## Electrical Standards Used For
### Specification and Construction

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AAMI = Association for Advancement of Medical Instruments  
ABYC = American Boat & Yacht Council  
AHAM = Association of Home Appliance Manufacturers  
ANSI = American National Standards Institute (EE Stds being taken over by IEEE)  
ASTM = American Society for Testing and Materials  
CBEMA = Computer and Business Equipment Manufacturers Association  
CPSC = Consumer Products Safety Commission  
ECSA = Exchange Carriers Standards Association  
EIA = Electronics Industries Association (http://www.eia.org)  
FCC = Federal Communications Commission  
FDA = Federal Department of Agriculture  
IEEE = Institute of Electrical and Electronics Engineers  
IEC = International Electrotechnical Commission (Outside US)  
IPCEA = Insulated Power Cable Engineers Association  
ISA = Instrument Society of America  
ISO = International Standards Organization:  
   (9000=General, 9001=System, 9002=Component)  
   (14000 = Environmental Management & Auditing)  
JEDEC = Joint Electron Devices Engineering Council (“Jed-eck”, part of EIA)  
MSHA = Mining Safety & Health Administration  
NAB = National Association of Broadcasters  
NIST = National Institute of Standards and Technology (formerly NBS)  
NCTA = National Cable Television Association  
NEC = National Electrical Code (provided by NFPA)  
NEMA = National Electrical Manufacturers Association  
NERC = North American Electric Reliability Council  
NESC = National Electrical Safety Code (for high voltage, by IEEE/ANSI)  
NFPA = National Fire Protection Association  
NRC = Nuclear Regulatory Commission  
OSHA = Occupational Safety and Health Administration  
SMPTE = Society of Motion Picture and Television Engineers  
UL = Underwriters’ Laboratories. (CSA in Canada)
WHY ARE STANDARDS NEEDED?

- **STANDARDIZED COMPONENTS**
  - Standardized discrete sizes, values
  - Predictable Performance and Ratings
  - Parts will fit and work together, regardless of manufacturer

- Standardize Procedures
  - Manufacturing
  - Assembling
  - Testing

  - Reassurance of good design (standards are hopefully written by experts)

    - Avoid wasted time of wheel reinvention - use standard design approaches and procedures.

    - Designs can be built at any manufacturing facility.
Design Criteria and Requirements (Constraints)

These are some general questions that might be asked during brainstorming and design evaluation. The focus of the question depends on if you are designing a product, system, or process.

- Performs intended purpose within required tolerance/specification?
- Meets all required laws, regulations, and standards (see next page)?
- Economically feasible to design with available technology & resources?
- Economically feasible to build or manufacture? Must you retool assembly line, retrain workers, stock additional materials, etc? How long does it take to manufacture or build?
- Economically feasible to market? Are competing products already on the market? Will your sales force require additional training? Can you deliver it on time?
- Reliable enough to make customer happy, last through warrantee? Avoid unhappy customers, bad reputation, decline in sales and profit margin.
- Easy to learn how to use and operate? It is user-friendly or user-hostile?
- Economic scheduled maintenance during warrantee period, repair afterwards?
- Is the product or system safe to use? Is it safe to be around? Will only a trained person use it, or will the general public be exposed to it?
- What happens after the economic or functional life is used up? How can it be disposed, recycled or demanufactured? Are there any environmentally hazardous materials?

Many of the above can be summed up as the “-ilities.” That is:

- Designability
- Disposability
- Liability
- Maintainability
- Manufacturability
- Operability
- Marketability
- Reliability
- Repairability