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NFPA 220 Types of Building Construction 1992 Edition

National Fire Protection Association 1 Batterymarch Park, PO Box 9101, Quincy, MA 02269-9101

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Policy Adopted by NFPA Board of Directors on December 3, 1982

The Board of Directors reaffirms that the National Fire Protection Association recognizes that the toxicity of the products of combustion is an important factor in the loss of life from fire. NFPA has dealt with that subject in its technical committee documents for many years.

There is a concern that the growing use of synthetic materials may produce more or additional toxic products of combustion in a fire environment. The Board has, therefore, asked all NFPA technical committees to review the documents for which they are responsible to be sure that the documents respond to this current concern. To assist the committees in meeting this request, the Board has appointed an advisory committee to provide specific guidance to the technical committees on questions relating to assessing the hazards of the products of combustion.

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1. Adoption by Reference — Public authorities and others are urged to reference this document in laws, ordinances, regulations, administrative orders or similar instruments. Any deletions, additions and changes desired by the adopting authority must be noted separately. Those using this method are requested to notify the NFPA (Attention: Secretary, Standards Council) in writing of such use. The term "adoption by reference" means the citing of title and publishing information only.

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NFPA 220

Standard on

Types of Building Construction

1992 Edition

This edition of NFPA 220, *Standard on Types of Building Construction*, was prepared by the Technical Committee on Building Construction, released by the Correlating Committee on Building Construction, and acted on by the National Fire Protection Association, Inc. at its Fall Meeting held November 18-20, 1991 in Montréal, Québec, Canada. It was issued by the Standards Council on January 17, 1992, with an effective date of February 10, 1992, and supersedes all previous editions.

The 1992 edition of this document has been approved by the American National Standards Institute.

Changes other than editorial are indicated by a vertical rule in the margin of the pages on which they appear. These lines are included as an aid to the user in identifying changes from the previous edition.

Origin and Development of NFPA 220

In 1952 the Committee on Building Construction secured tentative adoption of *Standard Types of Building Construction* at the NFPA Annual Meeting. At the 1954 NFPA Annual Meeting, revisions of the 1952 tentative text were adopted by the Association, and in 1955 minor revisions were also acted upon favorably. A new definition of "noncombustibility" and editorial changes in the description of the fire resistance rating of structural members (under the definition of fire-resistive construction) were adopted at the 1956 NFPA Annual Meeting on recommendation of the Committee on Building Construction.

In 1958, with the use of plastics in building construction, recommendations on the types of standard fire tests to be used in evaluating the firesafety of these materials were adopted and inserted in the Appendix.

In 1961 an Appendix was adopted to furnish a guide to NFPA Committees, regulatory officials, and others relative to the classification of air-supported structures.

In 1975 a more fundamental definition for noncombustible was added including the introduction of "limited-combustible" based on potential heat value limitations and more generalized definitions for types of building construction.

In 1979 the standard was extensively rewritten to introduce the nomenclature related to construction types "Type I" through "Type V," which include parenthetically placed hourly fire resistance designations of the structural components.

The 1985 edition included the addition of a new Chapter 4, which listed referenced publications whose use is mandated within this standard.

The 1992 edition provides changes in technical terminology.

Committee on Building Construction

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Donald W. Belles & Assoc., Inc.

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James A. Milke, University of Maryland, MD
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Alvin O. Peterson, Rogers Lovelock & Fritz
Lyndon Welch, Ann Arbor, MI
Robert A. Wessel, Gypsum Assoc.

Alternates

Kathleen H. Almand, American Iron & Steel Institute
(Alternate to D. F. Boring)
Kenneth E. Bland, Nat'l Forest Products Assoc.
(Alternate to P. H. Billing)
Donald J. Boehmer, Rolf Jensen & Assoc., Inc.
(Alternate for Rolf Jensen & Assoc., Inc.)
David W. Frable, U.S. General Services Administration
(Alternate to W. I. Blazek)
Harlan C. Ihlenfeldt, Kemper Group
(Alternate to E. M. Wetmore)
Douglas A. Remaley, Town of Nags Head, NC
Rep. International Association of Fire Chiefs
(Alternate to IAFC Rep.)
Stephen V. Skalko, Portland Cement Assoc.
(Alternate to J. J. Messersmith, Jr.)
Peter J. Gore Willse, Industrial Risk Insurers
(Alternate to IRI Rep.)

Gregory J. Cahanin, NFPA Staff Liaison

This list represents the membership at the time the Committee was balloted on the text of this edition. Since that time, changes in the membership may have occurred.

NOTE: Membership on a Committee shall not in and of itself constitute an endorsement of the Association or any document developed by the Committee on which the member serves.

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Types of Building Construction

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NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates explanatory material on that paragraph in Appendix A.

Information on referenced publications can be found in Chapter 4 and Appendix D.

Chapter 1 General

1-1 Scope. This standard considers only those factors necessary to define building types. The requirements for partitions, fire separation partitions, shaft enclosures, fire walls other than bearing walls, and openings in walls, partitions, floors, and roofs are not related to the construction types and need to be specified in other standards and codes, where appropriate. It is also necessary for the user to consider the influence of location, occupancy, exterior exposure, possibility of mechanical damage to fire protection material, and other features that may impose additional requirements for safeguarding life and property, as commonly covered in building codes.

1-2 Purpose. This standard outlines basic definitions for standard types of building construction for reference by committees operating under the procedures of the National Fire Protection Association.

1-3 Guide to Classification of Types of Construction. The types of construction include five basic types designated by Roman numerals as Type I, Type II, Type III, Type IV, and Type V. This system of designating types of construction also includes a specific breakdown of construction type through the use of Arabic numbers. These numbers follow the Roman numeral notation when naming a type of construction, e.g., Type I-443, Type II-111, Type III-200, etc.

The Arabic numbers following each basic type (Type I, Type II, etc.) designate the fire resistance rating requirements for certain structural elements as follows:

First Arabic Number — Exterior bearing walls.

Second Arabic Number — Structural frame or columns and girders, supporting loads for more than one floor.

Third Arabic Number — Floor Construction.

Chapter 2 Definitions*

Fire Resistance Rating.* The time, in minutes or hours, that materials or assemblies have withstood a fire exposure as established in accordance with the test procedures of NFPA 251, *Standard Methods of Fire Tests of Building Construction and Materials.*

Flame Spread Index. A number obtained according to NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials.*

Flame Spread Rating.* Numbers or classifications obtained according to NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials.*

Limited-Combustible. A building construction material *not complying with the definition of noncombustible material* that, in the form in which it is used, has a potential heat value not exceeding 3500 Btu per lb (8141 Kj/Kg), when tested in accordance with NFPA 259, *Standard Test Method for Potential Heat of Building Materials, and* complies with one of the following paragraphs (a) or (b). Materials subject to increase in combustibility or flame spread rating beyond the limits herein established through the effects of age, moisture, or other atmospheric condition shall be considered combustible.

(a) Materials having a structural base of noncombustible material, with a surfacing not exceeding a thickness of 1/8 in. (3.2 mm) that has a flame spread rating not greater than 50.

(b) Materials, in the form and thickness used, other than as described in (a), having neither a flame spread rating greater than 25 nor evidence of continued progressive combustion *and* of such composition that surfaces that would be exposed by cutting through the material on any plane would have neither a flame spread rating greater than 25 nor evidence of continued progressive combustion.

Minimum Hourly Fire Resistance Rating. That degree of fire resistance deemed necessary by the authority having jurisdiction.

Noncombustible Material. A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors, when subjected to fire or heat. Materials that are reported as passing ASTM E136, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C,* shall be considered noncombustible materials.

Chapter 3 Types of Construction

3-1 Type I (443-332). Type I construction is that type in which the structural members, including walls, columns, beams, floors, and roofs, are of approved noncombustible or limited-combustible materials and have fire resistance ratings not less than those set forth in Table 3.

3-2 Type II (222-111-000). Type II construction is that type not qualifying as Type I construction in which the structural members, including walls, columns, beams, floors, and roofs, are of approved noncombustible or limited-combustible materials and have fire resistance ratings not less than those set forth in Table 3.

3-3 Type III (211-200). Type III construction is that type in which exterior walls and structural members that are portions of exterior walls are of approved noncombustible or limited-combustible materials, and interior structural members, including walls, columns, beams, floors,

Table 3 Fire Resistance Requirements for Type I through Type V Construction

	Type I		Type II			Type III		Type IV	Type V	
	443	332	222	111	000	211	200	2HH	111	000
EXTERIOR BEARING WALLS —										
Supporting more than one floor, columns, or other bearing walls.....	4	3	2	1	0[1]	2	2	2	1	0[1]
Supporting one floor only	4	3	2	1	0[1]	2	2	2	1	0[1]
Supporting a roof only	4	3	1	1	0[1]	2	2	2	1	0[1]
INTERIOR BEARING WALLS —										
Supporting more than one floor, columns, or other bearing walls.....	4	3	2	1	0	1	0	2	1	0
Supporting one floor only	3	2	2	1	0	1	0	1	1	0
Supporting a roof only	3	2	1	1	0	1	0	1	1	0
COLUMN —										
Supporting more than one floor, bearing walls, or other columns.....	4	3	2	1	0	1	0	H[2]	1	0
Supporting one floor only	3	2	2	1	0	1	0	H[2]	1	0
Supporting a roof only	3	2	1	1	0	1	0	H[2]	1	0
BEAMS, GIRDERS, TRUSSES & ARCHES —										
Supporting more than one floor, bearing walls, or columns	4	3	2	1	0	1	0	H[2]	1	0
Supporting one floor only	3	2	2	1	0	1	0	H[2]	1	0
Supporting a roof only	3	2	1	1	0	1	0	H[2]	1	0
FLOOR CONTRUCTION.....	3	2	2	1	0	1	0	H[2]	1	0
ROOF CONTRUCTION	2	1½	1	1	0	1	0	H[2]	1	0
EXTERIOR NONBEARING WALLS	0[1]	0[1]	0[1]	0[1]	0[1]	0[1]	0[1]	0[1]	0[1]	0[1]

Those members listed that are permitted to be of approved combustible material.

[1] Requirements for fire resistance of exterior walls, the provision of spandrel wall sections, and the limitation or protection of wall openings are note related to construction type. They need to be specified in other standards and codes, where appropriate, and may be required in addition to the requirments of this standard for the construction type.

[2] "H" indicates heavy timber numbers; see text for requirements.

and roofs, are wholly or partly of wood of smaller dimensions than required for Type IV construction or of approved noncombustible, limited-combustible, or other approved combustible materials. In addition, structural members have fire resistance ratings not less than those set forth in Table 3.

3-4 Type IV (2HH).*

3-4.1 Type IV construction is that type in which exterior and interior walls and structural members that are portions of such walls are of approved noncombustible or limited-combustible materials. Other interior structural members, including columns, beams, arches, floors, and roofs, are of solid or laminated wood without concealed spaces and comply with the provisions of 3-4.2 through 3-4.6. In addition, structural members have fire resistance ratings not less than those set forth in Table 3.

Exception No. 1: Interior columns, arches, beams, girders, and trusses of approved materials other than wood shall be permitted provided they are protected to provide a fire resistance rating of not less than 1 hour.

Exception No. 2: Certain concealed spaces shall be permitted by the Exception to 3-4.4.

3-4.2 Wood columns supporting floor loads shall be not less than 8 in. (203 mm) in any dimension; wood columns supporting roof loads only shall be not less than 6 in. (152 mm) in least dimension and not less than 8 in. (203 mm) in depth.

3-4.3 Wood beams and girders supporting floor loads shall be not less than 6 in. (152 mm) in width and not less than 10 in. (254 mm) in depth; wood beams and girders and other roof framing, supporting roof loads only, shall be not less than 4 in. (102 mm) in width and not less than 6 in. (152 mm) in depth.

3-4.4 Framed or glued laminated arches that spring from grade or the floor line and timber trusses that support floor loads shall be not less than 8 in. (203 mm) in width or depth. Framed or glued laminated arches for roof construction that spring from grade or the floor line and do not support floor loads shall have members not less than 6 in. (152 mm) in width and not less than 8 in. (203 mm) in depth for the lower half of the height and not less than 6 in. (152 mm) in depth for the upper half. Framed or glued laminated arches for roof construction that spring

from the top of walls or wall abutments and timber trusses that do not support floor loads shall have members not less than 4 in. (102 mm) in width and not less than 6 in. (152 mm) in depth.

Exception: Spaced members shall be permitted to be composed of two or more pieces not less than 3 in. (76 mm) in thickness when blocked solidly throughout their intervening spaces or when such spaces are tightly closed by a continuous wood cover plate not less than 2 in. (51 mm) in thickness, secured to the underside of the members.

Splice plates shall be not less than 3 in. (76 mm) in thickness.

3-4.5 Floors shall be constructed of splined or tongued and grooved plank not less than 3 in. (76 mm) in thickness covered with 1-in. (25-mm) tongue and groove flooring, laid crosswise or diagonally to the plank, or with 1/2-in. (12.7-mm) plywood, or of laminated planks not less than 4 in. (102 mm) in width, set on edge close together, spiked at intervals of 18 in. (457 mm) and covered with 1-in. (25-mm) tongue and groove flooring laid crosswise or diagonally to the plank or with 1/2-in. (12.7-mm) plywood.

3-4.6 Roof decks shall be of splined or tongued and grooved plank not less than 2 in. (51 mm) in thickness; or of laminated planks not less than 3 in. (76 mm) in width, set on edge close together, and laid as required for floors; or of 1 1/8-in. (28.6-mm) thick interior plywood (exterior glue); or of approved noncombustible or limited-combustible materials of equal fire durability.

3-5 Type V (111-000). Type V construction is that type in which exterior walls, bearing walls, and floors and roofs and their supports are wholly or partly of wood or other approved combustible material smaller than required for Type IV construction. In addition, structural members have fire resistance ratings not less than those set forth in Table 3.

Chapter 4 Referenced Publications

4-1 The following documents or portions thereof are referenced within this standard and shall be considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

4-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 251, *Standard Methods of Fire Tests of Building Construction and Materials*, 1990 edition

NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*, 1990 edition

NFPA 259, *Standard Test Method for Potential Heat of Building Materials*, 1987 edition.

4-1.2 ASTM Publication. American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM E136-1982, *Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C.*

Appendix A

This Appendix is not a part of the requirements of this NFPA document, but is included for information purposes only.

A-2 These definitions apply to the materials used in the construction of buildings but do not apply to furnishings or the contents of buildings, or to the fire hazard evaluation of materials.

A-2 Fire Resistance Rating. The fire resistance of building construction varies with the susceptibility to damage by fire of the building materials used and the degree of fire protection, if any, provided for the structural members. See also ASTM E119 and UL 263.

A-2 Flame Spread Rating. See also ASTM E84 and UL 723. Under the criteria of NFPA 255, the flame spread rating is expressed numerically on a scale for which the zero point is fixed by the performance of inorganic-reinforced cement board and the 100 point (approximately) is fixed by the performance of untreated red oak flooring.

A-3-4 The dimensions used for sawn and glued laminated lumber in Section 3-4 are nominal dimensions.

Appendix B Recommendations on Plastics in Building Codes and Standards

This Appendix is not a part of the requirements of this NFPA document, but is included for information purposes only.

This Appendix is prepared to furnish guidance to NFPA Committees and for the drafting of provisions, applying to plastics, that may be used in building codes.

Small-scale fire tests may provide misleading results in evaluating plastics for building materials. It is not proper to exempt plastics from recommendations concerning fire hazard characteristics that building codes and standards specify for other building materials.

The use of standard fire tests for all building materials, including plastics, is recommended, particularly those for fire resistance of structural assemblies (NFPA 251, *Standard Methods of Fire Tests of Building Construction and Materials*) and for surface flame spread and other features (NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*).

Appendix C Potential Heat of Selected Building Materials

NOTE: Proceedings of ASTM, Vol. 61, 1961, pp. 1336-1348.

Material	Thickness in.	Density lb/ft^3	Potential Heat, Weight basis, Btu/lb
1. WOODS			
a. Douglas fir, untreated	3/4	38.0	8,400
b. Douglas fir (retardant treatment "A")	3/4	37.2	8,290
c. Douglas fir (retardant treatment "B")	3/4	47.2	7,850
d. Douglas fir (retardant treatment "C")	3/4	38.8	7,050
e. Maple soft, untreated	1	39.5	7,940
f. Hardboard, untreated	1/4	59.8	8,530
2. PLASTICS			
a. Polystyrene, wall tile	0.075	65.4	17,420
b. Rigid, polyvinyl chloride, retardant treated	.147	86.0	9,290
c. Phenolic laminate	.063	76.4	7,740
d. Polycarbonate resin	1/4	78.7	13,330
3. INSULATION			
a. Glass fiber, semirigid, no vapor barrier	1	3.0	3,040
b. Rock wool batting, paper enclosure	3	2.4	1,050
c. Roof insulation board	1	10.4	3,380
d. Cork (reconstituted cork sheet)	1/4	14.8	11,110
e. Cellulose mineral board	2	47.8	2,250
4. CONCRETE			
a. Cinder aggregate		93.0	3,080
b. Slag aggregate		110.1	80
c. Shale aggregate		80.5	10
d. Calcareous gravel aggregate		133.1	-250
e. Silceous gravel aggregate		166.8	- 40
5. CEMENT BOARD			
a. Asbestos cement board	3/16	117.0	80
b. Asbestos cement board + 20 mil paint	3/16	159.2	390
6. GYPSUM			
a. $CaSO_4 \cdot H_2O$ hydrated neat gypsum	0.41	137.9	- 290
b. Perlite aggregate plaster, 21 percent aggregate	1	53.2	70
c. Sand aggregate plaster 15 percent aggregate	1	101.8	- 50
d. Vermiculite aggregate plaster 15 percent aggregate	1	51.2	- 90
e. Gypsum board "A"	3/8	50.5	760
f. Gypsum board "A" with paper removed	3/8	46.6	- 270
g. Gypsum board "A" + alkyd gloss paint	3/8	46.7	880
h. Gypsum board "B"	1/2	51.2	650
7. LATH			
a. Gypsum A	3/8	55.3	310
b. Metal diamond mesh	.025	405	1,230
c. Metal diamond mesh, paint removed	.019	401	660
8. METALS			
a. Structural steel-unpainted	.060	489	230
b. Magnesium	.128	122	10,800
c. Aluminum	.004	165	30
d. Brass	.004	534	100
e. Copper	.024	556	60
f. Lead	.036	710	280
g. Zinc		415	760
9. MISCELLANEOUS			
a. Paint "E" (dried paint film)	.05		3,640
b. Asphalt shingles (fire retardant)	1/4	70.7	8,320
c. Building paper (asphalt impregnated)	.042	42.8	13,620
d. Building paper (rosin sized)	.018	23.6	7,650
e. Linoleum tile	1/8	86.0	7,760
f. Brick, red-face	2 1/4	139.1	20
g. Charcoal, coconut	—	—	13,870

NOTE: All weight and percentages refer to original air-dry weight.

Appendix D Referenced Publications

D-1 The following documents or portions thereof are referenced within this standard for informational purposes only and thus should not be considered part of the requirements of this document. The edition indicated for each reference is the current edition as of the date of the NFPA issuance of this document.

D-1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101.

NFPA 251, *Standard Methods of Fire Tests of Building Construction and Materials*, 1990 edition

NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*, 1990 edition.

D-1.2 Other Publications.

D-1.2.1 ASTM Publications. American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM *Proceedings*, Vol. 61, 1961, pp. 1336-1348

ASTM E84-1990, *Standard Test Method for Surface Burning Characteristics of Building Materials*

ASTM E119-1988, *Standard Test Method of Fire Tests of Building Construction and Materials.*

D-1.2.2 UL Publications. Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062.

UL 263-1984, *UL Standard for Safety Fire Tests of Building Construction and Materials*, Tenth Edition

UL 723-1983, *UL Standard for Safety Test for Surface Burning Characteristics of Building Materials*, Sixth Edition.

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SUBMITTING PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

Contact NFPA Standards Administration for final date for receipt of proposals on a specific document.

Note: All proposals must be received by 5:00 p.m. E.S.T./E.D.S.T. on the published proposal closing date.

INSTRUCTIONS

Use a separate proposal form for submitting each proposed amendment.

1. Type or print legibly in black ink.

2. Indicate the number, edition year, and title of the document. Also indicate the specific section or paragraph that the proposed amendment applies to.

3. Check the appropriate box to indicate whether this proposal recommends adding new text, revising existing text, or deleting text.

4. In the space identified as "Proposal" indicate the exact wording you propose as new or revised text, or the text you propose be deleted.

5. In the space titled "Statement of Problem and Substantiation for Proposal" state the problem which will be resolved by your recommendation and give the specific reason for your proposal. Include copies of test results, research papers, fire experience, or other materials that substantiate your recommendation.

6. Check the appropriate box to indicate whether or not this proposal is original material, and if it is not, indicate the source of the material.

7. Sign the proposal.

If supplementary material (photographs, diagrams, reports, etc.) is included, you may be required to submit sufficient copies for all members and alternates of the technical committee. The technical committee is authorized to abstract the "Statement of Problem and Substantiation for Proposal" if it exceeds 200 words for publication in the Technical Committee Reports.

NOTE: The NFPA Regulations Governing Committee Projects in Paragraph 10-10 state: Each proposal shall be submitted to the Council Secretary and shall include:

(a) identification of the submitter and his affiliation (Committee, organization, company) where appropriate, and

(b) identification of the document, paragraph of the document to which the proposal is directed, and

(c) a statement of the problem and substantiation for the proposal, and

(d) proposed text of proposal, including the wording to be added, revised (and how revised), or deleted.

FORM FOR PROPOSALS ON NFPA TECHNICAL COMMITTEE DOCUMENTS

Mail to: Secretary, Standards Council
National Fire Protection Association, 1 Batterymarch Park, Quincy, Massachusetts 02269-9101
Fax No.: 617-770-3500

Note: All proposals must be received by 5:00 p.m. E.S.T./E.D.S.T. on the published proposal closing date.

Date 5/18/85 Name John B. Smith Tel. No. 617-555-1212

Address 9 Seattle St., Seattle, WA 02255

Representing (Please indicate organization, company or self) Fire Marshals Assn. of North America

1. a) Document Title: Protective Signaling Systems NFPA No. & Year NFPA 72D

b) Section/Paragraph: 2-7.1 (Exception)

FOR OFFICE USE ONLY
Log #:
Date Rec'd:
Proposal #:

2. Proposal recommends: (Check one) ☐ new text
☐ revised text
☒ deleted text.

3. Proposal (include proposed new or revised wording, or identification of wording to be deleted):

Delete exception.

4. Statement of Problem and Substantiation for Proposal:

A properly installed and maintained system should be free of ground faults. The occurrence of one or more ground faults should be required to cause a "trouble" signal because it indicates a condition that could contribute to future malfunction of the system. Ground fault protection has been widely available on these systems for years and its cost is negligible. Requiring it on all systems will promote better installations, maintenance and reliability.

5. ☒ This Proposal is original material.
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John B. Smith
Signature (Required)

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