

NFPA 70B: Standard for Electrical Equipment Maintenance

What does this mean for safety?

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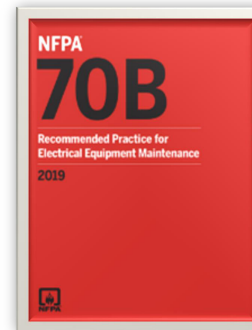


Agenda

- What is NFPA 70B?
- What regulations apply to maintenance?
- Will NFPA 70B becoming a Standard have an impact?
- How does maintenance improve electrical safety?
- How can maintenance improve customer service?



What is NFPA 70B?



- What is NFPA 70B?
 - NEC requests for maintenance
 - Committee formed in 1968
 - Recommended practice for electrical equipment maintenance
- Existed in a space that is 100% optional
- Was not ready for primetime





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OSHA Regulations – Federal Law

Code of Federal Regulations (CFR)

WHAT

CFR 1910. Occupational Safety and Health Standards

SUBPART

I	132-140	Personal Protective Equipment (PPE)	General Industry
S	301-399	Electrical	
R	261-272	269 Electric power generation, transmission, and distribution	Utilities/ Like Installations

261-272 Special Industries

- Enforceable as law
- Performance-based language
- Not updated on a regular basis

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OSHA Requirements

WHAT

The general duty clause...
requires workplaces to be **free from recognized hazards**
Specific duty clauses require **employers** to comply with OSHA standards

Examples

Subpart I: PPE
132(a) General Requirements.
... Protective equipment ... shall be provided, used, and maintained ... wherever it is necessary...

Subpart S: Electrical
333(a)(1) Deenergized Parts. Live parts to which an employee may be exposed shall be deenergized before the employee works on or near them...

335(a)(1)(i) Employees working ...where there are potential electrical hazards shall be provided with, and shall use, electrical protective equipment...

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Applicable Regulations and Standards for Electrical Industry

OSHA (CFR, Title 29)
1910, **Subpart S**
1926, **Subpart K**

National Electrical Code
NFPA 70E
NFPA 70B

Support Standards

- NETA MTS
- IEEE
- ASTM
- ANSI
- IEC

Comparable Canadian Standards

- OH&S
- CSA: Z462, CEC, Z463

NFPA 70B as a Standard

- Mandatory language
 - “Should” becomes “shall”
 - Drives compliance and enforcement
- Prescriptive requirements
 - Provides a blueprint to owners
 - Details the what and when
 - Fills in many informational gaps



NFPA 70B as a Standard

- NFPA Manual of Style format
- Chapter 1– Administration
 - Scope
 - Application
- Chapter 2– Referenced Pubs
- Chapter 3– Definitions



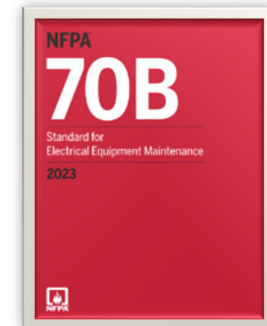
NFPA 70B as a Standard

- Chapter 4– General
 - Electrical Preventive Maintenance Program(EMP)
 - Personnel roles
 - Equipment cleaning
- Chapter 5– Personnel Safety
 - Qualified Persons
 - Refers to applicable laws, codes, and standards (OSHA & 70E)



NFPA 70B as a Standard

- Chapter 6 – Single line diagrams and system studies
 - Up-to-date drawings
 - Requires short-circuit study
 - Maintenance by design
- Chapter 7 – Fundamental tests
 - Bolted bus connections
 - Insulation resistance
 - Infrared thermography



NFPA 70B as a Standard

- Chapter 8 – Field testing and test methods
 - Special hazards risk assessment
 - Testing category types
 - Testing personnel qualifications
- Condition of maintenance
 - Serviceable
 - Limited Service
 - Non-serviceable



NFPA 70B as a Standard

- Chapter 9 – Maintenance Intervals
 - Table 9.2.2
 - Referenced by other Chapters
 - Can be altered if documented in EMP
 - Details frequency of maintenance based on the condition of equipment.



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0.4 Qualifications of Testing

link.nfpa.org/publications/70B/2023/chapters/9

2023 NFPA 70B Chapter 9 – Maintenance Intervals

Pin Header

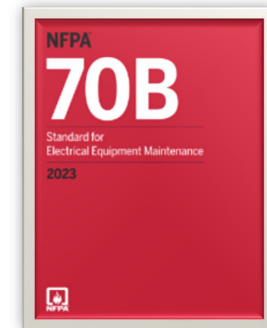
Table 9.2.2 Maintenance Intervals

Product	Scope of Work	Equipment Condition Assessment		
		Condition 1	Condition 2	Condition 3
All equipment	Infrared thermography	12 months	12 months	6 months
Battery ESSs	Visual inspection	60 months	36 months	12 months
	Cleaning	60 months	36 months	12 months
	Lubrication		Reserved	
	Mechanical servicing		Reserved	
	Electrical testing	60 months	36 months	12 months
Busways	Visual inspection	60 months	60 months	12 months
	Cleaning	60 months	36 months	12 months
	Lubrication	60 months	36 months	12 months
	Mechanical servicing	60 months	36 months	12 months
	Electrical testing	60 months	36 months	12 months
	Special	60 months	36 months	12 months
Cable trays	Visual inspection	12 months	12 months	6 months

Mechanical servicing 60 months 36 months

NFPA 70B as a Standard

- Chapter 9 – Maintenance Intervals (Cont.)
- Equipment Condition Assessment
 - Physical Condition
 - Criticality Condition
 - Operating Environment Condition



Physical Condition

- Condition 1
 - Appears in like new condition
 - Enclosure is clean, dry, and tight
 - No notifications or unaddressed issues
 - Previous maintenance in accordance with EMP
- Condition 2
 - Deviation from previous results indicate higher frequency
 - Active recommendations or notifications
- Condition 3
 - Missed two previous cycles
 - Urgent actions required
- Non-Serviceable Equipment



Criticality Condition

- Condition 1 or 2 can be assigned if failure will not endanger personnel
- Condition 3 must be applied if failure can cause injury to workers



Operating Environment Condition

- Condition 1 or 2 can be assigned if the equipment is rated for the environment in which it is installed
 - NEMA 4 enclosure where subject to hosedown conditions
- Condition 3 must be assigned when equipment is in a harsh environment for which it is not rated



NFPA 70B as a Standard

- Chapters 10 through 38 are specific to certain equipment
 - Chapter 12 – Substations and Switchgear
 - Chapter 15 – Circuit Breakers
 - Chapter 32 – Battery Energy Storage Systems
 - Reserved chapters



Maintenance Reduces Risk

- Proper maintenance ensures that equipment will operate as advertised
 - Normal operation
 - Circuit breakers
 - Switches
- EPM provides documentation for service work



Maintenance Improves Serviceability

- One-line diagrams are kept up-to-date
- Known issues are documented
- Cuts down on time to troubleshoot
- Establishes contractor as that go-to source of expertise



Thank you

Questions?

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