

2004 China-U.S. Standards and Conformity Assessment Workshop

Electrical Installation Codes and Standards

Clive W. Kimblin
August 19, 2004
Beijing, PRC



Electrical Installation Code in the United States of America

- National Electrical Code
- Date of the latest version-2002
- Next edition-2005 (Sept. 2004)
- Revisions made every 3 years
- National Fire Protection Association - Committee on the National Electrical Code - responsible for maintaining the Code
- Key contact person: Mark W. Earley
mwearley@nfpa.org

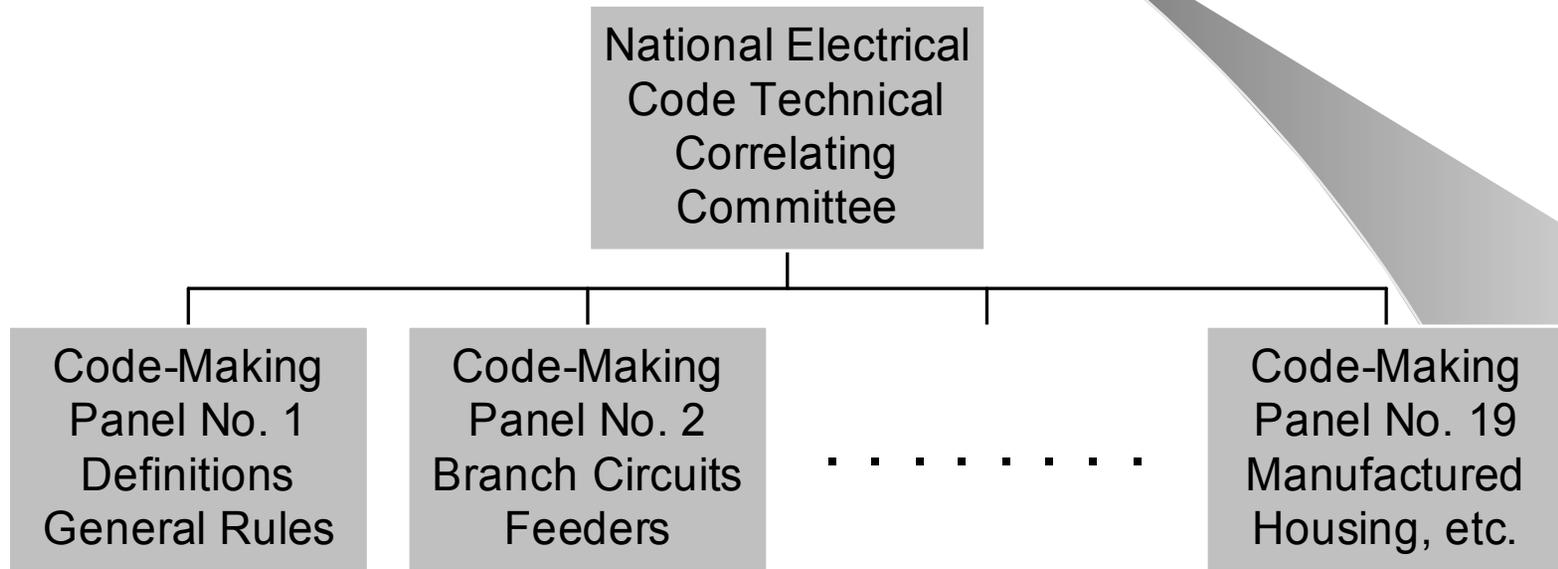


Electrical Installation Code in the United States of America

- First edition published in 1897 by the National Conference on Standard Electrical Rules
- NFPA assumed sponsorship in 1910
- Published annual and 2-year editions until 1959
- Has published every 3 years editions since 1959
- Published 40 of the 48 editions



Organization of the National Electrical Code Process



The National Electrical Code Committee

- Technical Correlating Committee-an oversight committee that has overall responsibility to correlate the reports of the various committees reporting to it.
- Code-Making Panels -Technical committees that have responsibilities for specific technical subject areas of the code

NFPA Codes and Standards Process

- Categories of Interest

- ◆ Users
- ◆ Manufacturers
- ◆ Enforcers
- ◆ Testing/Research
- ◆ Special Experts
- ◆ Insurance
- ◆ Installer/Maintainer
- ◆ Consumer
- ◆ Labor
- ◆ Utility

National Fire Protection Association

- Founded in 1896
- Private, Non-Profit, Voluntary Codes and Standards Developer
- ANSI Accredited Audited Designator Organization
- Membership Organization - 69,000 (members in U.S. and 97 Nations)
- Mission - "...To Reduce the Burden of Fire on the Quality of Life..."
- Focus - Fire Safety, Electrical Safety, and Related Hazards



Electrical Codes and Standards



NFPA Codes and Standards Process

- Open Consensus Process - Encourages Innovation, Accessible to All
- Broad Based Committee Membership
- North American Participation in Process
- Technically Skilled Staff Oversee Process and Support Users with Handbooks, Training, and Advice



NFPA Codes and Standards Process, cont.

- Staff Liaison
 - Technical Expert, Administrator
- Steps in Process
 - ◆ Enter Revision Cycle
 - ◆ Call for Proposals
 - ◆ Committee Acts on Proposals
 - ◆ Publish Report on Proposals - ROP
 - ◆ Call for Comments
 - ◆ Committee Acts on Comments
 - ◆ Publish Report on Comments – ROC
 - ◆ Adoption at National Meeting

National Electrical Code Applicability

- The code is used by construction contractors on a national basis
- Some amendments on the local level
- Compliance with the code is required for industrial, commercial, residential, public, and private; utilities are exempt.
- The code is applied to new construction and recommended for renovation.
- NFPA 70E is a recommended practice that covers electrical equipment maintenance



National Electrical Code Enforcement

- Evidence of compliance -- certificate of compliance/occupancy issued by Authority Having Jurisdiction (AHJ)
- Dispute settlement is usually handled through an electrical board
- Penalty for non-compliance
 - No certificate issued
 - Fines

Relationship between Code, Standards, and Certification

For Code Compliance the Authority Having Jurisdiction (AHJ) will check that the Equipment is Listed:

Listed (as defined by the Code). Equipment, materials, or services included in a list published by an organization that is acceptable to the AHJ and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services, and whose listing states that the equipment, material, or services either meets appropriate designated standards, or has been tested and found suitable for a specified purpose.



Relationship between Code and Certification

For Code Compliance the Authority Having Jurisdiction will check that the Equipment is Listed:

Listed (as defined by the Code). Equipment, materials, or services included in a list published by an organization that is acceptable to the AHJ and concerned with evaluation of products or services, that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services...



Relationship between Code and Standards

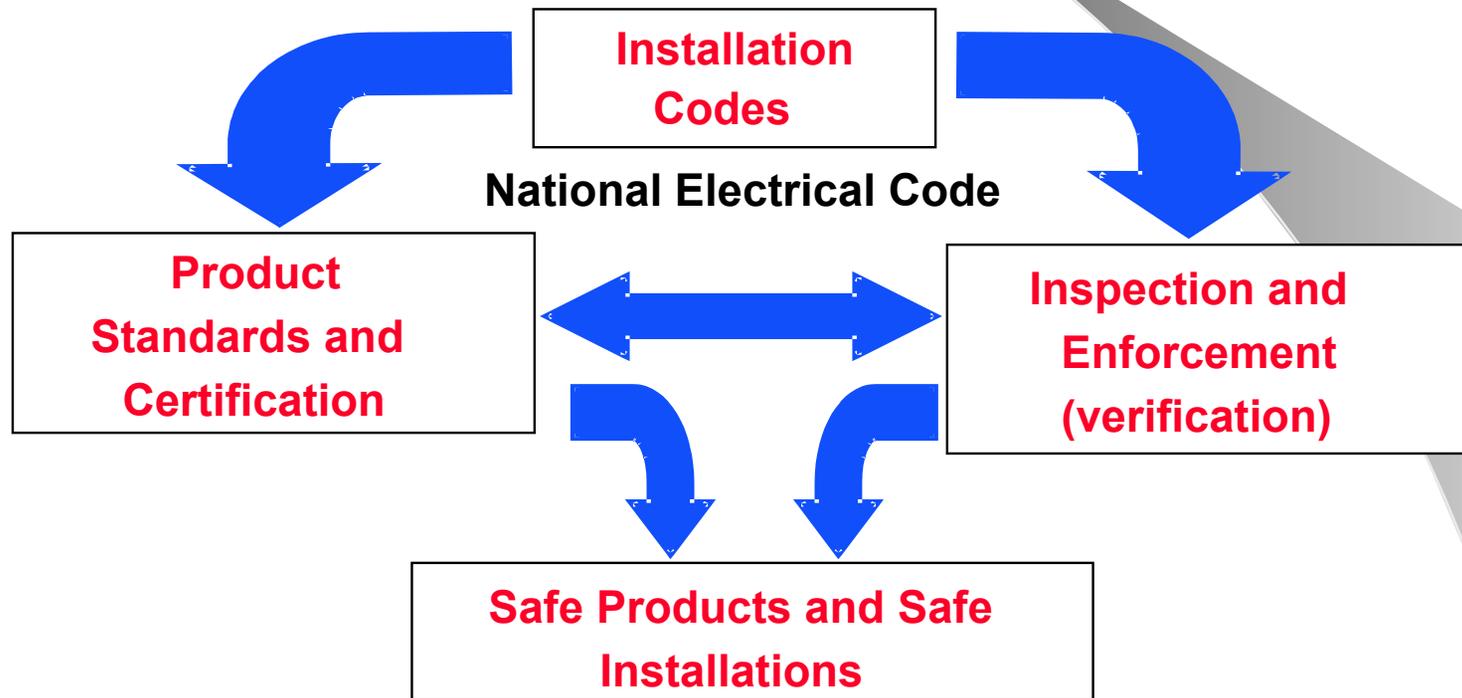
For Code Compliance the Authority Having Jurisdiction will check that the Equipment is Listed:

Listed (as defined by the Code)..... and whose listing states that the equipment, material, or services either meets appropriate designated standards, or has been tested and found suitable for a specified purpose.



The US Electrical Safety System

Relationship between Code, Standards, Conformity Assessment, and Inspection



Electrical Product Standards in the U. S.

- Examples of organizations responsible for developing, publishing:
 - UL, IEEE, NFPA, NEMA, ASHRAE, EIA, ISA
 - These organizations develop standards for all voltage levels
- Generally voluntary consensus standards*.
- Low voltage < 600 Volts AC; electrical distribution products (e.g. MG1, UL 489, 508 etc.)
- High voltage >1000 Volts (AC or DC); product standards above 1KV (e.g.: C37, C57).
- Source documents for new standards can be existing standards, manufacturers' specifications.

* Some medical products are covered by mandatory regulations. Also, installation codes although voluntary, are adopted by States and local jurisdictions.



Development Process for New Standards

- Can be initiated by component or original equipment manufacturers (OEMs), other users such as inspectors, installers, government agencies, or standards development organizations (SDOs).
- Participants include users, authorities, installers, manufacturers, consumers; balanced representation is required.

Development Process for New Standards cont.

- Time required to complete the process varies, but generally 12 to 24 months for new technology products.
- Impact of standards development organizations such as ISO and IEC varies. Some U.S. organizations adopt them, others propose incorporation of their national practices within ISO and IEC standards.

Making Revisions to Existing Standards

- Process is initiated by SDO or manufacturer or other users.
- Participants include the same list as for new standards. Many of those standards going through ANSI process require also public review.
- Revision usually completed within 12 months.
- Some revised standards become effective immediately upon approval, others have future effective dates.

Making Revisions to Existing Standards, cont.

- Products delivered must comply with the new standard on or before the effective date.
- The timing allowed for new compliance varies; codes and other rules could have mandatory compliance dates months or years after adoption.

Electrical Product Standards Impact on Importing Products into the U.S.

Requirements of Customs Agency

- Customs has the authority to enforce trademark laws at the port of entry.
- Other private sector organizations work with Customs to prevent “unsafe” products.

Other Agencies Having Impact on Product Safety

- Participation of government agencies:
 - Consumer Product Safety Commission (CPSC) – product recall.
 - Federal Battery Act – bans the sale of alkaline manganese batteries with added mercury.
- State and local:
 - California Prop. 65: Products that contain carcinogens and reproductive toxins cannot be sold unless labeled as such.

Expectations for the Future – The National Electrical Code

- The Code will continue to evolve and be the installation code for the U.S.

[Note: In 1999, NEMA published “Electrical Installation Requirements: A Global Perspective” that explores the similarities, differences, and various attributes of two documents: *The National Electrical Code*, ANSI/NFPA 70, and the International Electro-Technical Commission Standard, IEC 60364, *Electrical Installation of Buildings*.]



Expectations for the Future – Standards

- North American Standards satisfy the requirements of the U.S., Canada, and Mexico and certain areas of the world.
- IEC and ISO Standards Activities are increasing in volume due to demands of trading partners in Globalization of markets.
- There will continue to be differences due to infrastructure, climate, and different approaches to health and safety.



Expectations for the Future – Standards (continued)

- The new IEC Policy on Global Relevance is being studied.
- Levels of harmonization of domestic U.S. Standards with IEC / ISO Standards is increasing. This could be particularly helpful for product certification (one standard, one test, global acceptance.)

Summary

- The U.S. has a comprehensive and effective electrical safety system:
 - Code
 - Standards (with certifications)
 - Inspection
- Codes & Standards are constantly evolving.
- Global manufacturers are fully aware of the differences associated with the various electrical safety systems.

