

US
INFRARED
INSPECTIONS

US Infrared Inspections
US Informed Inspections

US Infrared Inspections & US informed inspections is a national company specializing in Infrared and ultrasound inspections to assist in all your electrical, building envelope, roof, air-leak, and motor inspections.

The list of electrical components and systems we inspect includes but is not limited to:

Bus Disconnect, MCC's, SWBD's, XFMR's, Breakers, Lugs, Terminal Blocks, Motor Disc, Elevator Disc, VFD's, ATS's, PDU's, Branch Panels, AC Control Panels, Data Centers, Center CRAC Units, Chiller Modules, RTU, Air Leaks, Tightness Testing, Hydraulics, Sub Stations, Distribution Lines, Refractures, and much more

Coverage: USA (all 50 States)

Why Choose USII?

Lets Start With The NFPA 70B

Prior to 2023, the NFPA (National Fire & Protection Authority) recommended infrared inspection on an undetermined schedule. In essence, no regulation. In most cases, the only companies that got the inspection done were those who had a recommendation from the insurance company or were conscientious about maintaining their facility.

The NFPA 70B code was changed in 2023 to STANDARD, where it pertains to infrared inspections

What does that mean to you?

If you own a commercial establishment/ building, you must get an infrared inspection once each calendar year with one exception.

Let's review NFPA 70B as it pertains to infrared inspections of your electrical systems.

Who is the NFPA

The National Fire Protection Association (NFPA) is a global self-funded nonprofit organization, established in 1896, devoted to eliminating death, injury, property and economic loss due to fire, electrical, and related hazards.

“NFPA is widely known as a codes and standards organization – that’s the backbone of what we do, and it always will be. Our mission is to provide you with the information and knowledge you need to do your job well in today’s ever-changing environment. Our 300 [codes and standards](#) are designed to minimize the risk and effects of fire by establishing criteria for building, processing, design, service, and installation around the world. The more than 250 technical committees, comprised of approximately 9,000 volunteers, review public inputs and vote on the revisions in a process that is accredited by the American National Standards Institute. NFPA provides [free online access](#) to its codes and standards.”

Is The NFPA 70B Enforceable?

- **NFPA 70B**, Recommended Practice for Electrical Equipment Maintenance, has historically been just that: a recommendation. However, beginning in 2023, that recommendation will now become a standard, i.e., it will become enforceable once adopted by an authority having jurisdiction (AHJ).
- **OSHA** – Occupational Safety and Health Authority
Under the guidelines of the NFPA 70B, Osha can come at any time to review your electrical and safety records and practices. If you cannot produce an infrared inspection report based on the proper condition of the NFPA 70B, you could receive a fine.
- **Insurance Carrier** –
 - Your insurance carrier could deny a claim if you cannot produce historical data showing you received an infrared inspection based on the proper condition of the NFPA 70B

Lets Review the NFPA 70B as it pertains to infrared inspections.

Issuance Date

Approval and Active Date

Direct Verbiage NFPA 70B As it pertains to Infrared Inspections procedures and frequency

2023 Edition

This edition of NFPA 70B, *Standard for Electrical Equipment Maintenance*, was prepared by the Technical Committee on Electrical Equipment Maintenance and released by the Correlating Committee on National Electrical Code. It was issued by the Standards Council on December 27, 2022, with an effective date of January 16, 2023, and supersedes all previous editions. This edition of NFPA 70B was approved as an American National Standard on January 16, 2023.

Table Of Content

Chapter 7 Fundamental Tests	
7.4 Infrared Thermography	70B-14

Chapter for infrared Inspections

N 7.4 Infrared Thermography.

N 7.4.1 Infrared thermography shall be used when required to verify temperature differences (Cl. T) of the following:

- (1) Similar electrical components under similar loading
- (2) Comparison between electrical components and ambient air temperatures

N 7.4.2 All accessible and necessary covers shall be removed prior to infrared thermography inspection to provide a clear line of sight to the equipment being scanned.

N 7.4.3 Temperature differences between the area of concern and the reference area shall be documented.

N 7.4.4 Infrared thermography inspections shall be performed at normal circuit loading.

N 7.4.5 Where normal circuit loading is not feasible, circuit loading of not less than 40 percent of nominal circuit loading shall be permitted.

N 7.4.6 Circuit loading characteristics shall be documented and retained for future reference

N Chapter 8 Field Testing and Test Methods

N 8.1 Introduction. Field testing and test methods shall be conducted in accordance with this chapter to assess the overall condition of electrical equipment and systems and to accomplish the following objectives:

- (1) Ascertain the ability of the device under test to continue to perform its function as designed
- (2) Determine whether any corrective maintenance or replacement is necessary
- (3) Document the condition of the equipment over its service life
- (4) Provide results to ascertain the overall condition of maintenance of the device under test

N 8.2 Risk Assessment Special Considerations. Where the following special considerations are present, a risk assessment shall be performed to identify hazards and determine if additional protective measures are required prior to beginning work:

- (1) Electrical, as follows:



Procedure



Field Testing & Methods

- (a) X-ray
- (b) Overpotential
- (2) Mechanical, as follows:
 - (a) Stored energy
 - (b) Mass energy
- (3) Chemical, as follows:
 - (a) SF₆ gas fault by-products
 - (b) Electrolytes
- (4) Environmental, as follows:
 - (a) Asbestos
 - (b) SF₆ gas
 - (c) Insulating fluids, as follows:
 - (i) PCBs
 - (ii) Tetrachloroethylene

N 8.3* Testing Category Types. Electrical maintenance testing tasks shall be identified as one of the following category types:

- (1) Category 1-Online standard test
- (2) Category IA - Online enhanced test
- (3) Category 2 - Offline standard test
- (4) Category 2A - Offline enhanced test

WARNING: Testing of electrical equipment while it is connected to the source of supply introduces additional hazards to the worker. Workers should understand the hazards and risks of the test being performed.

N 8.3.1 Category 1 - Online Standard Test. Online standard tests shall include testing procedures performed while the electrical equipment or device is connected to the source of supply.

N 8.3.2 Category I A Online Enhanced Test. Online enhanced tests shall include certain testing procedures performed while the electrical equipment or device is connected to the source of supply and that are not typically performed in normal electrical maintenance activities and that provide additional diagnostic information. (See A.8.3.)

N 8.3.3 Category 2 - Offline Standard Test. Offline standard tests shall include testing procedures performed while the electrical equipment or device is disconnected from the source of supply or is connected to an external test voltage source of supply.

N 8.3.4 Category 2A - Offline Enhanced Test. Offline enhanced tests shall include certain testing procedures performed while the electrical equipment or device is disconnected from the source of supply or is connected to an external test voltage source of supply and that are not typically performed in normal electrical maintenance activities and that provide additional diagnostic information. (See A.8.3.)

N 8.4 Qualifications of Testing Personnel.

N 8.4.1 Testing personnel shall be qualified to operate the test equipment used in the type of test to be performed.

N 8.4.2 Testing personnel shall be qualified to perform the test procedure the specific equipment to be tested.

V 8.5 Test Equipment And Tools

V 8.5.1 The test equipment shall be maintained in satisfactory Mechanical and electrical condition.

N 8.5.2 The test equipment shall be applied in accordance with The manufactures' specifications

N 8.3* Testing Category Types. Electrical maintenance testing tasks shall be identified as one of the following category types:

- (1) Category 1-Online standard test
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- (3) Category 2 - Offline standard test
- (4) Category 2A - Offline enhanced test

WARNING: Testing of electrical equipment while it is connected to the source of supply introduces additional hazards to the worker. Workers should understand the hazards and risks of the test being performed.

N8.5.3* Test equipment that provides measurements shall be calibrated.

N8.5.4 Calibration information shall be readily available for all test equipment.

N8.5.5 Test equipment calibration intervals shall be appropriate to ensure the accuracy of the test instrument with consideration for the conditions of use.

N8.5.6 Proper tools, instruments, and other test equipment shall be used when performing maintenance activities.

N8.6 Test Record.

N8.6.1 A test record shall be created for all field tests of electrical equipment.

N8.6.2 Test records shall contain the following minimum information:

- (1) Identification of the testing person and organization
- (2) Identification of the equipment under test
- (3) Nameplate or label data from the equipment under test
- (4) Environmental conditions, such as humidity and temperature, that could affect the results of the tests or calibrations
- (5) Date of the test
- (6) Indication of test performed
- (7) Indication of pass/fail criteria, where applicable
- (8) Indication of as-found and as-left test results, where applicable
- (9) Test operator's comments or recommendations, where applicable

N8.7 Condition of Maintenance Indication. Information shall be made readily available to communicate the condition of maintenance.

N8.7.1 Conditions of Maintenance.

N8.7.1.1 **Serviceable.** Equipment that passes all tests and is electrically and mechanically sound shall be designated as serviceable.

N8.7.1.2. **Limited Service.** Equipment that has problems that are not detrimental to the protective operation or design characteristics of the equipment shall be designated as limited service.

N8.7.1.3 **Nonserviceable.** Equipment that has a problem that is detrimental to the proper electrical or mechanical operation of the equipment shall be designated as nonserviceable.

N Chapter 9 Maintenance Intervals

N9.1 **Scope.** This chapter identifies the required frequency of maintenance for electrical equipment.

N9.1.1 * **Continuous Monitoring and Predictive Techniques.**

N9.1.1.1 * **Continuous monitoring or predictive techniques shall be permitted to be used as a consideration when determining maintenance intervals.**

N9.1.1.2* Continuous monitoring or predictive techniques shall be based on manufacturer's recommendations or accepted industry practices.

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N9.1.1.1 * Continuous monitoring or predictive techniques shall be permitted to be used as a consideration when determining maintenance intervals.

N9.1.2 Maintenance Frequency Modifications.

N9.1.2.1 Once the initial frequency for inspection and tests has been established based on the intervals listed in Table 9.2.2 and the equipment condition assessment, this frequency shall be adhered to for at least two maintenance cycles unless unexpected failures occur.

N9.1.2.1.1 For equipment that has unexpected failures, the cause of the failure shall be used to determine if the maintenance interval for the equipment needs to be reduced.

N9.1.2.1.2 If more than two inspections are completed without requiring additional service, the equipment owner shall be permitted to resume the original inspection period.

N9.1.2.2 If more than two inspections are completed without detecting equipment problems, the maintenance cycle shall be permitted to be extended to longer intervals than listed in Table 9.2-2.

N9.2 Frequency of Maintenance.

N9.2.1 The manufacturer's recommendations shall be followed for each of the maintenance scopes specified in this standard for the required intervals.

N9.2.2 Where the manufacturer's recommendations are not provided or available and failure, breakdown, or malfunction of the equipment will present an unacceptable risk for personnel or the environment, equipment maintenance shall be performed at not greater than the intervals specified in Table 9.2.2, in accordance with the equipment condition assessment in Section 9.2, and as modified by the other parts of this chapter.

N9.2.2.1 The intervals in Table 9.2.2 shall only be required if referenced by a specific section in another chapter.

N9.2.2.2 The maintenance interval for electrical equipment shall be permitted to be altered based on the potential risk to personnel or facility operations due to a failure of the equipment to operate as expected.

N9.2.2.3 Any deviations from the maintenance intervals described in Table 9.2.2 to extend the maintenance interval and the justification for the deviation shall be documented in the EMP.

N9.3 Equipment Condition Assessment. The equipment condition shall be the highest condition category in accordance with 9.3.1, 9.3.2, and 9.3.3 as determined by the owner or their designee.

N9.3.1 Physical Condition of Electrical Equipment. Equipment that is included in the electrical EMP shall be assessed for current equipment condition in accordance with 9.3.1.1 through 9.3.1.3.

N9.3.1.1 Equipment Physical Condition; 1 shall be assigned where all the following criteria apply:

- (1) The equipment appears in like new condition.
- (2) The enclosure is clean, free from moisture intrusion, and tight.
- (3) No unaddressed notification from the continuous monitoring system has occurred.
- (4) There are no active recommendations from predictive techniques.
- (5) Previous maintenance has been performed in accordance with the EMP.

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- (1) The equipment appears in like new condition.
- (2) The enclosure is clean, free from moisture intrusion, and tight.
- (3) No unaddressed notification from the continuous monitoring system has occurred.
- (4) There are no active recommendations from predictive techniques.
- (5) Previous maintenance has been performed in accordance with the EMP.

How to Determine Your Frequency

N 9.3.1.2 Equipment Physical Condition 2 shall be assigned where all of 9.3.1. 1 apply, and where any of the following criteria apply:

- (1) Maintenance results deviate from past results or have indicated more frequent maintenance in accordance with manufacturer's published data.
- (2) The previous maintenance cycle has revealed issues requiring the repair or replacement of major equipment components.
- (3) There have been notifications from the continuous monitoring system since the prior assessment
- (4) There are active recommendations from predictive techniques.

V 9.3.1.3 Equipment Physical Condition 3 shall be assigned where changes in **operation** are noted or where any of the following criteria applies ~

- 1) The equipment has missed the last two successive maintenance Cycles in accordance with the EMP.

- (2) The previous maintenance cycle has revealed issues requiring the repair or replacement of major equipment components.
- (3) There is an active or unaddressed notification from the continuous monitoring system.
- (4) There are urgent actions identified from predictive techniques.

N 9.3.1.4 Nonserviceable Equipment.

N 9.3.1.4.1 Equipment that poses an imminent risk of injury or negative health effects to personnel shall be designated as nonserviceable in accordance with 8.7.1.3.

N 9.3.1.4.2 Access to nonserviceable equipment by unqualified persons shall be restricted .

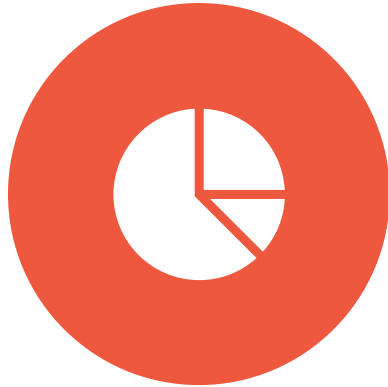
N 9.3.1.5 **Nonconforming Equipment.** Equipment exhibiting characteristics that do not conform to any of the above conditions shall be identified as requiring corrective measures before returning to a normal operating condition.' .

If you answer "No" to any of the criteria, you have to abide by condition 3

Product	Scope of Work	Condition 1	Condition 2	Condition 3
All equipment	Infrared	12 months	12 months	6 months
Battery ESSs	Visual inspection Cleaning Lubrication Mechanical servicing Electrical testing	60 months 60 months 60 months 60 months 60 months	36 months 36 months Reserved Reserved, 36 months	12 months 12 months 12 months
Busways	Visual inspection Cleaning Lubrication Mechanical servicing Electrical testing Special	60 months 60 months 60 months 60 months 60 months 60 months	60 months 36 months 36 months 36 months 36 months 36 months	12 months 12 months 12 months 12 months 12 months 12 months
Cable trays	Visual inspection Cleaning Lubrication Mechanical servicing Electrical testing	12 months 60 months 60 months 60 months 60 months	12 months 36 months 36 months 36 months 36 months	6 months 12 months 12 months 12 months 12 months
Electric vehicle power transfer systems	Visual inspection Mechanical inspection Electrical testing	60 months 60 months 60 months	36 months 36 months 36 months	12 months 12 months 12 months
Electronic equipment			Reserved	
Fuses	Visual inspection Cleaning Lubrication Mechanical servicing Electrical testing	60 months 60 months 60 months 60 months 60 months	36 months 36 months 36 months 36 months 36 months	12 months 12 months 12 months 12 months 12 months
GFCIs	Visual inspection Cleaning Lubrication Mechanical Reserved Servicing	12 months 60 months 60 months 60 months	12 months 36 months 36 months	6 months 12 months 12 months
Grounding and bonding	Visual inspection Lubrication Mechanical servicing Electrical testing	12 months 60 months	12 months Cleaning Reserved Reserved Reserved	6 months
High-voltage substation insulators	Visual inspection Corona detection Maintenance and Testing	12 months 12 months 60 months	12 months 6 months 36 months	6 months 4 months 12 months
Lighting	Visual inspection Cleaning Servicing	60 months 60 months 60 months	36 months 36 months 36 months	12 months 12 months 12 months

Product	Scope of Work	Condition 1	Condition 2	Condition 3
Switches	Visual inspection Cleaning Lubrication Mechanical servicing Electrical testing	60 months 60 months 60 months 60 months 60 months	36 months 36 months 36 months 36 months 36 months	12 months 12 months 12 months 12 months 12 months
Switchgear	Visual inspection Cleaning Lubrication Mechanical servicing Electrical testing Special	12 months 60 months 60 months 60 months 60 months 60 months	12 months 36 months 36 months 36 months 36 months 36 months	6 months 12 months 12 months 12 months 12 months 12 months
Uninterruptible power supplies	Visual inspection Cleaning Lubrication Mechanical servicing Electrical testing Special procedures	6 months 12 months 12 months 12 months 24 months	3 months 6 months Reserved 6 months 24 months	1 months 3 months 3 months 12 months 24 months
Wind power electric systems	Visual inspection Cleaning Lubrication Mechanical servicing Electrical testing	60 months 60 months 60 months 60 months 60 months	36 months 36 months Reserved 36 months 36 months	12 months 12 months 12 months 12 months 12 months
Wiring devices	Visual inspection Cleaning Lubrication Mechanical servicing Electrical testing	12 months 60 months 60 months 60 months 60 months	3 months 36 months Reserved 36 months 36 months	1 months 12 months 12 months 12 months 12 months

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