* Requirements set forth in the Code of Iowa must be met.

*b.* All requirements for graduation from an accredited school of practical nursing, including theory and clinical experience, must be completed before examination date.

*c.* Accredited school of practical nursing means one approved by the Iowa board of nursing or by a similar board in another jurisdiction to prepare persons for practical nurse licensure.

*d.* Previous conviction of a felony does not automatically bar an individual from eligibility for licensure. In order to determine eligibility, the applicant must be reviewed by the board of nursing to determine that qualification of good moral character is met.

**4.1(4)** *Work permit.*

*a.* A work permit to practice practical nursing for compensation will be issued by the board of nursing upon receipt of proof of graduation from an approved school of practical nursing.

(1) A letter from the co-ordinator or the official transcript will be considered proof of graduation.

(2) The work permit shall be effective on the legal finishing date.

(3) The graduate must appear for the first scheduled examination following graduation unless a written valid excuse is submitted to the board of nursing.

(4) A permit will be reissued once in the event of failure on the licensing examination upon application for the next scheduled examination.

*b.* A work permit to practice practical nursing for compensation may be issued by the board to graduates of approved schools of practical nursing in other states who submit documentary evidence to the board that they have either applied for or written the licensing examination in that state, provided the applicant meets all requirements for licensure as a practical nurse in this state. All of the above regulations (paragraph "a", subparagraphs (1) to (4)) apply in these cases.

*c.* Those candidates who qualify for the licensing examination by virtue of previous enrollment in a school preparing registered nurses are not eligible for a work permit.

*d.* A holder of a work permit shall not use the title licensed practical nurse or use the abbreviation L.P.N. in Iowa until his certificate is issued although he may be employed in practical nursing while the permit is valid.

**4.1(5)** *Re-examination.*

*a.* An applicant who fails to pass the Iowa licensing examination may rewrite the examination until a passing score is attained.

After the first failure, candidates may repeat the examination without further preparation other than what they wish to pursue on their own initiative.

*b.* Application for re-examination shall be a letter of intent accompanied by the statutory fee and identification picture. Application shall be submitted in advance of the published deadline for the desired examination date.

**4.1(6)** *Nurses educated in another country.*

*a.* If the application for licensure in Iowa does not meet the requirements for licensure as a registered nurse, he may apply for the practical nurse licensing examination provided qualifications 4.2(2)"*e*" and "*f*" are met.

**4.2(152) Licensure without examination by interstate endorsement.**

**4.2(1)** *Application.*

*a.* The application form and instructions for filing are provided by the Iowa board of nursing.

*b.* The completed application accompanied by the statutory fee and proof of licensure elsewhere shall be filed with the Iowa board of nursing.

*c.* A work permit or license to practice as a licensed practical nurse shall be received by the applicant from the Iowa board of nursing prior to employment.

**4.2(2)** *Qualifications.*

*a.* Applicants for licensure in Iowa as a licensed practical nurse must meet the qualifications for licensure in effect at the time of their graduation from their school of nursing.

*b.* A person licensed as a licensed practical nurse in another United States jurisdiction by waiver shall be accepted for Iowa licensure only if the waiver period corresponds to that in Iowa.

*c.* An applicant must have written the same licensing examination as that administered in Iowa and achieved score established as passing for that examination by the Iowa board of nursing unless he graduated and was licensed by examination prior to July 1951.

*d.* An applicant whose licensing examination score does not meet the Iowa requirements shall rewrite the current Iowa examination in order to raise his scores to meet Iowa standards.

*e.* Tenth grade equivalency shall be determined by the general educational development test. A standard score of not less than thirty-five on each test or an average standard score of forty-five or above on the five tests will be accepted.

*f.* High school equivalency shall be the high school equivalency certificate issued by the state department of public instruction.

**4.2(3)** *Work permit.*

*a.* A work permit for the practice of practical nursing in Iowa for a period up to thirty days shall be issued by the Iowa board of nursing to an applicant who is a graduate of an approved United States school of nursing and is licensed by examination in another United States jurisdiction upon submission of the current, valid license from another state or completed endorsement form.

*b.* Such permit allows employment in practical nursing in Iowa while application credentials are being assembled and Iowa certificate issued. The work permit does not entitle the individual to use the abbreviation L.P.N. or the title licensed practical nurse.

*c.* If the permit expires and the certificate has not been issued, a second permit may be issued for a period not to exceed fifteen days.

**4.3(147) Annual renewal.**

**4.3(1)** The application form and instructions for renewal of license to practice nursing as a licensed practical nurse will be mailed to the licensee at least ninety days prior to expiration of his license.

**4.3(2)** In order for a change of name to appear on the renewal license, the board of nursing must be notified. Name can be changed by:

*a.* Submitting marriage certificate, or

*b.* Submitting notarized change of name card supplied by the board of nursing.

**4.4(147) Reinstatement.**

**4.4(1)** A delinquent letter will be sent each year after July 1 to those licensees who fail to renew their license or fail to ask for inactive status.

**4.4(2)** Licensees who fail to notify the board of nursing of change of address as provided by statute shall pay statutory reinstatement fees.

**4.5(147) Enforcement.**

**4.5(1)** *Discipline of licensees.*

*a.* All complaints regarding licensees or those purporting to be licensed practical nurses shall be investigated by the staff or inspector of the board of nursing.

*b.* In investigating such complaints the licensee may be asked to appear at a board meeting for consultation by board members.

*c.* The board may accept the voluntary surrender of a license.

*d.* Any person whose license has been revoked or suspended may apply to the board for reinstatement at any time. Upon submission of documentary evidence of rehabilitation of the licensee, the board may reinstate the license or remove the license from suspension. The board may impose reasonable terms and conditions in conjunction with such action.

*e.* An Iowa license to practice nursing as a licensed practical nurse will not be issued by endorsement to an individual whose license to practice is under revocation, suspension, or, if applicable, probation, in another state.

[Effective May 12, 1970]

# SOCIAL SERVICES DEPARTMENT

TITLE I

## MEDICAL ASSISTANCE

Pursuant to authority of Chapter 223, Acts of the Sixty-second General Assembly, the following rules that appear in 1966 I.D.R. are rescinded:

[Filed March 11, 1970]

(1) On Page 641 in Section 249.7 under the heading "Group II" strike "Medical Care" and strike all of the remainder of 249.7.

(2) Beginning on Page 648 strike the heading "Medical Assistance for the Aged" and all of the material under this heading.

(3) On Page 653 in Section 239.5 under the heading "Group II" strike "Medical Care" and strike all of the remainder of 239.5.

(4) On Page 655 in Section 9.5 under the heading "Group II" strike "Medical Care Vendor Payments" and all of the remainder of 9.5.

And the following rules are adopted:

## CHAPTER 1

## CONDITIONS OF ELIGIBILITY

**1.1(223)TI Persons covered.**

1.1(1) *Money payment recipients.* Medical assistance will be available to all recipients of old age assistance, aid to dependent children, aid to the blind and aid to the disabled and their dependent relatives whose needs are included in the assistance grant.

1.1(2) *Medical only recipients.* Medical assistance will be available to those individuals and families who are not receiving assistance under one of the money payment public assistance categories as follows:

*a.* Individuals or families who would be eligible for one of the money payment public assistance programs except for an eligibility requirement in effect in the applicable money payment program which is prohibited by federal law and regulations in a medical assistance program.

*b.* Individuals receiving care in skilled nursing homes who would be eligible for a grant of assistance based on the department's standards, if they were receiving care in a licensed noncertified nursing home.

**1.2(223)TI Medical resources.** Medical resources include health and accident insurance, eligibility for care through Veterans Administration, Crippled Childrens Program, Title XVIII of the Social Security Act (Medicare) and other resources for meeting the cost of medical care which may be available to the recipient. Such resources must be used when reasonably available. Payment will be approved only for those services or that part of the cost of a given service for which no medical resources exist.

## CHAPTER 2

## APPLICATION AND INVESTIGATION

**2.1(223)TI Place of filing.** Application should be filed in the county department of social welfare in the county where the applicant resides. However, if medical care is required by the applicant while visiting in another county, application may be made in that county. The latter county will complete the forms used in the application process and forward them to the county of residence which will complete the determination of eligibility.

**2.2(223)TI Method of filing.** Application may be made by the person himself, or by someone acting responsibly in his behalf. A person filing an application in behalf of the applicant should be a relative, friend, or other person interested in the applicant's welfare and familiar with his affairs.

**2.3(223)TI Investigation.** Applications will be investigated by the county department of social welfare and a decision rendered regarding eligibility within 30 days of the date of application.

**2.4(223)TI Notification of decision.** The applicant will be notified in writing of the decision of the county department of social welfare regarding his eligibility for medical assistance. If he has been determined to be ineligible an explanation of the reason will be provided.

**2.5(223)TI Date of approval of medical assistance.** The effective date of approval of medical assistance will be the first day of the month preceding the month in which application is made providing the applicant was eligible on that date. If the applicant was not eligible during the month preceding application the effective date of approval will be the date on which eligibility was attained. No payment will be made for medical care received prior to the effective date of approval.

**2.6(223)TI Certification for services.** The state department of social services shall issue an appropriate medical assistance identification card to an individual determined eligible for the benefits provided under the medical assistance program.

**2.7(223)TI Reinvestigation.** Reinvestigation will be made as often as circumstances indicate but in no instance shall the period of time between reinvestigations exceed 12 months.

## CHAPTER 3

## CONDITIONS OF PARTICIPATION FOR PROVIDERS OF MEDICAL AND REMEDIAL CARE

**3.1(223)TI Physicians.** All physicians (doctors of medicine and osteopathy) licensed to practice in the state of Iowa are eligible to participate in the program. Physicians in other states are also eligible if duly licensed to practice in that state.

**3.2(223)TI Retail pharmacies.** Pharmacies are eligible to participate providing

they are licensed as such in the state of Iowa or duly licensed in other states.

**3.3(223)TI Hospitals.** All hospitals licensed in the state of Iowa and certified as eligible to participate in Part A of the Medicare program (Title XVIII of the Social Security Act) are eligible to participate in the medical assistance program. Hospitals in other states are also eligible if duly licensed and certified for Medicare participation in that state.

**3.4(223)TI Dentists.** All dentists licensed to practice in the state of Iowa are eligible to participate in the program. Dentists in other states are also eligible if duly licensed to practice in that state. NOTE: DENTAL LABORATORIES—Payment will not be made to a dental laboratory.

**3.5(223)TI Podiatrists.** All podiatrists licensed to practice in the state of Iowa are eligible to participate in the program. Podiatrists in other states are also eligible if duly licensed to practice in that state.

**3.6(223)TI Optometrists.** All optometrists licensed to practice in the state of Iowa are eligible to participate in the program. Optometrists in other states are also eligible if duly licensed to practice in that state.

**3.7(223)TI Opticians.** All opticians in the state of Iowa are eligible to participate in the program. Opticians in other states are also eligible to participate. NOTE: Opticians in states having licensing requirements for this professional group must be duly licensed in that state.

**3.8(223)TI Chiropractors.** All chiropractors licensed to practice in the state of Iowa are eligible to participate. Chiropractors in other states are also eligible if duly licensed in that state.

**3.9(223)TI Home health agencies.** Home health agencies are eligible to participate providing they are certified to participate in the Medicare program. (Title XVIII of the Social Security Act)

**3.10(223)TI Medical equipment and appliances, prosthetic devices and sickroom supplies.** All dealers in medical equipment and appliances, prosthetic devices and sickroom supplies in Iowa or in other states are eligible to participate in the program.

**3.11(223)TI Ambulance service.** Providers of ambulance service are eligible to participate providing they meet the eligibility requirements for participation in the Medicare program. (Title XVIII of the Social Security Act)

**3.12(223)TI Skilled nursing homes.** Nursing homes and hospitals or distinct parts thereof currently licensed as such by the Iowa state department of health are eligible to participate in the program providing these facilities meet all of the conditions for participation as extended care facilities in the Medicare program. (Title XVIII of the Social Security Act) In addition to these requirements such facilities must also meet the requirements of the 1967 Life Safety Code of the National Fire Protection Association.

## CHAPTER 4

## AMOUNT, DURATION AND SCOPE OF MEDICAL AND REMEDIAL SERVICES

**4.1(223)TI Physicians services.** Payment will be approved for all medically necessary services and supplies provided by the physician including services rendered in the physician's office or clinic, the home, in a hospital, nursing home or elsewhere.

*Exceptions—Drugs dispensed by physician.* There is no provision for payment for drugs dispensed by a physician unless it is established that there is no licensed retail pharmacy in the community in which the physician maintains his office.

**4.2(223)TI Retail pharmacies.** Payment will be approved for the following when ordered by a legally qualified practitioner (physician, dentist or podiatrist):

*a.* Legend drugs and devices requiring a prescription by law.

*b.* Insulin.

*c.* Medical and sickroom supplies when ordered by the physician for a specific rather than an incidental use.

**4.3(223)TI Hospitals.** Payment will be approved for not more than ten days of inpatient hospital care per admission. There are no limitations on the amount of outpatient care for which payment will be made so long as such care is medically necessary. If the recipient is eligible for inpatient or outpatient hospital care through the Medicare program payment will be made for deductibles and coinsurance applicable in that program. Payment will be approved for ward or other

multiple bed accommodations. No payment will be approved for a private room.

**4.4(223)*TI* Dentists.** Payment will be approved for services and supplies within the scope of a schedule of dental procedures furnished each dentist participating in the program.

**4.5(223)TI Podiatrists.** Payment will be approved only for certain podiatric services. Each podiatrist participating in the program is furnished with a list of podiatric services for which payment will be approved.

**4.6(223)TI Optometrists.** Payment will be approved only for certain optometric services and supplies. Each optometrist participating in the program is furnished with a list of services and supplies for which payment will be approved.

**4.7(223)TI Opticians.** Payment will be made only for certain services and supplies provided by opticians. Each optician participating in the program is furnished a list of services and supplies for which payment will be approved.

**4.8(223)TI Chiropractors.** Payment will be made only for certain chiropractic services. Each chiropractor participating in the program is furnished a list of chiropractic services for which payment will be approved.

**4.9(223)TI Home health agencies.** Payment will be approved for care in the same amount and subject to the same conditions effective in the Medicare program. (Title XVIII of the Social Security Act)

**4.10(223)TI Medical equipment and appliances, prosthetic devices and sick room supply dealers.** Payment will be made for all medical equipment and appliances, prosthetic devices and sickroom supplies required by the recipient because of his condition. The written prescription of the physician is necessary in all cases. If the item required by the recipient is costly and will be needed only a brief period consideration shall be given to rental rather than purchase of the item.

**4.11(223)TI Ambulance service.** Payment will be approved for ambulance service if it is required by the recipient's condition and the recipient is transported to the nearest hospital with appropriate facilities or to one in the same locality, from one hospital to another, to the patient's home or to a skilled nursing home. Payment for ambulance service to the nearest hospital for outpatient service will be approved only for emergency treatment. Ambulance service must be medically necessary and not merely for the convenience of the patient.

**4.12(223)TI Skilled nursing homes.** Payment will be approved for care in skilled nursing homes providing skilled nursing care is medically necessitated by the recipient's condition. The definition of "skilled nursing care" is identical to that in effect for extended care beneficiaries in the Medicare program. There are no limitations on the amount of care for which payment will be approved so long as skilled nursing care as defined above is medically necessary. Payment will be approved for multiple bed or ward accommodations. No payment will be approved for a private room.

## CHAPTER 5

## OTHER POLICIES RELATING TO PROVIDERS OF MEDICAL AND REMEDIAL CARE

**5.1(223)TI Principles governing reimbursement of providers of medical and remedial care.** Payment for services of providers of care participating in the medical assistance program will be made on the basis of "reasonable cost" for institutional providers (hospitals and skilled nursing homes). The determination of reasonable cost for institutional providers will be made utilizing the methods and criteria in effect for these providers in the Medicare program. (Title XVIII of the Social Security Act)

The department with the advice of representatives of the various professional groups participating in the program has developed schedules of maximum allowances for use in determining payment to noninstitutional providers of care. Providers of care must accept reimbursement based upon reasonable charges as determined by the department making no additional charges for the service.

**5.2(223)TI Disciplinary action against provider of care.** The department reserves the right to remove from participation in the medical assistance program any practitioner or provider of care who has violated the department's requirements for participation. Although not limited to the following practices, the following are illustrative practices which would be consid-

ered just cause for removal from participation of a provider of remedial care and services.

*a.* Billing for services or supplies not provided or for services and supplies different from those actually provided.

*b.* Provision of services or supplies in an amount in excess of that medically necessary for the proper treatment of the patient.

*c.* Persistent refusal to comply with the department's rules and regulations governing participation in the program.

*d.* Unprofessional, unethical or other questionable practices relating to care and treatment of recipients.

Any overpayments made to providers of service shall be recovered by the department.

**5.3(223)TI Appeal by provider of care.** Any provider of care who is dissatisfied with a decision rendered by the carrier with reference to reimbursement for services provided or the medical necessity of such service may file an appeal with the department of social services. The appeal which must be submitted in writing and state the complaint of the provider of care shall be filed with the department of social services. On receipt of the appeal a hearing will be arranged before the hearing officer of the department of social services. At the time of the hearing the provider of care may present such evidence as he desires. Following the hearing a decision will be rendered by the commissioner of the department of social services and such decision shall be final.

## CHAPTER 6

## PROCEDURE AND METHOD OF PAYMENT

**6.1(223)TI The carrier function in medical assistance.**

**6.1(1)** *General administrative responsibilities of carrier.* The carrier designated by the department will perform the following primary functions:

*a.* Receive, process and pay claims submitted by providers of medical and remedial care participating in the program.

*b.* Make available instructional materials and billing forms to providers participating in the program.

*c.* Provide reports, statistical and accounting information as required by the department.

*d.* Participate with staff of the department in analysis and evaluation of policies and procedures.

*e.* In co-operation with the department develop and carry out a continuous program of cost and utilization review which is applicable to all groups of providers participating in the program. The purpose of cost and utilization review is to assure that only required medical and health services are being received by recipients of medical assistance and that the cost of such services is not in excess of that charged the general public.

**6.1(2)** *Method of selection of carrier.* The department will receive sealed bids from prospective carriers for the medical assistance program. Basis of competitive bidding will be a per claim rate which would be applicable to all claims processed by the carrier under the program. A certified check payable to the Iowa department of social services in the amount of $5,000.00 shall be filed with each proposal. This check may be cashed and the proceeds retained by the department as liquidated damages if the bidder fails to execute a contract and file security as required by the specifications for the faithful performance thereof. Proposals containing any reservations not provided for in the specifications may be rejected and the department reserves the right to waive technicalities and to reject any or all bids.

**6.1(3)** *Reimbursement of carrier for performance of contract.* All allowable costs other than amounts paid providers of medical and remedial care and services shall be referred to as administrative costs.

*a. Rate per claim.* Administrative costs other than those not associated with the processing of claims as set forth below shall be based on a fixed rate per claim handled. Between July 1 and September 30 of each year a complete administrative cost analysis will be submitted to the department by the carrier. If the cost analysis indicates that the rate per claim handled is in excess of the cost of administration the carrier will refund to the department the overpayment and adjust the per claim charge as of October 1. If the cost analysis indicates an adminis-

trative cost in excess of the claim rate the carrier shall submit an additional billing to the department but in no event shall the additional billing exceed 10% of the immediately preceding claim rate.

*b. Costs not associated with processing of claims.* Administrative costs of the carrier which are not included in the claim rate and which are approved by the department for reimbursement may be billed as separate items. The following costs may be billed:

(1) Printing of informational materials and billing forms.

(2) Initial and subsequent mailings of billing forms and instructions to providers of care.

(3) Establishment of office routine but not to include materials, supplies or any office or processing equipment.

(4) Any special studies, reports or projects requested by the department which are not specified in the contract.

(5) Costs of utilization review.

**6.2(223)TI Submission of claims.** Providers of medical and remedial care participating in the program will submit claims for services rendered to the carrier on a monthly basis. Following audit of the claim the carrier will make payment to the provider of care.

**6.3(223)TI Amounts paid provider from other sources.** The amount of any payment made directly to the provider of care by the recipient, relatives, or any source shall be deducted from the established cost standard for the service provided to establish the amount of payment to be made by the carrier.

**6.4(223)TI Time limit for submission of claims.** Providers of medical and remedial care should submit claims to the carrier on or prior to the fifth day of the month following the month in which the service was provided. Payment will not be made on any claim where the amount of time that has elapsed between the date of service was rendered and the date the claim is received by the carrier exceeds one hundred eighty days.

[Effective April 10, 1970]

[Note attached by department]

These rules were filed without approval of the attorney general who had rendered no advisory opinion within thirty days after submission as provided in section 17A.8 of the Code.