NFPA®

1408

Standard for Training Fire Service Personnel in the Operation, Care, Use, and Maintenance of Thermal Imagers

2020

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NFPA® 1408

Standard for

Training Fire Service Personnel in the Operation, Care, Use, and Maintenance of Thermal Imagers

2020 Edition

This edition of NFPA 1408, *Standard for Training Fire Service Personnel in the Operation, Care, Use, and Maintenance of Thermal Imagers*, was prepared by the Technical Committee on Fire Service Training. It was issued by the Standards Council on November 4, 2019, with an effective date of November 24, 2019, and supersedes all previous editions.

This edition of NFPA 1408 was approved as an American National Standard on November 24, 2019.

Origin and Development of NFPA 1408

The 2015 edition of NFPA 1408 was the first edition of the standard dealing with training in thermal imaging. The chapters included policies and procedures, instructor requirements, student prerequisites, and training program components.

For the 2020 edition, the committee has done a complete review of the document and updated the extracted and referenced material for the purpose of consistency and accuracy. The committee also has added a new chapter, Chapter 8, on the care and maintenance of thermal imagers, expanding on a requirement in Chapter 7 of the 2015 edition. The committee also has added requirements addressing the operational limits of thermal imagers. End users must be aware of those operational limits and not set expectations outside of those limits.

Technical Committee on Fire Service Training

Committee Scope: This Committee shall have primary responsibility for all fire service training techniques, operations, and procedures to develop maximum efficiency and proper utilization of available personnel. Such activities can include training guides for fire prevention, fire suppression, and other missions for which the fire service has responsibility.

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

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced and extracted publications can be found in Chapter 2 and Annex B.

Chapter 1 Administration

Δ 1.1 Scope.

N **1.1.1** This standard shall contain minimum requirements for training fire service personnel to utilize fire service thermal imagers (TI).

1.1.2 This standard specifies evolutions that can be adapted to local conditions and serves as a standard mechanism for the evaluation of minimum acceptable performance during training for the utilization of fire service TI.

1.2 Purpose. The purpose of this standard is to specify a training program that is designed to create competency regarding the operation, application, use, and limitations of TI.

1.3 Equivalency. Nothing herein is intended to restrict any jurisdiction from exceeding these minimum requirements.

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1001, *Standard for Fire Fighter Professional Qualifications,* 2019 edition.

NFPA 1041, *Standard for Fire and Emergency Services Instructor Professional Qualifications,* 2019 edition.

NFPA 1081, *Standard for Facility Fire Brigade Member Professional Qualifications,* 2018 edition.

NFPA 1403, *Standard on Live Fire Training Evolutions,* 2018 edition.

NFPA 1801, *Standard on Thermal Imagers for the Fire Service,* 2018 edition.

2.3 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

Δ 2.4 References for Extracts in Mandatory Sections.

NFPA 1670, *Standard on Operations and Training for Technical Search and Rescue Incidents*, 2017 edition.

NFPA 1801, *Standard on Thermal Imagers for the Fire Service*, 2018 edition.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary,* 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3 Shall. Indicates a mandatory requirement.

3.2.4 Should. Indicates a recommendation or that which is advised but not required.

3.2.5 Standard. An NFPA Standard, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the NFPA Manuals of Style. When used in a generic sense, such as in the phrase "standards development process" or "standards development activities," the term "standards" includes all NFPA Standards,

including Codes, Standards, Recommended Practices, and Guides.

3.3 General Definitions.

3.3.1 Compliance/Compliant. Meeting or exceeding all applicable requirements of this standard.

3.3.2 Component. Any material, part, or subassembly used in the construction of the compliant product. [**1801,** 2018]

3.3.3 Emissivity. The ratio of the radiation emitted by a surface to the radiation emitted by a blackbody at the same temperature. [**1801,** 2018]

3.3.4 Immediately Dangerous to Life or Health (IDLH). Any condition that would pose an immediate or delayed threat to life, cause irreversible adverse health effects, or interfere with an individual's ability to escape unaided from a hazardous environment. [**1670,** 2017]

3.3.5 Manufacturer. The entity that directs and controls any of the following: compliant product design, compliant product manufacturing, or compliant product quality assurance; also, the entity that assumes liability for the compliant product or provides the warranty for the compliant product. [**1801,** 2018]

Chapter 4 Fire Service Thermal Imager Training Policy and Procedures

4.1 General.

4.1.1 A TI training program shall be implemented.

4.1.2 Risks to participants during training shall be kept to a minimum.

4.2 Training Policies and Guidelines.

4.2.1 The AHJ shall establish written policies for TI training that meet the requirements of this standard.

4.2.2 The policy shall address the training requirements for types of incidents where TIs may be used.

4.2.3 The training policy shall include an annual review of member competence in TI technology, operation, application, use and limitations, and care and maintenance.

4.2.4 TI training shall include practical evolutions, using TI.

4.2.5* Training and evaluation documentation shall be maintained by the AHJ.

4.2.6* The training program shall include both individual and crew training.

4.2.7 Members shall be provided with TI training and education before being permitted to operate TIs per AHJ.

4.2.8* Before new or unfamiliar TIs are placed into service, training and education relating to those imagers shall be provided for all affected members.

4.2.9 Members shall be provided with classroom education and hands-on familiarization in TI functions before being permitted to operate TIs in IDLH atmospheres.

4.2.10 Smoke produced from live fire shall be prohibited in TI training sessions until the participant has demonstrated proficiency with self-contained breathing apparatus (SCBA) acceptable to the AHJ.

4.2.11 A safety briefing shall be conducted prior to TI training evolutions.

4.2.11.1 All facets of each evolution to be conducted shall be discussed.

4.2.11.2 Assignments shall be made for all crews participating in the training session.

Chapter 5 Thermal Imager Instructor Requirements

5.1 Operation. Training related to the operation, application, use and limitations, and care and maintenance of TIs shall be provided by instructors meeting the job performance requirements (JPRs) of Instructor I of NFPA 1041.

5.1.1* Instructors shall also have knowledge of the specific features and functions of the thermal imager to be used in training, as provided by the manufacturer and NFPA 1801.

5.1.2 Instructors providing training on TIs shall be approved by the AHJ.

5.1.3 Instructor in Charge.

5.1.3.1 The instructor in charge shall be responsible for full compliance with this standard.

5.1.3.2 It shall be the responsibility of the instructor in charge to coordinate overall evolutions during TI training.

5.1.4 Instructors shall be familiar with the manufacturer's operation of the TIs being utilized.

5.2 Conducting Training Program.

Δ **5.2.1** Prior to each evolution, the instructor in charge shall ensure that all of the appropriate protective clothing and equipment are being worn or used according to manufacturer's specifications.

5.2.2 When performing TI training involving live fire, the instructor in charge shall be responsible for ensuring compliance with NFPA 1403.

5.2.3 Instructors shall monitor and supervise all assigned students during TI training evolutions.

5.2.4 The instructor-in-charge shall provide for rest and rehabilitation of members operating during training.

5.2.5 Safety Officer.

5.2.5.1 A safety officer shall be appointed when required for the training evolutions being performed.

5.2.5.2 All safety officers shall be trained on the application of the requirements contained in this standard.

5.2.5.3 The safety officer shall have the authority, regardless of rank, to intervene and control any aspect of the operations when, in his or her judgment, a potential or actual danger exists.

5.2.5.4 The safety officer shall provide for the safety of all persons on the scene, including students, instructors, visitors, and spectators.

5.2.5.5 The safety officer shall not be assigned other duties that interfere with safety responsibilities.

5.2.5.6 Additional safety personnel, as deemed necessary by the safety officer, shall be located to react to any unsafe or threatening situation or condition.

Chapter 6 Student Prerequisites

Δ 6.1 General Requirements.

N **6.1.1** Prior to being permitted to participate in the TI training program, students shall have received training to meet the JPRs for Fire Fighter I in NFPA 1001 or NFPA 1081.

Δ 6.1.1.1* Students participating in TI training who have received the required minimum training from other than the AHJ shall not be permitted to participate in any TI training without first presenting prior written evidence of having successfully completed the prescribed minimum training to the level specified in 6.1.1.

Δ 6.1.1.2 Students who have not yet met the full requirements of 6.1.1 shall be permitted to participate in cognitive-based TI training to obtain knowledge of basic TI technology and operation.

Chapter 7 Thermal Imager Training Program Components

7.1 Use and Limitations. All participants using TIs shall understand their use and limitations.

7.1.1* All participants using TIs shall understand their use and limitations along with scientific principles describing the operation of the TI.

7.1.2 All participants using TI shall understand how the temperature gauge measures temperature specific to the TI being used.

7.1.3 All participants shall understand the functions, modes and use of accessories specific to the TI being used.

7.1.4 All participants shall understand how to operate advanced features specific to the TI being used.

7.1.5 All participants shall understand how to continue operations in the event of a TI failure.

7.1.6* All participants shall understand image interpretation and misinterpretation, including the following:

(1) Distance to view and recognize an object is dependent upon the environment you are operating in.
(2) Image clarity is dependent upon the environment and conditions such as rain, snow, heat.
(3) Image will be compromised due to depth perception.
(4) Mirrors and shiny objects all cause reflectivity, thus not providing accurate information to the participant.
(5) The ability to "see" thermal energy through a window is dependent on the type of IR sensor, the type of glass, and the thermal conditions.
(6) False readings.
(7) Understand the emissivity values of materials as they pertain to two or more different materials in the imager's field of vision.
(8) Water will give a reflective image, thus not providing accurate information to the participant.

7.1.7* The participant shall have knowledge of how to use a TI for the following applications:

(1) Search
(2) Fire attack
(3) Investigations
(4) Overhaul
(5) Motor vehicle accidents
(6) Size-up
(7) Hazardous materials incidents
(8) Electrical emergencies
(9) USAR operations
(10) Rapid intervention crew (RIC) operations
(11) Accountability
(12) Rehab
(13) Participant safety
(14) Ventilation
(15) Apparatus placement
(16) Stream placement
(17) Exposure protection
(18) Water rescues
(19) Assisting other agencies such as the law enforcement agencies
(20) Wildland
(21) Building construction
(22) Training
(23) Other topics identified by the AHJ

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N Chapter 8 Thermal Imager Care and Maintenance

N **8.1 General.** All participants using TIs shall have knowledge of the manufacturer's specifications for care and maintenance of TIs.

N **8.2 Cleaning.**

N **8.2.1** All participants shall understand how to clean and maintain TIs.

N **8.2.2** The participant shall clean the outside of the TI after each use with mild soap or detergent and use a clean soft cloth and soapy water to wipe the display and the lens.

N **8.2.3** The participant shall check the tightness of screws on the cover, the display, and any straps.

N **8.2.4** All participants shall understand that solvents or paint thinners could damage or degrade the case or display lens and should not be used to clean a TI.

N **8.2.5*** All participants shall understand that a TI should not be submerged underwater or subjected to high-pressure water.

N **8.3 Batteries.** All participants shall understand how to charge a TI and change batteries if required.

N **8.4* Storage.** All participants shall understand how to safely store a TI.

N **8.5* Service.** All participants shall understand that TIs have no user serviceable parts.

Annex A Explanatory Material

Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.3.2.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction (AHJ). The phrase "authority having jurisdiction," or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A.4.2.5 See NFPA 1401 for guidance in documenting training.

A.4.2.6 TIs can be used individually depending upon the circumstance. For instance, an incident commander could use the imager for his or her initial and ongoing size-up, personnel accountability, exposure assessment, fire extension, and overall incident mitigation.

A.4.2.8 The intent of 4.2.8 is to ensure that the TI used to train personnel is of the same specific type and manufacture that is used within the jurisdiction. In some cases, such as at state and community college training facilities, participants should have to train initially with TIs unlike those used in the local jurisdiction. Upon return to the local jurisdiction additional training should take place to build on skills learned. This training should utilize the specific type and manufacturer of TI that will be used by the department.

A.5.1.1 Thermal imaging training must be conducted by instructors who are knowledgeable in the utilization of infrared technology in emergency incident mitigation.

Δ **A.6.1.1.1** The type of written documentation required can vary depending on the instructor's familiarity with the student participants' level of training from outside agencies. All student participants from outside agencies should be allowed to participate only as official representatives of an established organization. Prior documentation should be required to facilitate planning of the training session.

A.7.1.1 Thermal imagers (TIs) are used in a wide variety of thermal environments. For example, a fire fighter might encounter high temperatures, open flames, pools and sprays of water, and thick smoke; therefore, it is important that TIs are capable of seeing in these obstructive conditions with a minimum amount of interference from the surrounding environment. Fire service thermal imagers are generally designed to detect radiant thermal energy in the 8 μm–14 μm spectral range. This energy is radiated from solid surfaces, particulates, and some gases. A characteristic of the radiating surfaces and gases called *emissivity* affects how the thermal radiation intensity relates to the actual temperature in a way that can make the surface or gas appear to have a temperature that is different from reality. A surface or gas having an emissivity of 1 is said to be a *blackbody*, meaning that it absorbs and re-emits all energy incident upon it and thus is representative of its actual temperature. A surface or gas having an emissivity of 0 reflects all energy, making the surface or gas appear colder than it actually is. In general, surfaces that are flat black in color and somewhat rough in texture tend to have high emissivities, and surfaces that are shiny and smooth tend to have low emissivities. Most TIs are designed to use a constant emissivity value of 0.95 to convert the radiant energy signal to a temperature value. The further an object's emissivity is from 0.95, the less accurate that object's surface temperature will appear to be. The term *apparent temperature* is used to account for temperature deviations caused by differences in emissivity.

TIs typically sense energy radiated from a surface of a solid. If the solid object is a good insulating material such as a wood floor or an insulated wall or ceiling, the apparent temperature might not be representative of the thermal hazard on the other side of the solid object.

In other situations, the fire environment could change, resulting in rapidly increasing smoke temperatures. With a TI looking through smoke at a wall, the apparent temperature could be significantly less than the actual temperature of the gas. In other words, a TI is an unreliable thermometer. It should be used to look for thermal contrasts, movement, and heat signatures. It should not be relied on to determine the temperature of a compartment, through either a digital readout or a color scale.

Colorization ranges are not standardized and can vary significantly among TIs and manufacturers.

A.7.1.6 The TI operator must clearly understand the limitations of the technology.

Materials used in wall and wood floor assemblies and floor coverings are good insulators (poor conductors of heat): as a result, a TI will not provide a reliable indication of the thermal conditions on the other side of a wall or floor.

Post-flashover conditions [>1100°F (593°C)] might exist below a wood floor assembly, while the energy flow through the floor that can be "seen" by a TI is100°F to 200°F (38°C to 93°C).

Because of the insulating qualities of materials used in building construction, TIs provide no indication of the structural integrity of a building or a building component such as a floor. TIs cannot provide a reliable indication of collapse. See NIST Technical Note 1709, "Examination of the Thermal Conditions of a Wood Floor Assembly above a Compartment Fire."

A.7.1.7 *Searching.* A victim image could appear as white or black, depending on the environment. For example, in a room that is 70°F (21°C), the victim image should appear to be white, but in a room that is 300°F (149°C) the victim image should appear to be black. In a room where the surface temperature and the skin temperature are the same, the victim might not even be seen with the TI.

Fire attack. The TI could be used to look above and find the radiant heat, indicating which direction the fire fighter would need to proceed to find the fire.

Investigation. The TI could be used to identify heat sources such as hot light ballast, overheated machinery, or overheated electrical outlets.

Overhaul. The TI could be used to identify smoldering items or look for hidden fire in void spaces.

Motor vehicle collisions. The TI could be used to identify heat signatures of people ejected from the vehicle but might also show heat signatures of people in the car prior to the victims being ejected.

Size-up. The TI could be used to see heat signatures of the exterior of the building or windows indicating interior fire involvement. TI operators should understand that a structure that has the heating system on in a cooler environment might also appear as a structure fire.

Hazardous materials incidents. The TI could be used to see tank liquid levels, vapor spaces, and vapor releases. The TI operator should understand insulated tanks and double-walled tanks will not show liquid levels or vapor spaces. Tanks that have just had material removed or added might not show an accurate liquid level or vapor space.

Electrical emergencies. The TI could be used to see downed power lines, overheated electrical outlets, and so forth.

USAR operations. The TI could be used to look for victims in void spaces. TI operators should understand the victim image in a void space could be displayed as black or white, depending on the atmosphere or if the victim is dead or alive.

Rapid intervention crew (RIC). The TI could be used to assist in RIC operations. The TI operator should understand that down fire fighters could be displayed as black or white, depending upon the environment in which they are located.

Accountability. The TI is an excellent tool for participant accountability, reducing the time it takes to account for fire fighters in an emergency situation. TI operators should understand a false image could be displayed due to reflections. TIs account for the correct number of fire fighters but do not account for the correct fire fighters assigned to a sector or division.

Rehab. The TI could be used as a comparison of fire fighters. Fire fighters doing the same job or task should be the same shade, but an overheated fire fighter would show up whiter than other fire fighters.

Participant safety. The TI could be used to look for thermal layering and indications that the room is close to flashover conditions.

Ventilation. The TI could be used to look at roof conditions, scuttles, and vents displaying a heat signature. The TI operator must understand the difference between conducted heat from an interior fire and heat absorbed from the sun. The same should be understood about a scuttle or vent showing heat from a fire versus heat from the building's heating system.

Apparatus placement. The TI could be used to identify wires overhead prior to positioning aerial apparatus.

Stream placement. The TI could be used to position interior attack lines and master streams when fire fighters cannot see due to smoky conditions.

Exposures. The TI could be used to see exposures or what the fire is impinging upon from a distance.

Water rescue. The TI could see victims floating in water but not beneath the surface of the water. Victims exposed to cold water temperatures might be seen only for short periods of time, if at all.

Assisting other agencies such as the law enforcement agencies. The TI could be used to see skid marks of a motor vehicle collision, thus helping police in their investigations.

Building construction. The TI operator could use the TI to identify the type of building construction, trusses affected by heat, means of egress from the building, room height, and so forth.

Training. The TI is an excellent tool for fire instructors to record and show fire fighters proper search techniques and to show fire apparatus drivers/operators overheated pumps when water was not properly recirculated.

N **A.8.2.5** The TI operator should refer to OEM guidance for specific TI care and maintenance.

N **A.8.4** The TI should be stored in an apparatus mount or in a storage case designed for the TI.

N **A.8.5** The TI operator should not disassemble or attempt to repair the TI. If the TI is not functioning properly, it should be returned to the manufacturer's representative.

Annex B Informational References

B.1 Referenced Publications. The documents or portions thereof listed in this annex are referenced within the informational sections of this standard and are not part of the requirements of this document unless also listed in Chapter 2 for other reasons.

Δ **B.1.1 NFPA Publications.** National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1401, *Recommended Practice for Fire Service Training Reports and Records,* 2017 edition.

N **B.1.2 Other Publications.**

B.1.2.1 NIST Publications. National Institute of Standards and Technology, 100 Bureau Drive, Stop 1070, Gaithersburg, MD 20899-1070.

Madrzykowski and Kent, "Examination of the Thermal Conditions of a Wood Floor Assembly above a Compartment Fire," NIST Technical Note 1709, July 2011.

B.2 Informational References. (Reserved)

B.3 References for Extracts in Informational Sections. (Reserved)

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Sequence of Events for the Standards Development Process

Once the current edition is published, a Standard is opened for Public Input.

Step 1 – Input Stage

- Input accepted from the public or other committees for consideration to develop the First Draft
- Technical Committee holds First Draft Meeting to revise Standard (23 weeks); Technical Committee(s) with Correlating Committee (10 weeks)
- Technical Committee ballots on First Draft (12 weeks); Technical Committee(s) with Correlating Committee (11 weeks)
- Correlating Committee First Draft Meeting (9 weeks)
- Correlating Committee ballots on First Draft (5 weeks)
- First Draft Report posted on the document information page

Step 2 – Comment Stage

- Public Comments accepted on First Draft (10 weeks) following posting of First Draft Report
- If Standard does not receive Public Comments and the Technical Committee chooses not to hold a Second Draft meeting, the Standard becomes a Consent Standard and is sent directly to the Standards Council for issuance (see Step 4) or
- Technical Committee holds Second Draft Meeting (21 weeks); Technical Committee(s) with Correlating Committee (7 weeks)
- Technical Committee ballots on Second Draft (11 weeks); Technical Committee(s) with Correlating Committee (10 weeks)
- Correlating Committee Second Draft Meeting (9 weeks)
- Correlating Committee ballots on Second Draft (8 weeks)
- Second Draft Report posted on the document information page

Step 3 – NFPA Technical Meeting

- Notice of Intent to Make a Motion (NITMAM) accepted (5 weeks) following the posting of Second Draft Report
- NITMAMs are reviewed and valid motions are certified by the Motions Committee for presentation at the NFPA Technical Meeting
- NFPA membership meets each June at the NFPA Technical Meeting to act on Standards with "Certified Amending Motions" (certified NITMAMs)
- Committee(s) vote on any successful amendments to the Technical Committee Reports made by the NFPA membership at the NFPA Technical Meeting

Step 4 – Council Appeals and Issuance of Standard

- Notification of intent to file an appeal to the Standards Council on Technical Meeting action must be filed within 20 days of the NFPA Technical Meeting
- Standards Council decides, based on all evidence, whether to issue the standard or to take other action

Notes:

1. Time periods are approximate; refer to published schedules for actual dates.
2. Annual revision cycle documents with certified amending motions take approximately 101 weeks to complete.
3. Fall revision cycle documents receiving certified amending motions take approximately 141 weeks to complete.

Committee Membership Classifications[1,2,3,4]

The following classifications apply to Committee members and represent their principal interest in the activity of the Committee.

1. M *Manufacturer:* A representative of a maker or marketer of a product, assembly, or system, or portion thereof, that is affected by the standard.
2. U *User:* A representative of an entity that is subject to the provisions of the standard or that voluntarily uses the standard.
3. IM *Installer/Maintainer:* A representative of an entity that is in the business of installing or maintaining a product, assembly, or system affected by the standard.
4. L *Labor:* A labor representative or employee concerned with safety in the workplace.
5. RT *Applied Research/Testing Laboratory:* A representative of an independent testing laboratory or independent applied research organization that promulgates and/or enforces standards.
6. E *Enforcing Authority:* A representative of an agency or an organization that promulgates and/or enforces standards.
7. I *Insurance:* A representative of an insurance company, broker, agent, bureau, or inspection agency.
8. C *Consumer:* A person who is or represents the ultimate purchaser of a product, system, or service affected by the standard, but who is not included in (2).
9. SE *Special Expert:* A person not representing (1) through (8) and who has special expertise in the scope of the standard or portion thereof.

NOTE 1: "Standard" connotes code, standard, recommended practice, or guide.

NOTE 2: A representative includes an employee.

NOTE 3: While these classifications will be used by the Standards Council to achieve a balance for Technical Committees, the Standards Council may determine that new classifications of member or unique interests need representation in order to foster the best possible Committee deliberations on any project. In this connection, the Standards Council may make such appointments as it deems appropriate in the public interest, such as the classification of "Utilities" in the National Electrical Code Committee.

NOTE 4: Representatives of subsidiaries of any group are generally considered to have the same classification as the parent organization.