



BSR/ASHRAE Standard 180-2018R

Public Review Draft

Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems

**Advisory Public Review (August 2026)
(Complete Draft for Full Review)**

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FOREWORD

The 2026 edition of ANSI/ASHRAE/ACCA Standard 180 is another step in the continuous improvement journey of this standard. Unintended errors, omissions, and oversights that occurred in the 2018 edition required a comprehensive review and update of that text. The updates to the text have resolved these issues. The text has been improved for better clarity and continuity. An initial review of the published 2018 edition by ASHRAE Headquarters listed instances with improper verbiage that has been corrected. There was a significant improvement with the current committee where the members were knowledgeable in HVAC maintenance and the requirements imposed by ANSI and ASHRAE for developing standards. The members from ACCA brought depth of professional experience, an understanding of standards development, and a collaborative attitude to the committee.

It is critical for users and implementers of this standard to understand the implementation requirements found in Section 4 before moving on to the equipment tables in Section 5.n

Title, Purpose, and Scope remain unchanged from prior editions. The committee found no compelling reasons to revise these sections that would offer significant improvement. Changes to the standard are summarized as follows:

1. **Forward** *The forward is created at the discretion of the Committee Chairman; therefore, changes can be expected with every edition. This edition stands on the efforts of past committees and chairmen. ACCA and ASHRAE members have served with distinction to advance the practice of Commercial HVAC equipment inspection and maintenance. The following is a summary of the changes to the text.*
2. **Definitions** *Several terms and their respective definitions have been removed due to the terms being deleted from the text. One definition, Program Objectives, was better suited to be included in the body of the standard.*
3. **Maintenance Plan** *was retitled as: **Maintenance Program Implementation Plan***
4. **Program Development and Implementation – Section 4** *Text was added to this section to better explain requirements and concepts. Informative notes were also revised. Similar topics have been co-located and other paragraphs have been relocated.*
5. **Required Inspection and Maintenance Tasks**: *Some of the text in Section 5 including the equipment tables has been revised, task requirements have been clarified, and task frequencies have been updated. A significant change has been relocating the Recommended Corrective Action information from equipment tables in Section 5 to new equipment tables in the new Appendix F. It was thought collocating standard requirements with recommended actions would be convenient for users implementing this standard. When reviewed for this edition of the standard, the potential for misunderstanding the requirements was apparent. It was decided that the equipment table column titled “Recommended Corrective Action”, a non-normative action, be located in the appendix to conform to ANSI and ASHRAE standards. The committee affirmed this information is worthwhile to retain as reference for inexperienced users.*
6. **Relocated Information** *The Standard Project Committee affirmed the recommended corrective actions information is worthwhile as a reference for inexperienced users. Therefore, the Recommended Corrective Action data column was relocated, from the tables in Section 5 to new tables created in Appendix F.*
7. **New Column** *To facilitate documenting task and condition results, a new column was added to the equipment tables: “**Documentation Required**.” Its purpose is to indicate which tasks require a written record of the observations and results from inspection and maintenance tasks. An important feature of a maintenance program is keeping accurate records of the result of maintenance tasks and changes in equipment condition. Finally, the required inspection and maintenance tasks have been edited and task frequencies updated.*

8. **Appendices A through E:** have been updated to provide more clarity to the user.
9. **Appendix F** is new and includes equipment Tables F-1 through F-25 similar to those in Section 5. The duplication of equipment tables from Section 5 in Appendix F is the inclusion of recommended corrective actions in context with required inspection and maintenance tasks. The committee determined that the user will benefit from having all tasks in a set of equipment tables in the event that maintenance actions do not preserve equipment condition and performance. This information is intended to show a path for maintenance to evolve into repair tasks and provide non-mandatory guidance for performing other tasks for new or inexperienced owners and implementers. These tasks are outside the scope of this standard

Standard 180 Other Updates

Standard 180 was created in a collaborative effort between ASHRAE and Air Conditioning Contractors of America (ACCA). Collaboration among these committee members was outstanding. There was a clear understanding of the requirement for developing a standard written in code intended language. Its intent is to define the requirements for developing and implementing a minimum standard practice of Commercial HVAC inspection and maintenance work that preserves condition and performance of HVAC equipment. Compliance with this standard is intended to deliver consistent practice for inspecting and maintaining HVAC equipment in commercial, institutional, and other buildings where the public may be exposed to the indoor environment.

While progress has been made since the first publication of this standard in 2008, there are continual opportunities for improvement. Current maintenance practices in commercial buildings vary widely. The minimum standard practices of this standard are well suited for application in smaller commercial businesses, as well as facilities having advanced programs. Fundamental improvements in energy efficiency can reduce costs for small buildings. Likewise, similar improvements in thermal comfort and indoor air quality as a result of maintaining facilities according to the requirements of this standard are important factors towards improving worker productivity and health.

For the public good, it is essential that the HVAC equipment in all commercial buildings where people work, visit, or reside supports an indoor environment that has proper ventilation air and is free of harmful contaminants. In addition, sustainability mandates that these conditions be maintained in an energy efficient and reduced carbon manner.

Developed with the philosophy of “maintenance is preservative, and repair is restorative,” this standard describes the minimum acceptable level of maintenance to preserve the condition of commercial building HVAC equipment. It is not intended to limit the level of service provided or recommendations made by a maintenance provider. Those performing HVAC maintenance are encouraged to consider and recommend energy conservation measures or technology improvements that would help improve thermal comfort, the energy efficiency of the HVAC equipment, and indoor air quality.

This standard is written in code-intended language and some code organizations have referenced or adopted prior editions of this standard as the minimum acceptable level of performance within their jurisdictions. Because ownership of commercial buildings spans such a broad spectrum of owner knowledge, resources, and skill, this standard specifies the minimum requirements for compliance. This is intentional for requirements to apply to all commercial buildings and to encourage all business owners to adopt this standard regardless of size, experience, or ability. This standard also allows maintenance work to exceed the requirements of this standard and to work to continuously improve the delivery of inspection and maintenance work. Therefore, maintenance programs can comply or exceed requirements as business philosophy and resources allow.

This standard is specifically focused on inspection and maintenance of HVAC equipment for occupant thermal comfort, equipment energy efficiency, and indoor air quality. Additional maintenance program considerations related to equipment reliability, equipment robustness, and minimizing overall maintenance costs are also appropriate objectives to support sustainability efforts, protect the HVAC capital investment, and/or minimize system downtime. These considerations, however, are outside the scope of this standard.

This standard identifies what must be done, but not how to perform the required tasks to comply with the standard. This is left to the building owner and implementing organizations to determine. It is recognized that there is a wide spectrum of resources, skills, and management support that shapes and supports the work, and that similarly, several methods exist to perform the work that comply with this standard's requirements.

The intent of this standard is to (a) monitor changes in equipment condition over time as a measure of the efficacy of the maintenance program in meeting performance objectives and (2) provide advance indication of equipment failures. Unacceptable conditions could lead to equipment failure or performance degradation. When condition indicators reach unacceptable levels, additional preservative or restorative action is required.

STANDARD PRACTICE FOR INSPECTION AND MAINTENANCE OF COMMERCIAL BUILDING HVAC SYSTEMS

1. PURPOSE

The purpose of this standard is to establish minimum HVAC inspection and maintenance requirements that preserve a system's ability to achieve acceptable thermal comfort, energy efficiency, and indoor air quality in commercial buildings.

2. SCOPE

2.1 This standard specifies minimum requirements for *commercial HVAC inspection and maintenance* practice in new and existing buildings. Where specifically noted in this standard, different requirements apply.

2.2 The requirements of this standard do not apply to:

- a. single-family houses or multifamily structures of three or fewer stories above grade;
- b. Other HVAC *equipment* that primarily provides for industrial, manufacturing, or commercial processes; or
- c. other building HVAC *equipment* that this standard specifically identifies.

2.3 This standard shall not be used to circumvent any safety, health, or environmental requirements.

3. DEFINITIONS

Many of the terms used in this standard are defined in the *ASHRAE Terminology of Heating, Ventilation, Air-Conditioning, and Refrigeration*. Additional terms used in this standard are defined below.

commercial building: includes but is not limited to governmental and educational facilities, health care and hospitality facilities, institutional buildings, offices, places of assembly, restaurants, and buildings for retail and wholesale businesses.

commercial HVAC: any nonresidential or non-process or manufacturing-related HVAC application, including, but not limited to, applications for commercial buildings such as for governmental and educational facilities, health care and hospitality facilities, institutional buildings, offices, places of assembly, restaurants, retail and wholesale businesses.

commercial process: a process used primarily to produce, manipulate, or hold material goods or works, such as cold food storage, painting, *equipment* assembly or repair, clothing assembly or cleaning, etc. It is used in manufacturing, assembly, repair, conditioned storage, and treatment systems.

commercial HVAC: any nonresidential or non-process or manufacturing-related HVAC applications, including, but not limited to, applications for *commercial buildings*.

condition: the assessed physical characteristics of *equipment*, such as visual appearance and working order (noise, odor, vibration, or fluid leaks), as compared to a desired state or requirement. *Condition* is also the measurement of *performance*, that is, the delivery of the intended output capacities of the *equipment* that are compared to agreed-upon *condition* requirements. These assessments and measurements shall be documented and trended.

condition indicators: *predefined* descriptions and measures of the physical characteristics and delivery *performance* of *HVAC equipment*. The described characteristics and *performance* are outcomes of operation and maintenance tasks. Actual outcomes, when compared to the required standard, measure the effectiveness of the *equipment* and *performance*, and the effectiveness of the *maintenance program*. These are developed by the owner in collaboration with the maintenance implementer.

corrective action: work required to restore systems or *equipment* to an acceptable *condition*.

equipment: the assembly of machines and devices in a logical, functional manner that work systematically to provide an intended, conditioned environment for the facility.

inspection frequency: time period or interval when *inspection* and *maintenance* tasks are performed. The period of *inspection frequency* is based on timed intervals (i.e., weekly, monthly, quarterly, or annually) or on hours of use (run time), or system *condition*, as established in the *maintenance program implementation plan*.

inspection task: a work process to observe the *condition* of *equipment* and components and assess its *condition*.

inventory: the orderly documentation of *equipment* data that are used to provide detailed identification of what is operated, inspected, and maintained. *Equipment* in the inventory shall be uniquely identified.

maintenance program: the overarching philosophy, management, and organization required to achieve the goals and requirements established for the facility and its occupants. The *maintenance program* explains what maintenance will be performed and managed to preserve the *condition* and capability of the *HVAC equipment* to enable delivery of the required thermal comfort, energy efficiency, and indoor air quality required for the facility. The program shall include an *inventory* of *equipment* to be inspected and maintained, a maintenance program implementation plan for executing the work, minimum documentation, requirements for authorizing and performing the work, a process to revise the program in an orderly manner, and a process for periodic program review and evaluation.

maintenance program implementation plan: defines the scope of *inspection* and *maintenance tasks* to be performed on the required time intervals to comply with this standard. The *maintenance program implementation plan* establishes what tasks to perform, on which *equipment* at the required time. The *maintenance program implementation plan* shall include: required tools, safety equipment, and the method and measures for evaluating work *performance*. The *maintenance program implementation plan* shall also include the information required for documenting the results of the task.

maintenance task: a work process requiring a minimum of tools to adjust components and restore expendable materials (such as fluids and filters) to their agreed upon *condition*.

performance: a quantifiable measure of *equipment* delivery capacity.

task: a defined unit of work actions described by a sequence of instructions.

task frequency: The time period or intervals when *inspection* and *maintenance tasks* are scheduled and performed. The *frequency* may be based upon set intervals (i.e., weekly, monthly, quarterly, or annually) or on hours of use (run time), or system *condition*, as established in the maintenance plan.

work request: a written or verbal request for maintenance or repair work in response to an observed deficiency or as scheduled by the maintenance plan. The *work request* must be evaluated and authorized to

initiate the *task*. For work required beyond the scope of the maintenance plan, confirm that a funding source is available to perform the work.

4. PROGRAM DEVELOPMENT AND IMPLEMENTATION

4.1 Introduction This standard applies to owners of *commercial building HVAC equipment* and those performing inspection and maintenance work on *commercial HVAC*. Section 4 contains the requirements for creating a *maintenance program* to manage inspection and maintenance tasks that comply with this standard. Section 5 presents requirements for *equipment* and *tasks* that focus on energy efficiency, indoor air quality, and thermal comfort. Requirements are described in terms consistent with a minimum standard.

4.1.1 *Task* implementation methods are not within the scope of this standard.

4.2 Owner Responsibility. The building owner shall be responsible for meeting the requirements of this standard. The owner may designate other parties that shall be authorized and obligated to fulfill the owner's responsibility.

4.2.1 This standard permits the owner to self-perform *inspection and maintenance tasks*.

4.2.2 This standard allows the owner to engage outside implementers authorized and obligated to perform *inspection and maintenance tasks* that comply with this standard.

4.2.3 The owner and implementer shall share responsibility for program development and defining *inspection and maintenance tasks*.

4.2.4 *Task* implementation methods are not within the scope of this standard.

4.2.5 This standard allows exceeding program and task requirements.

4.2.6 Maintenance tasks and frequencies shall preserve equipment in acceptable condition.

4.2.7 The maintenance program shall be capable of continuous improvement. Improvement in this context shall be manifest when changes in *equipment condition* or status, changes to the facility, or acquisition of new maintenance technology warrant review and revision of the *maintenance program*. The intent of the standard is to enable *tasks* and/or frequencies to be changed in order to deliver proper preservative action in response to actual conditions.

4.2.8 Maintenance tasks required by this standard, but not required by equipment manufacturers, shall be performed.

4.3 Implementer Responsibility. The implementer(s) shall be responsible for accomplishing inspection and maintenance *tasks*, documentation, and supporting program reviews.

Informative Note No. 1: The intent of this standard is to (a) monitor changes in *equipment condition* over time as a measure of the efficacy of the *maintenance program* in meeting *performance* objectives and (2) provide advance signs of *equipment* failures. Unacceptable *condition indicators* signal early signs of *equipment* failure or *performance* degradation. When *condition indicators* reach unacceptable levels, additional preservative or restorative action is required.

4.3.1 A list of *inspection and maintenance tasks* shall be developed. This list shall document the process and procedures to be accomplished at scheduled intervals on the *inventory* of *equipment* to be maintained. These *tasks* shall be developed specifically for the size, design, scope, criticality, and complexity of the *equipment* serving the facility. Each required *task* shall describe the frequency of each *task* and *task* schedule; identify the party responsible for performing the *task*; and specify the authorizing party, *task*

completion documentation procedure, plan monitoring procedures, and procedures for evaluation and feedback. The plan shall include the information described in Sections 4.4.1 through 4.4.5.

4.4 Maintenance Program Development. A fully developed *maintenance program* shall preserve the *commercial HVAC* capability and condition to deliver the required thermal comfort, energy efficiency, and indoor air quality. The *maintenance program* shall identify inspection and maintenance tasks, including documentation of task results, task close out, and updating inventory information. The owner shall approve the program elements selected to create an *inspection and maintenance program* that is compliant with this standard.

4.4.1 Maintenance Program Implementation Plan Elements

Plan elements shall include the following:

- a. *Equipment Inventory*
- b. *Inspection task* description
- c. *Maintenance task* description
- d. *Task* resources required
- e. Inspection and maintenance tasks frequencies
- f. *Task* documentation
- g. *Task* closeout procedure and documentation requirements
- h. Responsible party to perform the *tasks*
- i. Response to unacceptable equipment conditions

Informative Note No. 2: Inspection monitors and documents the *condition* of *equipment* and components over time regarding appearance, function, and *performance*. Maintenance preserves *equipment condition* and *performance* as required by the owner.

4.4.2 The program elements shall be integrated into a document that defines the *Program Maintenance Implementation Plan*. This plan shall include the process and procedures for implementing required tasks.

Informative Note No. 3: The user must develop the task requirements found in the equipment tables in Section 5 into actions and instructions that comply with the requirements of this standard.

4.4.3 Maintenance Program Objectives. Program objectives shall be established to define desired outcomes for the *maintenance program* for HVAC systems and *equipment* delivering required thermal comfort, energy efficiency, and indoor air quality. Program objectives shall be measurable quantities that can be trended over time and shall, when achieved, define *maintenance program* success. Program objectives shall be based on owner requirements and operating procedures.

Informative Note No.4. Informative Appendix B lists sources for establishing program objectives.

4.5 Maintenance Program Implementation Plan: A plan to implement *inspection and maintenance tasks* shall be developed describing the tasks to be implemented when scheduled. This plan shall apply specifically to the capacity, design, and scope of the *equipment* delivering energy efficiency, indoor air quality, and thermal comfort to the facility. This plan shall describe required *tasks*, the frequency of each *task*, and *task* schedule. Also required are procedures for: *task* completion documentation, *task* monitoring, task evaluation and documentation of the results of the task, and measures for evaluating task *results*. The plan shall include the requirements described in Sections 4.4 through 4.13. These shall be the minimum required tasks to enable the equipment to deliver the required energy efficiency, indoor air quality, and thermal comfort.

Informative Note No. 5: For *maintenance program implementation plan* development, the equipment tables in Section 5 list the required tasks. It is left to the user to apply required tasks to

a schedule of covered equipment for their respective *inspection and maintenance tasks*. Examples of *maintenance tasks* include replacing filters, cleaning, adjusting, tightening, calibration, measurement, and lubrication.

4.5.1 Implementation shall include, but not be limited to, establishing procedures for documenting *task* results, *task* close out, and updating *inventory* information. The owner shall approve program elements selected to create a *maintenance program* that is compliant with this standard.

4.5.2 Maintenance Program and Maintenance Program Implementation Plan Approvals The *maintenance program* and *maintenance program implementation plan*: both shall be approved by the owner with concurrence by the implementer.

4.5.3 Maintenance Program and Maintenance Program Implementation Plan Authorization and Execution. Upon approval, the *maintenance program* and *maintenance program implementation plan* shall be authorized by a confirming document from the owner. When authorized, maintenance tasks shall commence as described in the *maintenance program implementation plan*, or other approved means.

4.5.4 Inventory of equipment to be Inspected and Maintained. HVAC *equipment* that affects thermal comfort, energy efficiency, and indoor air quality shall be listed in an *equipment inventory* of items to be inspected and maintained. This list shall include manufacturers' information, location, capacity, *maintenance program* identifier, and other data agreed upon by the owner and implementer. This *inventory* shall be included in the maintenance program implementation plan.

4.5.5 Inspection and Maintenance Task Frequencies. The baseline frequencies of inspection and maintenance tasks for equipment are listed in the tables in Section 5. These frequencies are the minimum required for compliance. Refer to Section 4.7 for requirements for revising *inspection and maintenance task* frequencies.

Informative Note No. 6: Inspection monitors and documents the *condition* of *equipment* and components over time regarding appearance, function, and *performance*. Maintenance preserves *equipment condition* and *performance* as required by the facility.

4.5.6 Maintenance tasks and frequencies shall preserve equipment in acceptable conditions. When degraded *conditions* are unacceptable, the nature and frequency of the maintenance tasks shall be evaluated for opportunities for improvement.

Informative Note No. 7: Refer to Section 4.11 for requirements for revising inspection and *maintenance task* frequencies.

4.6 Condition Indicators The *Maintenance Program Implementation Plan* shall include descriptions of requirements for equipment physical state and quantifiable delivered performance. These are acceptable *conditions* and are a goal of the maintenance program. The assessed *condition of equipment* when compared to the required condition is considered as the so-called *condition indicator*. Inspection results shall be documented for future reference of trends in condition over time.

4.6.1 Degradation of Condition and Performance. *Equipment condition* that continues to deviate from the requirement over time is considered to be degrading. Degradation of *equipment condition* or *performance* shall be monitored and documented until the equipment condition is unacceptable.

4.6.2 When comparisons of *in situ* observed *condition indicators* are degraded from required conditions, condition indicators are used to determine the level of degradation from the requirement. Subsequent responsive action is determined by the deviation from the required condition. When these *condition*

indicators are compared to subsequent inspection results, the trend is established for the rate of change for the degradation of the equipment.

4.6.3 Response to degradation. When unacceptable *equipment conditions* that are observed while performing scheduled *inspection and maintenance tasks* or on other occasions shall be documented. Then the *condition* is resolved with the maintenance worker, tools, and parts on hand. When these actions do not resolve the *unacceptable condition*, a *work request* is prepared for further maintenance work.

Informative Note No. 8: For examples of noncompliant system *condition indicators*, refer to Appendix A.

4.6.4 Unacceptable *equipment conditions* found between *inspection and maintenance task* intervals shall be documented and a work request prepared for maintenance work to resolve the *condition*.

Informative Note No. 9: *Equipment condition* examples: rust on interior surfaces of an air handler is a measure of a physical characteristic or condition. When compared to an established requirement, such as “like new” *condition*, then the *condition* of the equipment is defined. The air volume flow rate of the air handler compared to design rate is an indicator of a *performance* characteristic. This is different than a condition indicator. Condition indicators include the amount of rust on surfaces of an air handler and are a measure of the severity of the physical characteristic or condition. When compared to a required standard, such as a “like new” *condition indicator*, establishes the *condition* of the asset. Another example is the air volume flow rate of the air handler compared to design rate is an indicator of a *performance* characteristic.

4.6.5 Unexpected Conditions: the *maintenance program implementation plan* shall include requirements for responding to unexpected or unplanned, noncompliant equipment conditions, including equipment failures. The conditions shall be documented and resolved. Response to noncompliant conditions that require more than maintenance tasks are beyond the scope of this standard.

4.7 Task Documentation. Inspection and maintenance task results shall be documented. Inspection results shall be compared to unacceptable *condition indicators* and include any changes in condition from the prior inspections. Maintenance task results shall include nature of the tasks performed and the resulting equipment condition. Acceptable condition and performance shall be documented.

4.7.1 Task Completion and Reporting. Completed *tasks* shall be documented and verified. The completion document shall be routed as established in the *Maintenance Program Implementation Plan*.

4.7.2 Task Close Out. A record of the verified *task* completion shall be identified as “closed out” by the owner and routed as established in the *Program Maintenance Implementation Plan*.

4.7.3 Record Keeping. *Task* documentation shall be filed for future reference for evaluating program performance, changes in condition, future planning, and reporting.

4.7.4 Record Retention. *Task* records shall include the original *task* order, results of the *task*, and observations by the implementer.

Informative Note No. 10: Where manufacturer recommendations or warranty terms require more frequent *tasks* (or more *tasks*) than the Section 5 tables show, this standard does not require users to perform the additional maintenance to comply with the standard.

4.8. Revision of the Maintenance Program and Maintenance Program Implementation Plan. The *maintenance program* shall be capable of continuous improvement. Improvement in this context is when task procedures or task frequencies provide the same, or improved effect on equipment with fewer tasks, or frequencies. Also, changes in *equipment* status, changes to the facility, or acquisition of new maintenance technology warrant review of the maintenance plan. The intent of this standard is to enable *tasks* and/or frequencies to be revised in order to deliver required maintenance in response to actual .

4.8.1 Unacceptable equipment *conditions* found between *inspection and maintenance task* intervals shall be documented with a work request for *maintenance* work to be performed. This shall include documentation, authorization, and scheduling to perform the maintenance tasks.

Informative Note No. 11: For examples of reasons for a plan and program review of the *maintenance plan*, refer to Appendix C.

4.9 Revision of the Maintenance Program Implementation Plan. The *maintenance program* shall be capable of continuous improvement. Improvement in this context is when task procedures or task frequencies provide the required equipment preservation or improved equipment condition using fewer resources, fewer tasks, or greater intervals between tasks. Changes to the facility or acquisition of new maintenance technology warrant review and revision of the maintenance plan. The intent of this standard is to enable *tasks* and/or frequencies to be revised to deliver required maintenance in response to actual conditions.

Informative Note No. 12: For examples of reasons for review and revision of the *maintenance program* and maintenance program implementation plan, refer to Appendix C.

4.9.1 When unacceptable *conditions* or unacceptable *performance* with equipment during two successive inspections, the inspections and task records for the equipment shall be reviewed to determine if inspection or the maintenance task frequency require revising. Further, maintenance tasks shall be reviewed for improvement opportunities. Results of this review, and revisions to the *maintenance program improvement plan*, shall be documented and implemented.

4.9.2 When acceptable *conditions* or acceptable performance are observed during three successive inspections, the inspection and maintenance task records for the equipment shall be reviewed for opportunities to reduce task frequencies or *task* procedures without compromising equipment condition or performance. Revisions to task frequencies and work procedures shall be documented.

4.10 Equipment Manufacturers' Requirements. Where compliance with manufacturers' requirements to maintain safety and other product listing certifications is required, such work shall be performed instead of maintenance work required by this standard.

4.10.1 New Equipment Warranty. During the warranty period, requirements of this standard shall not preempt *equipment* manufacturers' warranty terms, conditions, and other guidance that require different *inspection tasks and maintenance tasks*.

Informative Note No. 10: When manufacturer recommendations or warranty terms require more frequent maintenance tasks (or more tasks) than the Section 5 tables show, this standard does not require users to perform the additional maintenance to comply with the standard.

4.11 Program Review. The owner and performer shall review the *maintenance program* on an annual basis. Upon a change in performer, the *maintenance program* shall be reviewed. There shall be formal review meetings between the owner and the performer at the beginning of the evaluation period and annually thereafter.

4.11.1 Environmental Impacts and Operational Requirements When environmental impacts or facility operational requirements affect execution of the *maintenance plan*, the maintenance program implementation plan shall be reviewed for options to mitigate the impact. Adjusting task work and task frequencies are mitigating factors. Reasons for adjusting tasks shall be documented.

Informative Note No.11: For examples of environmental impacts or facility operational requirements that affect *inspection* and *maintenance tasks*, refer to Appendix D.

4.11.2 Beginning Review. The owner and performer shall define scope, expectations, and desired outcomes for the *maintenance program*. The beginning review shall include developing factors such as program objectives and *condition* requirements as measures to evaluate program effectiveness. These shall be mutually acceptable to the owner and the performer. *Performance* objectives and *condition indicators* shall be established before the work commences.

4.11.3 Annual Review The annual review shall consist of comparing *maintenance program* results with the *program objectives* and *condition* standards. The responsible party owner and the implementing party shall review the measurements and observations collected during the evaluation period. The actual results shall be compared to the program requirements, desired outcomes, and *commercial HVAC equipment performance*. The information shall be used to evaluate the *maintenance program performance*. This information shall be used to develop a plan for improving the *maintenance program*. Program improvement actions shall be mutually agreeable between the owner and the implementer.

5 REQUIRED INSPECTION AND MAINTENANCE TASKS

5.1 Introduction This section contains the required *inspection* and *maintenance tasks* for *equipment* listed in the *program maintenance implementation plan*. The required work is found in the equipment tables in this section. Each table includes minimum required *inspection and maintenance tasks*, *task frequencies*, and *whether the task and results require documentation*.

5.1.1 Tasks that preserve equipment condition to meet energy efficiency, thermal comfort, and indoor air quality requirements shall be evaluated.

5.1.2 *Inspection* and *maintenance tasks* shall be performed according to the requirements described in Section 4.

Informative Note No. 12: Not all tasks in the equipment tables apply to each item.

Informative Note No. 13: Refer to Section 4.6 for maintenance program implementation plan requirements.

5.2 Equipment Tables: Required inspection and maintenance *tasks* are found in the equipment tables that follow. To determine the required inspection and *maintenance tasks* for the *equipment*, the following procedure shall be used:

5.3.2 The tables include the following columns:

- a. Sequence letter (To identify each *task*.)
- b. *Inspection tasks* required for all *equipment* in the *inventory*.
- c. *Maintenance tasks* required for all *equipment* in the *inventory*.
- d. Minimum frequencies allowed for all *equipment* in the *inventory*.
- e. Documentation requirement.

5.2.1 Equipment Selection Procedure

- a. Select a unit from the *commercial HVAC equipment tables*.
- b. Select the equipment table that best describes the unit. Characteristics such as functional titles, use, or field experience are used to select the equipment table that best describe the equipment being considered.
- c. Select the maintenance tasks and associated task frequencies that preserve required equipment condition and performance.

5.2.2 When scheduled, perform the task.

Informative Note No. 14: The same equipment table is used for similar equipment, regardless of capacity, size, or use (e.g. fans, pumps, chillers etc.)

5.2.3 For *commercial HVAC equipment* not found in the tables in this section, use *inspection and maintenance tasks* from tables for similar *equipment* to create the required *inspection and maintenance tasks* or create a new list of appropriate tasks.

5.3 The required Inspection and Maintenance *tasks* for the *equipment* are listed in the following tables:

5.3.1 Equipment Tables

<u>Table Number</u>	<u>Equipment</u>
5-1	Air Distribution Systems
5-2	Air Handlers
5-3	Boilers
5-4	Chillers—Absorption
5-5	Chillers—Air-Cooled
5-6	Chillers—Water-Cooled
5-7	Coils and Radiators
5-8	Condensing Units
5-9	Control Systems
5-10	Cooling Towers and Evaporative-Cooled Devices
5-11	Humidification and Dehumidification Devices
5-12	Economizers – Air Side
5-13	Engines – Micro-Turbines
5-14	Fans - Exhaust, Supply, Transfer, Return
5-15	Fan Coils –Hot Water and Steam Unit Heaters
5-16	Furnaces – Combustion Unit Heaters
5-17	HVAC Water Distribution Systems
5-18	Indoor Section Duct-Free Splits
5-19	Outdoor-Air-heat Exchanging Systems
5-20	Package Terminal Air Conditioner/Heat Pumps (PTAC/PTHP)
5-21	Pumps
5-22	Rooftop Units
5-23	Steam Distribution Systems
5-24	Terminal and Control Boxes (e.g. VAV, Fan Powered, Bypass)
5-25	Water Source Heat Pumps

5.3.2 Task Selection Procedure: To determine the required *inspection* and *maintenance tasks* for *equipment* in the inventory, use the following procedure:

- From the *commercial HVAC equipment inventory*, group equipment by building or by type and list the *equipment* in the selected group.
- Select *inspection and maintenance tasks* from Tables 5-1 through 5-25 that apply to the *commercial HVAC equipment* in the grouping.
- When the grouping contains equipment that is not found in the tables in this section, use *inspection and maintenance tasks* from tables for similar *equipment* or create a new list of appropriate tasks.
- At a minimum, the program maintenance implementation plan for the building shall include each of the inspection and maintenance tasks from all of the applicable tables.
- This standard shall not supersede equipment manufacturers’ instructions and guidelines that may require more frequent or added tasks.
- In cases where manufacturers require more frequent tasks (or more tasks) than these tables show, this standard does not require its users to perform the additional

maintenance to comply with the standard.

5.3.3 The equipment tables shall include the following columns:

- a. *Task* identification letter (To facilitate identifying each *task* for reference.)
- b. Inspection and Maintenance tasks required for all - equipment in the inventory.
- c. Minimum task frequencies required for all commercial HVAC equipment in the inventory.
- d. Task Documentation Requirements.

Informative Note No. 15: Recommended corrective actions are removed from Section 5 Equipment Tables. This informative text is found in Appendix F.

Equipment Tables Section 5

Table 5-1 Air Distribution Systems

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Documentation Required
a	Check control system and devices for evidence of improper operation	Clean, lubricate, and/or adjust.	Semiannually	Yes or No
b	Inspect diffusers, grilles, and registers for dirt accumulation	Clean as needed to remove dirt build up.	Semiannually	Yes or No
c	Check damper for <i>condition</i> , setting, and operation.	Clean, lubricate, and adjust to preserve required operation.	Annually	Yes or No
d	Inspect areas of moisture accumulation for biological growth.	If present, remove moisture and clean biological growth to preserve required operation.	Annually	Yes or No
e	Inspect accessible exposed ductwork for insulation and vapor barrier integrity.	Reattach and patch small breaks in insulation. Record damage location.	Annually	Yes or No
f	Inspect accessible internally lined ductwork until the first turn or up to 20 ft. (6.1 m) from a potential moisture source, such as a supply plenum, from air handler, outdoor air damper, humidifier, etc., for water damage and/or biological contamination.	Reattach and patch breaks in insulation. Determine and record location of damage beyond maintenance.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-2 Air Handlers

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency	Documentation Required
a	Check for particulate accumulation on filters.	Clean or replace to ensure operation	Quarterly	Yes or No
b	Check P-trap.	Clean prime as proper operation.	Quarterly	Yes or No
c	Check drain pan, drain line, coil, and other areas of moisture accumulation for visible signs of biological growth.	Clean and verify proper operation.	Semiannually	Yes or No

d	Check steam system traps, pumps, strainers, and controls.	Clean and verify proper operation.	Semiannually	Yes or No
e	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Semiannually	Yes or No
f	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment or evidence of wear.	Correct tension and sheave alignment.	Semiannually	Yes or No
g	Check variable-frequency drive for proper operation.	Correct as needed. Clean housing and tighten connections as needed to preserve required operation. Clean or replace air filter.	Semiannually	Yes or No
h	Check for damage or evidence of leaks on the refrigeration-cycle indoor heat exchanger, chilled-water-coil heat exchanger, or steam or hot-water-coil heat-exchanger surfaces	Tighten connections. Record location of identified remaining leaks.	Semiannually	Yes or No
i	Check air-filter fit and housing seal integrity	Clean and verify proper fit/finish.	Annual	Yes or No
j	. Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical terminations to preserve required condition.	Annual	Yes or No
k	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical terminations to preserve required condition.	Annual	Yes or No
l	Check fan blades and fan housing	Clean and tighten electrical connections to preserve required condition.	Annual	Yes or No
m	Check refrigerant system temperatures	When outside of recommended levels, find and record the cause.	Annual	Yes or No
n	. Check integrity of all panels on <i>equipment</i> .	Replace missing or broken fasteners to preserve-required integrity of <i>equipment</i> .	Annual	Yes or No
o	Assess field-serviceable bearings.	Lubricate to preserve required operation as necessary. (Noise, vibration, and temperature)	Annual	Yes or No
p	Check for fin damage and evidence of fouling on the refrigeration-cycle indoor heat exchanger, chilled-water-coil heat exchanger, or steam or hot-water-coil heat-exchanger surfaces.	Clean and restore to acceptable <i>condition</i> and air flow.	Annually	Yes or No
q	Inspect for evidence of moisture carryover beyond the drain pan from cooling coils.	Clean moisture outside drain pan. Check drain pan for proper flow. Confirm coil face velocity meets requirements.	Annually	Yes or No

r	Check damper for <i>condition</i> , setting, and operation.	Adjust and lubricate to preserve required operation.	Annually	Yes or No
s	Check condensate pump.	Clean and verify proper operation.	Annually	Yes or No
t	Inspect exposed ductwork for insulation and vapor barrier for integrity.	Record location of damage.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-3 Boilers

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Documentation Required
a	For systems using fuel oil, inspect fuel filter, nozzle, and electrodes.	Clean and verify proper operation.	Annually	Yes or No
b	Perform chemical testing of system water.	Verify water treatment target levels are being maintained.	Quarterly	Yes or No
c	For systems using fuel oil, check fuel pump and ignition transformer for proper operation.	Clean and verify proper operation.	Annually	Yes or No
d	Inspect blowdown or drain valve. Clear all debris to ensure proper operation.	Clean and verify proper operation.	Quarterly	Yes or No
e	Check for evidence of leakage of fuel supply, heat transfer fluid, and flue gas.	Record location of identified leaks.	Quarterly	Yes or No
f	For systems using natural gas, check gas pressure, gas valve operation, and combustion fan operation.	Clean and verify proper operation.	Quarterly	Yes or No
g	Check controls and safety devices for proper operation.	Clean, lubricate, and verify proper operation.	Annually	Yes or No
h	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
i	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No

j	Check for evidence of buildup or fouling, corrosion, or degradation on heat-exchange surfaces.	Clean and restore to preserve required operation and acceptable <i>condition</i> .	Annually	Yes or No
k	Check damper for <i>condition</i> , setting, and operation.	Adjust and lubricate.	Annually	Yes or No
l	Check combustion chamber, burner(s), and flue for deterioration, moisture problems, condensation, and combustion products.	Clean and adjust combustion process for proper operation.	Annually	Yes or No
m	Inspect refractory for damage or wear.	Clean combustion-side e.g., fire tubes, upper and lower drums. Record location of refractory damage or wear.	Annually	Yes or No
n	Observe burner flame at high load for correct operating condition.	Clean and adjust.	Annually	Yes or No
o	Verify proper operation of safety devices per manufacturer's instructions.	Clean, lubricate, adjust.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-4 Chillers—Absorption

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Documentation Required
a	Check for the presence of non-condensable. Note and log purge count.	Adjust vacuum-pump purge timer non-condensable removal.	Monthly	Yes or No
b	Perform chemical testing of system water.	Treat as needed to ensure required water chemistry and freeze protection set points are being maintained.	Quarterly	Yes or No
c	Check steam system traps, pumps, strainers, and controls.	Clean and verify proper operation.	Annually	Yes or No
d	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Annually	Yes or No
e	Check variable-frequency drive for proper operation.	. Clean housing, and tighten connections. Correct settings to preserve required operation. Clean or replace air filter.	Annually	Yes or No

f	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation	Annually	Yes or No
g	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
h	Check for fouling, corrosion, or degradation.	Clean to preserve required operation.	Annually	Yes or No
i	Check open drive couplings, bearings, and seals for evidence wear or alignment problems.	Lubricate and align to preserve required operation.	Annually	Yes or No
j	Check for evidence of build-up, fouling, corrosion, or degradation on heat exchange surfaces.	Clean and restore to preserve required operation and ensure acceptable <i>condition</i> .	Annually	Yes or No
k	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No
l	Check inhibitor and internal fluid chemistry.	Correct inhibitor and internal fluid chemistry if outside of established operating ranges.	Annually	Yes or No
m	Verify proper operation of safety devices per manufacturer's recommendations.	Clean, lubricate, adjust.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-5 Chillers—Air-Cooled

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Documentation Required
a	Perform chemical testing of system water.	Test and treat to ensure water chemistry and freeze protection target levels are being maintained.	Quarterly	Yes or No
b	Check control system and devices for evidence of improper operation.	Clean, lubricate, and verify proper operation.	Annually	Yes or No

c	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment or evidence of wear.	Correct tension and sheave alignment.	Semiannually	Yes or No
d	Check variable-frequency drive for proper operation.	Correct to preserve required operation. Clean housing and tighten connections to preserve required operation. Clean or replace air filter.	Semiannually	Yes or No
e	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
f	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
g	Check fan blades and fan housing.	Clean to preserve required operation.	Annually	Yes or No
h	Check refrigerant system pressures and/or temperatures.	When outside of recommended levels, find and record the cause.	Annually	Yes or No
i	Check open drive couplings, bearings, and seals for evidence of wear or alignment problems.	Lubricate and adjust, and record evidence of wear.	Semiannually	Yes or No
j	Assess field-serviceable bearings.	Lubricate to preserve required operation.	Annually	Yes or No
k	Check for fin damage and evidence of fouling on the outdoor refrigeration-cycle heat-exchanger surfaces.	Clean and restore to preserve required operation and ensure acceptable <i>condition</i> .	Annually	Yes or No
l	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No
m	Check for damage or evidence of leaks on the outdoor refrigeration-cycle heat exchanger surfaces.	Check for damage or evidence of leaks on the outdoor refrigeration cycle heat-exchanger surfaces.	Semiannually	Yes or No
n	Check low ambient head pressure control sequence for evidence of improper operation.	Clean and adjust components or modify software/algorithm to ensure proper operation.	Annually	Yes or No
o	Check compressor oil level and/or pressure on refrigerant systems having oil level and/ or pressure measurement means.	When outside of recommended levels, find and record the cause.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-6 Chillers—Water-Cooled

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	Documentation Required
a	Perform chemical testing of system water.	Test and treat to ensure water chemistry and freeze protection target levels are being maintained.	Monthly	Yes or No
b	Inspect gearbox for excessive wear.	Clean, lubricate, and verify proper operation.	Quarterly	Yes or No
c	Check control system and devices for evidence of improper operation.	Clean, lubricate, and verify proper operation.	Semiannually	Yes or No
d	Check variable-frequency drive for proper operation.	Correct to preserve required operation. Clean housing and tighten connections to preserve required operation. Clean or replace air filter.	Semiannually	Yes or No
e	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
f	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
g	Check refrigerant system pressures and/or temperatures.	When outside of recommended levels, find and record the cause.	Annually	Yes or No
h	Check open drive couplings, bearings, and seals for evidence wear or alignment problems.	Lubricate and align to preserve required operation.	Annually	Yes or No
i	Check for evidence of build-up, fouling, corrosion, or degradation on heat exchange surfaces.	Clean and restore to preserve required operation to ensure acceptable <i>condition</i> .	Annually	Yes or No
j	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No

k	Check compressor oil level and/or pressure on refrigerant systems having oil level and/ or pressure measurement means.	When outside of recommended levels, find and record the cause.	Annually	Yes or No
l	Assess field-serviceable bearings.	Lubricate to preserve required operation.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-7 Coils and Radiators

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>
a	Check for proper operation of control valves and vents.	Clean, and verify proper operation.	Quarterly	Yes or No
b	Check steam trap and condensate return line.	Prime trap to ensure proper operation.	Quarterly	Yes or No
c	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Semiannually	Yes or No
d	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No
e	Check refrigerant system temperatures differential across coil.	When outside of recommended levels, find and record location of identified leaks.	Annually	Yes or No
f	Check for damage or evidence of leaks on the refrigeration-cycle indoor heat exchanger, chilled-water-coil heat exchanger, or steam or hot-water-coil heat-exchanger surfaces.	Clean and restore to preserve required operation and ensure acceptable <i>condition</i> . Record location of identified leaks.	Annually	Yes or No
g	Check integrity of all removable access panels on <i>equipment</i> .	Replace fasteners to preserve required operation and to ensure proper integrity and fit/finish of <i>equipment</i> .	Annually	Yes or No
h	Check drain pan, drain line, coil, and other areas of moisture accumulation for visible signs of biological growth.	Clean and verify proper operation.	Annually	Yes or No

i	Check for fin damage and evidence of fouling on the refrigeration-cycle indoor heat exchanger, chilled-water-coil heat exchanger, or steam or hot-water-coil heat-exchanger surfaces.	Clean and restore to preserve required operation and to ensure acceptable <i>condition</i> .	Annually	Yes or No
j	Inspect for evidence of moisture carryover beyond the drain pan from cooling coils.	Clean to preserve required operation.	Annually	Yes or No
k	Check condensate drain pan, condensate drain line, and condensate pump.	Clean and verify proper operation.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-8 Condensing Units

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>
a	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Annually	Yes or No
b	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment or evidence of wear.	Correct tension and sheave alignment.	Semiannually	Yes or No
c	Check variable-frequency drive for proper operation.	Correct to preserve required operation. Clean housing & tighten connections to preserve required operation. Clean or replace air filter.	Semiannually	Yes or No
d	Check control box for dirt, debris, insects, rodents, and for loose electrical terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
e	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
f	Check fan blades, blower wheel, and fan housing for proper operation.	Clean to preserve required operation.	Annually	Yes or No
g	Check refrigerant system pressures and temperature differentials across refrigeration-cycle heat-exchanger.	When outside of recommended levels, find and record the cause.	Annually	Yes or No
h	Check for fin damage and evidence of fouling on the outdoor refrigeration-cycle heat exchanger surfaces.	Replace fasteners to preserve required operation to ensure proper integrity and fit/ finish of <i>equipment</i> .	Annually	Yes or No

i	Check open drive couplings, bearings, and seals for evidence of wear or alignment problems.	Lubricate and align to preserve required operation.	Annually	Yes or No
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j	Check for leaks on the outdoor refrigeration-cycle heat-exchanger surfaces and other accessible refrigeration components.	Check for damage or evidence of leaks on the outdoor refrigeration-cycle heat exchanger surfaces.	Annually	Yes or No
k	Check low ambient head pressure control sequence for proper operation.	Clean and adjust components or modify software/algorithm to ensure proper operation.	Annually	Yes or No
l	Check compressor oil level and/or pressure on refrigerant systems having oil level and/or pressure measurement means.	When outside of recommended levels, find and record the cause.	Annually	Yes or No
m	Check compressor amp draw and voltage.	Record readings and document any condition adversely affecting its performance.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-9 Control Systems

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>
a	For pneumatic systems, check compressed-air system (e.g., compressor, dryer, receiver, blowdown valve) for proper operation. Check for evidence of oil carryover and <i>condition</i> of oil filter.	Clean and lubricate to preserve required operation. Blowdown accumulated moisture	Monthly	Yes or No
b	For pneumatic systems, check for proper air pressure.	Clean, lubricate, adjust.	Monthly	Yes or No

c	For systems designed specifically for humidity control, measure relative humidity.	Clean, lubricate, adjust.	Quarterly	Yes or No
d	Check alarms and alarm history.	Note and respond to preserve required operation.	Quarterly	Yes or No
e	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Annually	Yes or No
f	Check time-of-day schedule to confirm consistency with facility operation.	Adjust schedule to preserve required operation.	Annually	Yes or No
g	Check set points, trended points, and time schedules.	Note and respond to preserve required operation.	Annually	Yes or No
h	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
i	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
j	For pneumatic systems, check pneumatic lines for blockages.	Clean to preserve required operation.	Annually	Yes or No
k	Check to see that backup of digital control program is current.	Update when it is not current.	Annually	Yes or No
l	Check battery backup and verify proper operation.	Clean and maintain batteries to preserve required operation.	Annually	Yes or No
m	Verify actuator movement and device response to control output.	Lubricate and align to preserve required operation	Annually	Yes or No
n	Change building management system (BMS) interface user authentication passwords.	Make the change to preserve required operation.	Annually	Yes or No
o	Verify no <i>equipment</i> has been left in override (hand/OFF instead of auto) either locally or through the BMS	Make corrections as required to preserve required operation.	Monthly	Yes or No
p	Simulate an alarm <i>condition</i> in the system, which normally notifies personnel via email or text message, to confirm proper operation	Restore to preserve required operation.	Annually	Yes or No

Refer to Section 4.11 for procedure to modify frequency.

Table 5-10 Cooling Towers and Evaporative-Cooled Devices

	Normative	Normative	Normative	Normative
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	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>
a	Perform chemical testing of system water.	Test and treat to ensure water chemistry and freeze protection target levels are being maintained.	Quarterly	Yes or No
b	Check conductivity and other sensors for proper readings.	Clean and verify proper operation.	Quarterly	Yes or No
c	Check water system ultraviolet lamp.	Clean and verify that it is functioning.	Quarterly	Yes or No
d	Inspect blowdown or drain valve.	Clean and verify proper operation.	Quarterly	Yes or No
e	Check chemical injector device.	Verify water treatment target levels are being maintained.	Quarterly	Yes or No
f	Check cooling-tower-fan open drive system couplings, bearings, and seals for wear and proper alignment.	Lubricate and align to preserve required operation.	Quarterly	Yes or No
g	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment or evidence of wear.	Correct tension and sheave alignment.	Quarterly	Yes or No
h	Check for fouling, corrosion, degradation, or dirt/debris accumulation on or in sump and strainer, wet decks, fill, nozzles, and exterior louvers.	Clean and restore to preserve required operation and to ensure required <i>condition</i> .	Quarterly	Yes or No
i	If two-stage (dual flow rate) tower, verify proper operation at both high and low flow rates.	Clean and verify proper operation.	Quarterly	Yes or No
j	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Semi-annually	Yes or No
k	Check variable-frequency drive for proper operation.	Correct to preserve required operation. Clean housing, and tighten connections to preserve required operation. Clean or replace air filter.	Semi-annually	Yes or No
l	Inspect pumps and associated electrical components.	Clean and verify proper operation.	Semi-annually	Yes or No
m	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
n	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No

o	Check fan blades and fan housing.	Clean to preserve required operation.	Annually	Yes or No
p	Assess field-serviceable bearings.	Lubricate to preserve required operation.	Annually	Yes or No
q	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No
r	Check for proper damper operation.	Clean, lubricate, repair, replace, or adjust to preserve required operation.	Annually	Yes or No
s	Check cooling tower motors and pumps for proper operation.	Correct as needed. Clean housing and tighten connections to preserve required operation. Clean strainers.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-11 Dehumidification and Humidification Devices

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>
a	For systems designed specifically for humidity control, measure relative humidity.	Clean, lubricate, and verify proper operation.	Annually	Yes or No
b	Check for proper fluid flow, drainage, and for fluid leaks.	Adjust flow when outside of recommended flow range. Clean drain line and verify proper operation. When leaking, find and record the location of identified leaks.	Annually	Yes or No

c	Check steam system traps, pumps, and controls.	Clean, lubricate, and verify proper operation.	Annually	Yes or No
d	Check for fouling, corrosion, or degradation of pads and coils.	Clean and restore to preserve required operation and to ensure acceptable <i>condition</i> .	Annually	Yes or No
e	Check strainers.	Clean housing and tighten connections to preserve required operation. Clean strainers.	Annually	Yes or No
f	Inspect distributors, drain pans, and other areas of moisture accumulation for biological growth.	Clean and verify proper operation.	Annually	Yes or No
g	Check coils used for dehumidification	Clean and verify proper operation.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-12 Economizers—Air Side

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>
a	Check for particulate accumulation on filters.	Clean or replace to preserve required operation.	Quarterly	Yes or No
b	For communicating economizers only, check, review, and document alarms.	Reset resolved alarms	Quarterly	Yes or No
c	For communicating economizers only, check <i>condition</i> , setting, and operation of all related sensors.	Clean, lubricate, adjust.	Annually	Yes or No

d	Check <i>condition</i> , setting, and operation of the economizer controller and actuators.	Clean, lubricate, and verify proper operation.	Annually	Yes or No
e	Check dampers for <i>condition</i> , setting, and operation.	Clean, lubricate, and verify proper operation.	Annually	Yes or No
f	Check air-filter fit and housing seal integrity.	Clean and verify proper fit/finish.	Annually	Yes or No
g	For all economizers, check <i>condition</i> , setting, and operation of all related sensors against a trusted sensor.	Clean, lubricate, adjust.	Annually	Yes or No
h	Check integrity of all panels on <i>equipment</i> .	Replace fasteners to preserve required operation and to ensure proper integrity and fit/finish of <i>equipment</i> .	Annually	Yes or No
i	Inspect areas of moisture accumulation for biological growth.	If present, clean.	Annually	Yes or No
j	Check <i>condition</i> , setting, and operation of the low-limit stat.	Clean and verify proper operation.	Annually	Yes or No
k	Check <i>condition</i> , setting, and operation of the relief dampers or power exhaust fan.	Adjust and lubricate to preserve required operation.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-13 Engines—Microturbines

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Documentation Required
a	Check oil level and pressure.	Add, adjust, and lubricate to preserve required operation.	Quarterly	Yes or No
b	Inspect fuel filter.	Clean or replace lubricate to preserve required operation.	Quarterly	Yes or No
c	Check for particulate accumulation on turbine intake air filters.	Clean or replace lubricate to preserve required operation.	Quarterly	Yes or No
d	Inspect flexible connections.	Clean and lubricate to preserve required operation.	Annually	Yes or No
e	For systems using fuel oil, check fuel pump for proper operation.	Clean and verify proper operation.	Annually	Yes or No
f	Check control box for dirt, debris, and/or loose terminations.	Clean, lubricate, and verify proper operation.	Annually	Yes or No
g	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections and lubricate to preserve required operation.	Annually	Yes or No

h	Check open drive couplings, bearings, and seals for evidence of wear or alignment problems.	Lubricate and align lubricate to preserve required operation.	Annually	Yes or No
i	Check exhaust system for corrosion.	Clean and restore lubricate to preserve required operation and to ensure acceptable <i>condition</i> .	Annually	Yes or No
j	Verify proper operation of safety devices per manufacturer's recommendations.	Clean, lubricate, adjust.	Annually	Yes or No
k	Assess field-serviceable bearings.	Lubricate to preserve required operation.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-14 Fan (e.g., Exhaust, Supply, Transfer, & Return)

	Normative	Normative	Normative	Normative
	Inspection Task	Maintenance Task	Frequency*	Documentation Required
a	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment and <i>condition</i> .	Correct tension and sheave alignment.	Annually	Yes or No
b	Check variable-frequency drive for proper operation.	Clean housing and tighten connections to preserve required operation. Clean or replace air filter.	Annually	Yes or No
c	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Annually	Yes or No
d	Check fan drive for <i>condition</i> (poor alignment or poor bearing seating).	Adjust and lubricate to preserve required operation.	Annually	Yes or No
e	Check fan blades and fan housing for <i>condition</i> and cleanliness.	Clean to preserve required operation.	Annually	Yes or No
f	Check field-serviceable bearings for <i>condition</i> .	Lubricate to preserve required operation.	Annually	Yes or No
g	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
h	Check motor contactor for <i>condition</i> (pitting or other signs of damage) and wire connections.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
i	Check integrity of all panels on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/finish of <i>equipment</i> .	Annually	Yes or No

j	Inspect exposed and accessible ductwork and external piping for insulation and vapor barrier integrity.	Record location of damage.	Annually	Yes or No
k	Check damper for <i>condition</i> , setting, and operation.	Adjust and lubricate to preserve required operation.	Annually	Yes or No
l	Inspect flexible connections.	Clean to preserve required operation.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-15 Fan Coils—Hot-Water, Steam and Refrigeration

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Required Documentation</i>
a	Check for particulate accumulation on coils and filters.	Clean or replace to preserve required operation.	Annually	Yes or No
b	Check P-trap.	Prime as needed to ensure proper operation.	Annually	Yes or No
c	Check steam system traps, pumps, and controls.	Clean and verify proper operation.	Annually	Yes or No
d	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Annually	Yes or No
e	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment and condition.	Correct tension and sheave alignment.	Annually	Yes or No
f	Check for condition and evidence of leaks on the refrigeration-cycle indoor heat exchanger, chilled-water-coil heat exchanger, or steam or hot-water coil heat-exchanger surfaces.	Clean and restore to preserve required operation and to ensure required <i>condition</i> . Find and record the location of identified leaks.	Annually	Yes or No
g	Check air-filter fit and housing seal integrity.	Clean to preserve required operation.	Annually	Yes or No
h	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No

i	Check motor contactor for condition (pitting or other signs of damage) and wire connections.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
j	Check fan blades and fan housing for condition and cleanliness.	Clean to preserve required operation.	Annually	Yes or No
k	Check refrigerant system temperature difference across coil.	When outside of recommended levels, find and record the cause.	Annually	Yes or No
l	Check integrity of all panels on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/finish of <i>equipment</i> .	Annually	Yes or No
m	Check field-serviceable bearings for condition.	Lubricate to preserve required operation.	Annually	Yes or No
n	Check for proper fluid flow.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No
o	Check drain pan, drain line, coil, and other areas of moisture accumulation for visible signs of biological growth.	Clean and verify proper operation.	Annually	Yes or No
p	Check for fin damage and evidence of fouling on the refrigeration-cycle indoor heat exchanger, chilled-water-coil heat exchanger, or steam or hot-water-coil heat-exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No
q	Inspect for evidence of moisture carryover beyond the drain pan from cooling coils.	Clean to preserve required operation.	Annually	Yes or No
r	Check damper for <i>condition</i> , setting, and operation.	Adjust and lubricate to preserve required operation.	Annually	Yes or No
s	Check condensate pump.	Clean and verify proper operation	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-16 Furnaces—Combustion Unit Heaters

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Required Documentation
a	Check for particulate accumulation on coils and filters.	Clean or replace to preserve required operation.	Annually	Yes or No

b	For systems using fuel oil, inspect fuel filter.	Clean or replace to preserve required operation and verify proper operation.	Annually	Yes or No
c	For systems using fuel oil, check fuel pump for proper operation.	Check pressure and verify proper operation.	Annually	Yes or No
d	Check combustion air intake.	Preserve required operation. Clean and verify proper operation.	Annually	Yes or No
e	Check burner(s) and check for proper combustion.	Clean and adjust per manufacturer's instructions. Verify proper operation.	Annually	Yes or No
f	Check control system and devices for evidence of improper operation.	Clean, lubricate, and verify proper operation.	Annually	Yes or No
g	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
h	Check air-filter fit and housing seal integrity.	Clean and verify proper fit/ finish.	Annually	Yes or No
i	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment and condition.	Correct tension and sheave alignment.	Annually	Yes or No
j	Check fan blades, impeller, and fan housing for condition and cleanliness.	Adjust and lubricate to preserve required operation.	Annually	Yes or No
	Check fan drive for problems due to poor alignment or poor bearing seating.	Adjust and lubricate to preserve required operation.	Annually	Yes or No
l	Check combustion air intake.	Clean to preserve required operation and verify proper operation.	Annually	Yes or No
m	Check fan drive for problems due to poor alignment or poor bearing seating.	Adjust and lubricate to preserve required operation.	Annually	Yes or No
n	Check field serviceable bearings.	Lubricate as necessary.	Annually	Yes or No
o	Check integrity of all panels on equipment.	Replace fasteners as needed to ensure proper integrity and fit/ finish of equipment.	Annually	Yes or No
p	Check damper for condition, setting, and operation.	Adjust and lubricate to preserve required operation.	Annually	Yes or No
q	Check combustion chamber, burner, and flue for deterioration, leaks and moisture problems, condensation, and combustion products.	Patch refractory eroded by combustion. Tighten fittings.	Annually	Yes or No

r	Check pressure vessel for leaks, thermal damage, or structural damage	Document required repairs.	Annually	Yes or No
s	Verify proper operation of safety devices per manufacturer's instructions.	Clean, lubricate, adjust.	Annually	Yes or No
t	Check condition of heat-exchanger and evidence of leaks on the heat-exchanger surfaces.	Clean to preserve required operation. Find and record the condition and location of identified leaks.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-17 HVAC Water Distribution System

	Normative	Normative	Normative	Normative
	Inspection Task	Maintenance Task	Frequency*	Documentation
a	Perform chemical testing of system water.	Treat to preserve required operation for ensuring water chemistry and freeze protection target levels are being maintained.	Quarterly	Yes or No
b	Check chemical injector device.	Verify water treatment target levels are being maintained.	Quarterly	Yes or No
c	Check make-up water system for pressure and operation.	Clean and adjust to preserve required operation.	Quarterly	Yes or No
d	Vent air from system high points. Check for proper fluid flow, and check piping for leaks.	When leaking, or when outside of recommended flow range, find and record the location of identified leaks.	Quarterly	Yes or No
e	Inspect pumps and associated electrical components.	Clean and verify proper operation.	Annually	Yes or No
f	Check for evidence of fouling on the water-cooled heat-exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No
g	Check strainers.	Correct to preserve required operation. Clean housing and tighten connections to preserve required operation. Clean strainers.	Annually	Yes or No
h	Inspect accessible external piping insulation and vapor barrier for condition.	Record location of damage.	Annually	Yes or No
i	Check freeze stats, relief valves, flow and float switches, low-water cutoffs, and other safety devices for proper operation	Clean, lubricate, adjust. Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify **frequency**.

Table 5-18 Indoor Section Duct-Free Splits

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>
a	Check for particulate accumulation on filters.	Clean dirt and debris or replace media to ensure proper operation.	Annually	Yes or No
b	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust, and calibrate. Change batteries if possible, reset controls, and record <i>condition</i> .	Annually	Yes or No
c	Check condensate drain P-trap.	Prime as needed to ensure proper operation.	Annually	Yes or No
d	Check air-filter fit and housing seal integrity.	Clean and remove dirt and debris to preserve required condition and operation. Document perforations and other damage to housing	Annually	Yes or No
e	Check for damage or evidence of leaks on the indoor refrigeration-cycle heat exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> . Record location of identified leaks.	Annually	Yes or No
f	Check fan blade, housing, and blower.	Clean to remove accumulated dirt and debris to preserve required operation.	Annually	Yes or No
g	Check refrigerant system pressures and temperature difference across coils.	When outside of recommended levels, find and record the cause.	Annually	Yes or No
h	Check integrity of all panels on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/finish of <i>equipment</i> .	Annually	Yes or No
i	Check field-serviceable bearings for noise, vibration, and temperature.	Lubricate to preserve required condition. Document excessive noise, vibration, or temperature	Annually	Yes or No
j	Check condensate drain pan and drain line for proper drainage.	Clean drain pan and condensate drain line as required for proper operation.	Annually	Yes or No
k	Check drain pan, drain line, coil, and other areas of moisture accumulation for visible signs of biological growth.	Clean and remove moisture to preserve required operation.	Annually	Yes or No

l	Check for fin damage and evidence of fouling on the indoor refrigeration-cycle heat-exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No
m	Check condensate pump.	Clean and verify proper operation.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-19 Outdoor-Air Heat-Exchanging Systems

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>
a	Check for particulate accumulation on filters.	Clean or replace as needed to ensure proper operation.	Semiannually	Yes or No
b	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Semiannually	Yes or No
c	Check P-trap drain.	Prime as needed to ensure proper operation.	Semiannually	Yes or No
d	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment or evidence of wear.	Correct tension and sheave alignment.	Semiannually	Yes or No
e	Check for proper operation of sensible heat exchanger.	Clean and adjust to ensure proper operation.	Semiannually	Yes or No
f	Check for proper operation of enthalpy exchanger.	Clean and adjust to ensure proper operation.	Semiannually	Yes or No
g	Check drain pan, drain line, coil, and other areas of moisture accumulation for visible signs of biological growth.	Clean and verify proper operation.	Semiannually	Yes or No
h	Check damper for <i>condition</i> , setting, and operation.	Adjust and lubricate to preserve required condition and operation.	Semiannually	Yes or No
i	Check <i>condition</i> , setting, and operation of damper motors.	Adjust and lubricate to preserve required operation.	Semiannually	Yes or No

j	Check air-filter fit and housing seal integrity.	Clean and verify proper fit/finish.	Annually	Yes or No
k	Check control box for dirt, debris, and/or loose terminations.	Clean, lubricate, and verify proper operation.	Annually	Yes or No
l	Check integrity of all panels on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/finish of <i>equipment</i> .	Annually	Yes or No
m	Check field-serviceable bearings for noise, vibration and temperature.	Lubricate and align to preserve required condition. Document excessive noise, vibration, or temperature.	Annually	Yes or No
n	Inspect exposed accessible ductwork for insulation and vapor barrier integrity.	Record location of damage.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-20 Package Terminal Air Conditioners/Heat Pumps (PTACs/PTHPs)

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Documentation Required
a	Check for particulate accumulation on filters.	Clean or replace as needed to ensure proper operation.	Annually	Yes or No
b	Check condensate slinger and/or drain system.	Clean and verify proper operation.	Annually	Yes or No
c	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Annually	Yes or No
d	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No
e	Check air-filter fit and housing seal integrity.	Clean and verify proper fit/ finish.	Annually	Yes or No
f	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required condition and operation.	Annually	Yes or No

g	Check fan blades, fan housing, blower wheel, and fan housing for proper condition	Clean dirt and debris and document any imbalance noise or vibration to preserve required condition.	Annually	Yes or No
h	Check temperature difference across refrigerant system coils.	When outside of recommended levels, find and record the cause.	Annually	Yes or No
i	Check integrity of all panels on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/finish of <i>equipment</i> .	Annually	Yes or No
j	Check drain pan and drain line for proper condensate drainage.	Check coil for required face velocity and drain for required flow to preserve required operation. Clean and verify proper operation.	Annually	Yes or No
k	Check for fin damage and evidence of fouling on the indoor refrigeration-cycle heat exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No
l	Check for damage or evidence of leaks on the indoor refrigeration-cycle heat-exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No
m	Inspect for evidence of moisture carryover beyond the drain pan from cooling coils.	Clean and remove excess moisture. Check coil for required face velocity and drain for required flow to preserve required operation.	Annually	Yes or No
n	Check for damage or evidence of leaks on the outdoor refrigeration-cycle heat-exchanger surfaces.	Check for damage or evidence of leaks on the outdoor refrigeration-cycle heat exchanger surfaces.	Annually	Yes or No
o	Check for evidence of fouling on the outdoor refrigeration-cycle heat-exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No
p	Inspect areas of moisture accumulation for biological growth.	Clean and verify proper operation.	Annually	Yes or No
q	Check field-serviceable bearings for noise, vibration, and temperature..	Lubricate to preserve required condition. Document excessive noise, vibration, or temperature	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-21 Pumps

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>
a	Check variable-frequency drive for proper operation.	Correct as needed. Clean housing and tighten connections as needed. Clean or replace air filter.	Annually	Yes or No
b	Inspect pumps and associated electrical components.	Clean and verify proper operation.	Annually	Yes or No
c	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Annually	Yes or No
d	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required condition and operation.	Annually	Yes or No
e	Check pump drive for wear or problems due to poor alignment or poor bearing seating.	Lubricate and adjust and record evidence of wear.	Annually	Yes or No
f	Check for proper fluid flow. Clean, adjust, and repair as needed to restore proper flow.	Clean and adjust as needed to restore proper flow.	Annually	Yes or No
g	Check field-serviceable bearings for noise, vibration, and temperature.	Lubricate to preserve required condition. Document excessive noise, vibration, or temperature	Annually	Yes or No
h	Check insulation, vibration isolators, and flexible connectors for integrity.	Record location of damage.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-22 Packaged Heat/Cool Units

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	Documentation Required
a	Check for particulate accumulation on filters.	Clean or replace as needed to ensure proper operation.	Quarterly	Yes or No
b	Check condensate drain pan for proper drainage.	Clean drain pan and condensate drain line for required operation.	Annually	Yes or No
c	Check P-trap.	Prime as needed to ensure proper operation.	Quarterly	Yes or No
d	Check drain pan, drain line, coil, and other areas of moisture accumulation for visible signs of biological growth.	Clean and verify proper operation.	Annually	Yes or No
e	Check steam system traps, pumps, and controls.	Clean and verify proper operation.	Quarterly	Yes or No
f	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Annually	Yes or No
g	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment or evidence of wear.	Correct tension and sheave alignment.	Semiannually	Yes or No
h	Check variable-frequency drive for proper operation.	Correct to preserve required operation. Clean housing and tighten connections as needed to preserve required operation. Clean or replace air filter.	Semiannually	Yes or No
i	Check for fin damage and evidence of fouling on the indoor refrigeration-cycle heat exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Semiannually	Yes or No
j	Check for fin damage and evidence of fouling on the outdoor refrigeration-cycle heat exchanger surfaces	Clean and restore as needed to ensure acceptable <i>condition</i> .	Semiannually	Yes or No
k	Check air-filter fit and housing seal integrity.	Clean and verify proper fit/finish.	Annually	Yes or No

l	Check control box for dirt, debris, insects, rodents, and for loose electrical terminations.	Clean and tighten electrical connections to preserve required condition	Annually	Yes or No
m	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No
n	Check fan blades, blower wheel, and fan housing for proper condition	Clean dirt and debris and document any imbalance noise or vibration.	Annually	Yes or No
o	Check refrigerant system pressures and temperature differences across refrigeration-cycle heat-exchanger surfaces.	When outside of required levels, find and record the cause.	Annually	Yes or No
p	Check fan drive for wear or problems due to poor alignment or poor bearing seating.	Adjust alignment and lubricate to preserve required operation. Document improper bearing configuration.	Annually	Yes or No
q	Check integrity of all panels and curbs on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/finish of <i>equipment</i> .	Annually	Yes or No
r	Check field-serviceable bearings for noise, vibration, and temperature.	Lubricate to preserve required condition. Document excessive noise, vibration, or temperature.	Annually	Yes or No
s	Check for damage or evidence of leaks on the indoor refrigeration-cycle heat-exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> . Find and record the location of identified leaks.	Annually	Yes or No
t	Inspect for evidence of moisture carryover beyond the drain pan from cooling coils.	Clean and remove excess moisture. Check coil for required face velocity and drain for required flow to preserve required operation.	Annually	Yes or No
u	Check damper for <i>condition</i> , setting, and operation.	Adjust and lubricate to preserve required operation.	Annually	Yes or No
v	Check for damage or evidence of leaks on the outdoor refrigeration-cycle heat-exchanger surfaces.	Check for damage or evidence of leaks on the outdoor refrigeration-cycle heat exchanger surfaces.	Annually	Yes or No
w	Check low ambient head pressure control sequence for proper operation.	Clean and adjust components or modify software/algorithm to ensure proper operation.	Annually	Yes or No

x	Check combustion, burner, and flue for deterioration, leaks, moisture problems, and condensation. Check gas pressure, combustion products controls, and safety devices.	Clean and adjust combustion process for proper operation. Find and record the location of identified leaks.	Annually	Yes or No
y	Check for damage or evidence of leaks on the gas heat section heat-exchanger surfaces.	Clean debris and test for harmful gases and inspect for surface perforations to preserve required condition. Find and record the location of identified leaks.	Annually	Yes or No
z	Inspect insulation and areas of moisture accumulation for biological growth.	Remove moisture and biological growth to preserve required condition.	Annually	Yes or No
aa	Check compressor motor voltage and amp draw.	Record readings and document any <i>condition</i> adversely affecting its <i>performance</i>	Annually	Yes or No
bb	Check compressor oil levels and/or pressure on refrigerant systems having oil level and/or pressure measurement means.	When outside of recommended levels, find and record the cause.	Annually	Yes or No
cc	Inspect accessible and exposed ductwork and external piping for insulation and vapor barrier for integrity.	Record location of damage.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-23 Steam Distribution Systems

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Documentation Required
a	Perform chemical testing of system condensate and feed water.	Verify water treatment target levels are being maintained.	Quarterly	Yes or No
b	Check piping for leaks.	Record location of identified leaks.	Quarterly	Yes or No
c	Check safety devices per manufacturer's recommendations.	Clean, lubricate, adjust.	Quarterly	Yes or No
d	Check piping anchors for integrity, and check piping for alignment and expansion fittings for proper operation.	Adjust and lubricate as needed.	Quarterly	Yes or No
e	Inspect blowdown or drain valve.	Clean and verify proper operation.	Quarterly	Yes or No
f	Check chemical injector device.	Verify water treatment target levels are being maintained.	Quarterly	Yes or No
g	Check steam system traps, pumps, and controls.	Clean and verify proper operation.	Quarterly	Yes or No
h	Check for evidence of build-up, fouling, corrosion, or degradation on heat exchange surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No
i	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No
j	Check strainers.	Clean housing and tighten connections as needed. Clean strainers.	Annually	Yes or No
k	Inspect external piping insulation and vapor barrier for integrity.	Record location of damage.	Annually	Yes or No
l	Check interior of condensate return piping for wall thickness integrity.	Record location of damage.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-24 Terminal and Control Boxes (e.g., VAV, Fan-Powered, Bypass)

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Documentation Required
a	Check for particulate accumulation on filters.	Clean or replace as needed to ensure proper operation.	Semiannually	Yes or No
b	Check control system and devices for evidence of improper operation.	Clean, lubricate, calibrate, and adjust to meet required function.	Semiannually	Yes or No
c	Check for evidence of build-up, fouling, corrosion, or degradation on heat exchange surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Semiannually	Yes or No
d	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Semiannually	<u>Yes or No</u>
e	Check air-filter fit and housing seal integrity.	Clean and verify proper fit/finish.	Annually	Yes or No
f	Check fan blades and fan housing.	Clean as needed.	Annually	Yes or No
g	Check integrity of all panels on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/finish of <i>equipment</i> .	Annually	Yes or No
h	Check damper for <i>condition</i> , setting, and operation.	Adjust and lubricate as necessary.	Annually	Yes or No
i	Inspect areas of moisture accumulation for biological growth.	If present, clean	Annually	Yes or No
j	Inspect accessible exposed ductwork and external piping for insulation and vapor barrier for integrity.	Reattach loose elements. Record location of damaged ductwork, insulation, and piping.	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

Table 5-25 Water-Source Heat Pumps

	Normative	Normative	Normative	Normative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	Documentation Required
a	Check for particulate accumulation on filters.	Clean or replace as needed to ensure proper operation.	Semiannually	Yes or No
b	Check P-trap and drain pan for proper drainage.	Prime as needed, tighten fittings, and note any leaks.	Semiannually	Yes or No
d	Check drain pan, drain line, coil, and other areas of moisture accumulation for visible signs of biological growth.	Clean and verify proper operation.	Semiannually	Yes or No
e	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Semiannually	Yes or No
f	Check for damage or evidence of leaks on the water-cooled heat-exchanger surfaces.	Record location of identified leaks.	Semiannually	Yes or No
g	Check variable-frequency drive for proper operation.	Correct as needed. Clean housing and tighten connections as needed. Clean or replace air filter.	Semiannually	Yes or No
h	Check air-filter fit and housing seal integrity.	Clean and verify proper fit/finish.	Annually	Yes or No
i	Check fan blades and fan housing for <i>condition</i> and cleanliness	Clean to preserve required operation.	Annually	Yes or No
j	Check integrity of all panels on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/finish of <i>equipment</i> .	Annually	Yes or No
k	Inspect areas of moisture accumulation for biological growth.	When present, remove moisture and biological growth.	Annually	Yes or No
l	Check fan drive for wear or problems due to poor alignment or poor bearing seating.	Adjust to required alignment and lubricate.	Annually	Yes or No
m	Check field-serviceable bearings for noise, vibration, and temperature.	Lubricate to preserve required condition	Annually	Yes or No
n	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No

o	Check refrigerant system pressures differences across refrigerant heat exchangers.	When outside of required levels, find and record the cause.	Annually	Yes or No
p	Check for damage or evidence of leaks on the indoor refrigeration-cycle heat exchanger surfaces.	Record location of identified leaks.	Annually	Yes or No
q	Check for fin damage and evidence of fouling on the indoor refrigeration-cycle heat-exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No
r	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No
s	Inspect for evidence of moisture carryover beyond the drain pan from cooling coils.	Clean moisture outside drain pan. Check drain pan for proper flow. Confirm coil face velocity meets requirements to preserve required operation.	Annually	Yes or No
t	Check condensate pump.	Clean and verify proper operation.	Annually	Yes or No
u	Check compressor voltage and amp draw.	Record readings and document any <i>condition</i> adversely affecting its <i>performance</i>	Annually	Yes or No

*Refer to Section 4.11 for procedure to modify frequency.

APPENDIX

(This appendix is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

INFORMATIVE APPENDIX A SOURCES OF *PROGRAM OBJECTIVES*

This appendix provides additional information relating to Section 4.4.3, “*Maintenance Program Objectives*.” These sources may assist in establishing specific *program objectives* based on Basis of Design and operational criteria specific to a particular system:

- a. Design documents for the HVAC system with the provision that those documents still reflect the current loads, space utilization, and other system requirements
- b. A duly licensed professional authorized to perform HVAC design work
- c. Manufacturers’ technical material or generally accepted industry criteria
- d. Requirements from ASHRAE Standards:
 - Standard 55-2023, Thermal Environmental Conditions for Human Occupancy (ANSI Approved)
 - Standard 62.1-2022, Ventilation and Acceptable Indoor Air Quality
 - Standard 90.1-2022, Energy Standard for Buildings, Except Low-Rise Residential Buildings
- e. Authority having jurisdiction
- f. Licensed HVAC contractor
- g. Owner’s program requirements

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INFORMATIVE APPENDIX B INDICATORS OF UNACCEPTABLE CONDITIONS

This appendix provides additional information relating to Section 4.9, “*Condition Indicators*.” When designing a maintenance plan, it is helpful to identify representative observations or *inspections* of *equipment* conditions to serve as indicators of unacceptable operating conditions, *performance* degradation, or pending failure. This appendix provides examples of such *condition indicators*.

Physical-State Related

- a. Deformation, perforation, discoloration, contamination, or oxidation of component surfaces
- b. Fluid or vapor leakage evidence
- c. Excessive or abnormal noise or vibration
- d. Loose or missing fasteners
- e. Unusual ice, frost, or condensate formation
- f. Worn or damaged electrical insulating materials
- g. High levels (>20% area) of surface corrosion or scale accumulation
- h. High levels of accumulated dirt or sludge observed as encasing operating mechanisms, covering instrumentation, covering heat
- i. Visible biological growth (fungi, algae, or bacteria)
- j. Biological growth determined by test results
- k. Failure of insulation or vapor barrier material integrity observed as condensation, physical damage, or creating a hazardous *condition* risking injury on human contact
- l. Slow-running or overflowing drains
- m. Overheated electrical *equipment*
- n. Nonfunctional *equipment* observed as *equipment* energized but where *equipment* is not delivering intended service, such as lack of airflow or water flow
- o. Torn or perforated filter media
- p. Abnormal building pressures
- q. Visible smoke or abnormal odors, such as burning smells or natural gas, sensed as smoke, steam, ozone-electrical, or sewer gas

Note: Be wary of potential toxic fumes; test before entering area or confined space.

Performance Related

- a. Filter operation outside established criterion, such as pressure drop
- b. Chiller incapable of producing, leaving water temperature within original design
- c. Airflow from air handler not within design requirements
- d. Space temperature exceeding set-point requirements
- e. Condensing water temperature rising beyond design

- f. Energy consumption exceeds design-basis energy consumption without a significant change in operating hours or function
- g. Degraded delivery of functional purpose measured by incorrect air or water flow, current draw, pressure drop, etc.

Program or Plan Related

- a. Poor field practices: Review inspection documentation and/or technician execution to ensure *maintenance tasks* are performed correctly.
- b. Insufficient time budgeted for *tasks*: Review time planned for the technician to ensure that reasonable time has been given to perform the *tasks*.
- c. Component repairs noted/pending/not made: Review documentation to determine that repair or component replacement has been undertaken.
- d. Obsolete *equipment* or components: Determine whether the *equipment* or component has been in service beyond its useful life.

Other Issues

- a. Conditions outside of the HVAC system causing failure: Investigate whether water leaks, vandalism, a problem in the building envelope, or some other external factor is causing the problem.
- b. Design issues: Determine whether underlying design issues are causing successive failures.

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INFORMATIVE APPENDIX C SITUATIONS REQUIRING REVIEW OF THE MAINTENANCE PLAN

This appendix provides additional information relating to Section 4.11, “*Revision of the Maintenance Program and Maintenance Plan*.” The following list includes examples of changes to the facility, HVAC systems, and *equipment* that require review of the *maintenance plan*:

- a. Modifications to the building that impact HVAC capacities or configuration
- b. Changes to building function or building use that impact HVAC design intent or configuration
- c. Changes to HVAC components or HVAC system
- d. Documented, agreed-upon recommendations from the owner or maintenance implementer
- e. Equipment-changes, including:
 - 1. Condition,
 - 2. Status,
 - 3. Components and systems,
 - 4. Equipment function where the equipment is found incapable of achieving their design intent, or
- f. Revisions to task frequencies in response to actual conditions shall result in improved *condition* or reduced inspection and maintenance work.

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INFORMATIVE APPENDIX D REASONS FOR ADJUSTING MAINTENANCE TASK FREQUENCY

Informative Appendix D lists examples of environmental impacts and operational requirements that affect inspection and maintenance task frequencies. When these or similar ~~situations~~ occur while an existing maintenance plan is in place, a review and potential revision of the *maintenance plan* be initiated. As noted in Section 4.11.3, operational requirements, process priorities, weather, construction/renovation, and *equipment* replacement are examples of situations that can interrupt the timely delivery of *inspection* and *maintenance*.

Note that changing circumstances provide an opportunity to review existing *inspection* and *maintenance tasks* as well as frequencies and make adjustments. The maintenance plan is intended to be a living document, capable of being adapted as required.

Examples of causes for adjusting task frequencies include the following (each adjustment to task or frequency shall be documented, including the reason for the adjustment):

- a. A cooling tower/chiller shutdown during the winter:
Inspection and maintenance suspended during the shutdown period; the same is true for a heating system or boiler in the summer.
- b. A new chiller is installed and the old chiller is retained as a backup: Adjust inspection and maintenance *tasks* of any backup units to reflect fewer operating hours.
- c. For off-season conditions, adjust inspection and maintenance *tasks* of idle equipment to reflect fewer operating hours.
- d. Nearby demolition, earth moving activity, or heavy construction increases air filter dust loading.
- e. A smoke event requires immediate air filter replacement, as well as potential follow up with carbon impregnation or other filtration. Upon the conclusion of the responses directly related to the smoke event, consider a “lessons learned” review of the *maintenance plan*.
- f. Construction activity within the building is anticipated to add to air filter dust loading.

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INFORMATIVE APPENDIX F EQUIPMENT TABLES RECOMMENDED ACTIONS

This appendix provides additional information relating to Section 5, *Equipment Tables*. When inspection and maintenance tasks do not preserve equipment and performance, these tables add further recommended action intended to restore the equipment to required condition. The recommended actions are listed with the normative tasks for reference. This appendix is created to separate requirements in Section 5 from non-mandatory recommended restorative actions that are beyond the scope of this standard. The normative information columns are included for reference only. Required Tasks are found in Section 5.

Table F-1 Air Distribution Systems

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Documentation Required	Recommended Corrective Action
a	Check control system and devices for evidence of improper operation	Clean, lubricate, and/or adjust.	Semi-Annually	Yes or No	Repair or replace to ensure proper operation
b	Inspect diffusers, grilles and registers for dirt accumulation	Clean as needed to remove dirt build up.	Semi-Annually	Yes or No	Replace missing or damaged
c	Check damper for <i>condition</i> , setting, and operation.	Clean, lubricate, and adjust to preserve required operation.	Annually	Yes or No	Replace if missing or damaged.
d	Inspect areas of moisture accumulation for biological growth.	If present, remove moisture and clean biological growth to preserve required operation.	Annually	Yes or No	Disinfect as needed.
e	Inspect accessible exposed ductwork for insulation and vapor barrier integrity.	Reattach and patch small breaks in insulation. Record damage location.	Annually	Yes or No	Replace or repair if needed.
f	Inspect accessible internally lined ductwork until the first turn or up to 20 ft (6.1 m) from a potential moisture source, such as a supply plenum, from air handler,	Reattach and patch breaks in insulation. Determine and record location of damage beyond maintenance.	Annually	Yes or No	Eliminate moisture source. Repair/replace wet insulation. Remove biological

	outdoor air damper, humidifier, etc., for water damage and/or biological contamination.				contamination and disinfect surfaces.
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*Refer to Section 4.11 for procedure to modify frequency.

Table F-2 Air Handlers

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency</i>	<i>Documentation Required</i>	<i>Recommended Corrective Action</i>
a	Check for particulate accumulation on filters.	Clean or replace to ensure proper operation.	Quarterly	Yes or No	Evaluate frequency of change requirement.
b	Check P-trap.	Clean and prime as needed and verify proper operation.	Quarterly	Yes or No	Replace damaged P-trap.
c	Check drain pan, drain line, coil, and other areas of moisture accumulation for visible signs of biological growth.	Clean and verify proper operation.	Semiannually	Yes or No	Repair or replace as needed to ensure proper operation.
d	Check steam system traps, pumps, strainers, and controls.	Clean and verify proper operation.	Semiannually	Yes or No	Repair or replace components as needed to ensure proper operation.
e	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Semiannually	Yes or No	Repair or replace components as needed to ensure proper operation.
f	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment or evidence of wear.	Correct tension and sheave alignment.	Semiannually	Yes or No	Replace belts and sheaves as needed to ensure proper operation
g	Check variable-frequency drive for proper operation.	Correct as needed. Clean housing and tighten connections as needed to preserve required operation.	Semiannually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.

		Clean or replace air filter.			
g	Check for damage or evidence of leaks on the refrigeration-cycle indoor heat exchanger, chilled-water-coil heat exchanger, or steam or hot-water-coil heat-exchanger surfaces.	Tighten connections. Record location of identified remaining leaks.	Semiannually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
h	Check air-filter fit and housing seal integrity.	Clean and verify proper fit/ finish.	Annual	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
i	. Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical terminations to preserve required condition.	Annual	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
j	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical terminations to preserve required condition.	Annual	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
k	Check fan blades and fan housing.	Clean and tighten electrical connections to preserve required condition.	Annual	Yes or No	Repair or replace as needed to ensure proper operation.
l	Check refrigerant system temperatures.	When outside of recommended levels, find and record the cause.	Annual	Yes or No	Repair, and adjust refrigerant to achieve optimal operating levels.
m	. Check integrity of all panels on <i>equipment</i> .	Replace missing or broken fasteners as needed to preserve required integrity and fit and finish of <i>equipment</i> .	Annual	Yes or No	Repair or replace damaged panels
n	Assess field-serviceable bearings.	Lubricate to preserve required operation. (noise, vibration, and temperature).	Annual	Yes or No	Replace as needed

o	Check for fin damage and evidence of fouling on the refrigeration-cycle indoor heat exchanger, chilled-water-coil heat exchanger, or steam or hot-water-coil heat-exchanger surfaces.	Clean and restore to acceptable <i>condition</i> and air flow.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
p	Inspect for evidence of moisture carryover beyond the drain pan from cooling coils.	Clean as needed moisture outside drain pan. Check drain pan for proper flow. Confirm coil face velocity meets requirements.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
q	Check damper for <i>condition</i> , setting, and operation.	Adjust and lubricate to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
r	Check condensate pump.	Clean and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
s	Inspect exposed ductwork for insulation and vapor barrier for integrity.	Record location of damage.	Annually	Yes or No	Repair or replace as needed.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-3 Boilers

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Documentation Required	Recommended Corrective Action
a	For systems using fuel oil, inspect fuel filter, nozzle, and electrodes.	Clean and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
b	Perform chemical testing of system water.	Verify water treatment target levels are being maintained.	Quarterly	Yes or No	Repair equipment and treat as needed to ensure proper water chemistry.

c	For systems using fuel oil, check fuel pump and ignition transformer for proper operation.	Clean and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
d	Inspect blowdown or drain valve. Clear all debris to ensure proper operation.	Clean and verify proper operation.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
e	Check for evidence of leakage of fuel supply, heat transfer fluid, and flue gas.	Record location of identified leaks.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
f	For systems using natural gas, check gas pressure, gas valve operation, and combustion fan operation.	Clean and verify proper operation.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
g	Check controls and safety devices for proper operation.	Clean, lubricate, and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
h	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
i	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation-
j	Check for evidence of buildup or fouling, corrosion, or degradation on heat-exchange surfaces.	Clean and restore to preserve required operation and acceptable <i>condition</i> .	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
k	Check damper for <i>condition</i> , setting, and operation.	Adjust and lubricate to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
l	Check combustion chamber, burner(s), and flue for deterioration, moisture problems, condensation, and combustion products.	Clean and adjust combustion process for proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.

m	Inspect refractory for damage or wear.	Clean combustion-side; e.g., fire tubes, upper, and lower drums. Record location of refractory damage or wear.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
n	Observe burner flame at high load for correct operating condition.	Clean and adjust.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
o	Verify proper operation of safety devices per manufacturer's instructions.	Clean, lubricate, adjust.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-4 Chillers—Absorption

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>	<i>Recommended Corrective Action</i>
a	Check for the presence of non-condensable. Note and log purge count.	Adjust vacuum-pump purge timer to deliver required non-condensable removal.	Monthly	Yes or No	Repair or replace as required to ensure proper operation.
b	Perform chemical testing of system water.	Treat as needed to ensure required water chemistry and freeze protection set points are being maintained.	Quarterly	Yes or No	Repair or replace <i>equipment</i> and treat as required to ensure proper water chemistry.
c	Check steam system traps, pumps, strainers and controls.	Clean, and verify proper operation.	Annually	Yes or No	Repair or replace as required to ensure proper operation.
d	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
e	Check variable-frequency drive for proper operation.	Clean housing and tighten connections. Correct settings to preserve required operation. Clean or replace air filter.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
f	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
g	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
h	Check for fouling, corrosion, or degradation.	Clean as needed to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.

i	Check open drive couplings, bearings, and seals for evidence wear or alignment problems.	Lubricate and align to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
j	Check for evidence of build-up, fouling, corrosion, or degradation on heat exchange surfaces.	Clean and restore to preserve required operation and ensure acceptable <i>condition</i> .	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
k	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No	Repair and adjust to achieve optimal operating flows.
l	Check inhibitor and internal fluid chemistry.	Correct inhibitor and internal fluid chemistry if outside of established operating ranges.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
m	Verify proper operation of safety devices per manufacturer's recommendations.	Clean, lubricate, adjust.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-5 Chillers—Air-Cooled

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>	<i>Recommended Corrective Action</i>
a	Perform chemical testing of system water.	Test and treat to ensure water chemistry and freeze protection target levels are being maintained.	Quarterly	Yes or No	Repair equipment and treat as needed to ensure proper water chemistry.
b	Check control system and devices for evidence of improper operation.	Clean, lubricate, and verify proper operation.	Annually	Yes or No	Repair equipment and treat as needed to ensure proper water chemistry.
c	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment or evidence of wear.	Correct tension and sheave alignment.	Semiannually	Yes or No	Repair or replace as needed to ensure proper operation.
d	Check variable-frequency drive for proper operation.	Correct to preserve required operation. Clean housing and tighten connections to preserve required operation. Clean or replace air filter.	Semiannually	Yes or No	Replace belts and sheaves as needed to ensure proper operation.
e	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
f	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
g	Check fan blades and fan housing.	Clean to preserve required operation.	Annually	Yes or No	Repair or replace as needed to restore required condition.
h	Check refrigerant system pressures and/or temperatures.	When outside of recommended levels,	Annually	Yes or No	Repair and adjust refrigerant to

		find and record the cause.			achieve optimal operating levels.
i	Check open drive couplings, bearings, and seals for evidence of wear or alignment problems.	Lubricate, adjust, and record evidence of wear.	Semiannually	Yes or No	Repair or replace as needed to ensure proper operation.
j	Assess field-serviceable bearings.	Lubricate to preserve required operation.	Annually	Yes or No	Replace as needed.
k	Check for fin damage and evidence of fouling on the outdoor refrigeration-cycle heat-exchanger surfaces.	Clean and restore to preserve required operation and ensure acceptable <i>condition</i> .	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
l	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No	Repair and adjust to achieve optimal operating flows.
m	Check for damage or evidence of leaks on the outdoor refrigeration-cycle heat exchanger surfaces.	Check for damage or evidence of leaks on the outdoor refrigeration cycle heat-exchanger surfaces.	Semiannually	Yes or No	Repair or replace damaged or leaking components.
n	Check low ambient head pressure control sequence for evidence of improper operation.	Clean and adjust components or modify software/algorithm to ensure proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
o	Check compressor oil level and/or pressure on refrigerant systems having oil level and/or pressure measurement means.	When outside of recommended levels, find and record the cause.	Annually	Yes or No	Repair and adjust refrigerant to achieve optimal operating levels.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-6 Chillers—Water-Cooled

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	Documentation Required	Recommended Corrective Action
a	Perform chemical testing of system water.	Test and treat to ensure water chemistry and freeze protection target levels are being maintained.	Monthly	Yes or No	Repair <i>equipment</i> and treat as needed to ensure proper water chemistry.
b	Inspect gearbox for excessive wear.	Clean, lubricate, and verify proper operation.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
c	Check control system and devices for evidence of improper operation.	Clean, lubricate, and verify proper operation.	Semiannually	Yes or No	Repair or replace as needed to ensure proper operation.
d	Check variable-frequency drive for proper operation.	Correct to preserve required operation. Clean housing and tighten connections to preserve required operation. Clean air filter.	Semiannually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
e	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
f	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
g	Check refrigerant system pressures and/or temperatures.	When outside of recommended levels, find and record the cause.	Annually	Yes or No	Repair and adjust refrigerant to achieve optimal operating levels.
h	Check open drive couplings, bearings, and seals for evidence wear or alignment problems.	Lubricate and align to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
i	Check for evidence of build-up, fouling, corrosion, or degradation	Clean and restore to preserve required operation to ensure acceptable <i>condition</i> .	Annually	Yes or No	Repair or replace as needed to ensure proper operation.

	on heat exchange surfaces.				
j	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No	Repair and adjust to achieve optimal operating flows.
k	Check compressor oil level and/or pressure on refrigerant systems having oil level and/ or pressure measurement means.	When outside of recommended levels, find and record the cause.	Annually	Yes or No	Repair and adjust refrigerant to achieve optimal operating levels.
l	Assess field-serviceable bearings.	Lubricate to preserve required operation.	Annually	Yes or No	Replace as needed.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-7 Coils and Radiators

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>	<i>Recommended Corrective Action</i>
a	Check for proper operation of control valves and vents.	Clean and verify proper operation.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
b	Check steam trap and condensate return line.	Prime trap to ensure proper operation.	Quarterly	Yes or No	Repair or replace damaged steam trap.
c	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Semiannually	Yes or No	Repair or replace components as needed to ensure proper operation.
d	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No	Repair or replace to achieve optimal operating flows.

e	Check refrigerant system temperatures differential across coil.	When outside of recommended levels, find and record location of identified leaks.	Annually	Yes or No	Repair and adjust refrigerant to achieve optimal operating levels.
f	Check for damage or evidence of leaks on the refrigeration-cycle indoor heat exchanger, chilled-water-coil heat exchanger, or steam or hot-water-coil heat-exchanger surfaces.	Clean and restore to preserve required operation and ensure acceptable <i>condition</i> . Record location of identified leaks.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
g	Check integrity of all removable access panels on <i>equipment</i> .	Replace fasteners to preserve required operation and to ensure proper integrity and fit/finish of <i>equipment</i> .	Annually	Yes or No	Repair or replace damaged panels.
h	Check drain pan, drain line, coil, and other areas of moisture accumulation for visible signs of biological growth.	Clean and verify proper operation.	Annually	Yes or No	Disinfect as needed.
i	Check for fin damage and evidence of fouling on the refrigeration-cycle indoor heat exchanger, chilled-water-coil heat exchanger, or steam or hot-water-coil heat-exchanger surfaces.	Clean and restore to preserve required operation and to ensure acceptable <i>condition</i> .	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
j	Inspect for evidence of moisture carryover beyond the drain pan from cooling coils.	Clean to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
k	Check condensate drain pan, condensate drain line, and condensate pump.	Clean, and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-8 Condensing Units

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>	<i>Recommended Corrective Action</i>
a	Check control system and devices for evidence of improper operation.	Calibrate, clean, lubricate, and adjust.	Annually	Yes or No	Repair or replace components as needed to ensure proper operation.
b	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment or evidence of wear.	Correct tension and sheave alignment.	Semiannually	Yes or No	Replace belts and sheaves as needed to ensure proper operation.
c	Check variable-frequency drive for proper operation.	Correct to preserve required operation. Clean housing and tighten connections to preserve required operation. Clean or replace air filter.	Semiannually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
d	Check control box for dirt, debris, insects, rodents, and for loose electrical terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
e	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
f	Check fan blades, blower wheel, and fan housing for proper operation.	Clean to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
g	Check refrigerant system pressures and temperature differentials across refrigeration-cycle heat-exchanger.	When outside of recommended levels, find and record the cause.	Annually	Yes or No	Repair and adjust refrigerant to achieve optimal operating levels.
h	Check for fin damage and evidence of fouling on the outdoor refrigeration-cycle heat exchanger surfaces.	Replace fasteners to preserve required operation to ensure proper integrity and fit/ finish of <i>equipment</i> .	Annually	Yes or No	Repair or replace damaged panels.

i	Check open drive couplings, bearings, and seals for evidence of wear or alignment problems.	Lubricate and align to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
j	Check for damage evidence of leaks on the outdoor refrigeration-cycle heat-exchanger surfaces and other accessible refrigeration components.	Check for damage or evidence of leaks on the outdoor refrigeration-cycle heat exchanger surfaces.	Annually	Yes or No	Check for damage or evidence of leaks on the outdoor refrigeration-cycle heat-exchanger surfaces.
k	Check low ambient head pressure control sequence for proper operation.	Clean and adjust components or modify software/algorithm to ensure proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
l	Check compressor oil level and/or pressure on refrigerant systems having oil level and/or pressure measurement means.	When outside of recommended levels, find and record the cause.	Annually	Yes or No	Repair leaks and top off oil level.
m	Check compressor amp draw and voltage.	Record readings and document any condition adversely affecting its performance.	Annually	Yes or No	Check for cause(s) that are adversely affecting its <i>performance</i> .

*Refer to Section 4.11 for procedure to modify frequency.

Table F-9 Control Systems

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>	<i>Recommended Corrective Action</i>
a	For pneumatic systems, check compressed-air system (e.g., compressor, dryer, receiver, blowdown valve) for proper operation. Check for evidence of oil carryover and <i>condition</i> of oil filter.	Clean and lubricate to preserve required operation. Blowdown accumulated moisture.	Monthly	Yes or No	Repair or replace as needed to ensure proper operation.
b	For pneumatic systems, check for proper air pressure.	Clean, lubricate, adjust.	Monthly	Yes or No	Repair or replace as needed to ensure proper operation.
c	For systems designed specifically for humidity control, measure relative humidity.	Clean, lubricate, adjust.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
d	Check alarms and alarm history.	Note and respond to preserve required operation.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
e	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Annually	Yes or No	Repair or replace components as needed to ensure proper operation.
f	Check time-of-day schedule to confirm consistency with facility operation.	Adjust schedule to preserve required operation.	Annually	Yes or No	Repair or replace components as needed to ensure proper operation.
g	Check set points, trended points, and time schedules.	Note and respond to preserve required operation.	Annually	Yes or No	Repair or replace components as needed to ensure proper operation.
h	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
i	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections	Annually	Yes or No	Repair, replace, or restore as needed to

		to preserve required operation.			ensure proper operation.
j	For pneumatic systems, check pneumatic lines for blockages.	Clean to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
k	Check to see that backup of digital control program is current.	Update when it is not current.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
l	Check battery backup and verify proper operation.	Clean and maintain batteries to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
m	Verify actuator movement and device response to control output.	Lubricate and align to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
n	Change building management system (BMS) interface user authentication passwords.	Make the change to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
o	Verify no <i>equipment</i> has been left in override (hand/OFF instead of auto) either locally or through the BMS.	Make corrections as required to preserve required operation.	Monthly	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
p	Simulate an alarm <i>condition</i> in the system, which normally notifies personnel via email or text message, to confirm proper operation.	Restore to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.

Refer to Section 4.11 for procedure to modify frequency.

Table F-10 Cooling Towers and Evaporative-Cooled Devices

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Documentation Required	Recommended Corrective Action
a	Perform chemical testing of system water.	Test and treat to ensure water chemistry and freeze protection target levels are being maintained.	Quarterly	Yes or No	Repair <i>equipment</i> , and treat as needed to ensure proper water chemistry.
b	Check conductivity and other sensors for proper readings.	Clean and verify proper operation.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
c	Check water system ultraviolet lamp.	Clean and verify that it is functioning.	Quarterly	Yes or No	Replace as needed to ensure proper operation.
d	Inspect blowdown or drain valve.	Clean and verify proper operation.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
e	Check chemical injector device.	Verify water treatment target levels are being maintained.	Quarterly	Yes or No	Repair <i>equipment</i> , and treat as needed to ensure proper water chemistry.
f	Check cooling-tower-fan open drive system couplings, bearings, and seals for wear and proper alignment.	Lubricate and align to preserve required operation.	Quarterly	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
g	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment or evidence of wear.	Correct tension and sheave alignment.	Quarterly	Yes or No	Replace belts and sheaves as needed to ensure proper operation.
h	Check for fouling, corrosion, degradation, or dirt/debris accumulation on or in sump and strainer, wet decks, fill, nozzles, and exterior louvers.	Clean and restore to preserve required operation and to ensure required <i>condition</i> .	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
i	If two-stage (dual flow rate) tower, verify proper operation at both high and low flow rates.	Clean and verify proper operation.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
j	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Semi-annually	Yes or No	Repair or replace components as

					needed to ensure proper operation.
k	Check variable-frequency drive for proper operation.	Adjust to preserve required operation. Clean housing and tighten connections to preserve required operation. Clean or replace air filter.	Semiannually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
l	Inspect pumps and associated electrical components.	Clean and verify proper operation.	Semiannually	Yes or No	Repair or replace as needed to ensure proper operation.
m	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
n	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
o	Check fan blades and fan housing.	Clean to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
p	Assess field-serviceable bearings.	Lubricate to preserve required operation.	Annually	Yes or No	Replace as needed.
q	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No	Repair and adjust to achieve optimal operating flows.
r	Check for proper damper operation.	Clean, lubricate, repair, replace, or adjust to preserve required operation.	Annually	Yes or No	Replace if missing or damaged.
s	Check cooling tower motors and pumps for proper operation.	Correct as needed. Clean housing and tighten connections to preserve required operation. Clean strainers.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-11 Dehumidification and Humidification Devices

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Documentation Required	Recommended Corrective Action
a	For systems designed specifically for humidity control, measure relative humidity.	Clean, lubricate, and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
b	Check for proper fluid flow, drainage, and for fluid leaks.	Adjust flow when outside of recommended flow range. Clean drain line and verify proper operation. When leaking, find and record the location of identified leaks.	Annually	Yes or No	Repair and adjust to achieve optimal operating flows.
c	Check steam system traps, pumps, and controls.	Clean, lubricate, and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
d	Check for fouling, corrosion, or degradation of pads and coils.	Clean and restore to preserve required operation and to ensure acceptable <i>condition</i> .	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
e	Check strainers.	Clean housing and tighten connections to preserve required operation. Clean strainers.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
f	Inspect distributors, drain pans, and other areas of moisture accumulation for biological growth.	Clean and verify proper operation.	Annually	Yes or No	Disinfect as needed.
g	Check coils used for dehumidification	Clean and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-12 Economizers—Air Side

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Documentation Required	Recommended Corrective Action
a	Check for particulate accumulation on filters.	Clean or replace to preserve required operation.	Quarterly	Yes or No	Evaluate frequency of change requirements.
b	For communicating economizers only, check, review, and document alarms.	Reset resolved alarms.	Quarterly	Yes or No	Repair, adjust, or replace components to ensure proper operation.
c	For communicating economizers only, check <i>condition</i> , setting, and operation of all related sensors.	Clean, lubricate, adjust.	Annually	Yes or No	Repair, adjust, or replace components to ensure proper operation.
d	Check <i>condition</i> , setting, and operation of the economizer controller and actuators.	Clean, lubricate, and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
e	Check dampers for <i>condition</i> , setting, and operation.	Clean, lubricate, and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
f	Check air-filter fit and housing seal integrity.	Clean and verify proper fit/ finish.	Annually	Yes or No	Repair, restore, or replace as needed to ensure proper operation.
g	For all economizers, check <i>condition</i> , setting, and operation of all related sensors against a trusted sensor.	Clean, lubricate, adjust.	Annually	Yes or No	Repair, adjust, or replace components to ensure proper operation.
h	Check integrity of all panels on <i>equipment</i> .	Replace fasteners to preserve required operation and to ensure proper integrity and fit/finish of <i>equipment</i> .	Annually	Yes or No	Repair or replace damaged panel.
i	Inspect areas of moisture accumulation for biological growth.	If present, clean.	Annually	Yes or No	Disinfect as needed.

j	Check <i>condition</i> , setting, and operation of the low-limit stat.	Clean and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
k	Check <i>condition</i> , setting, and operation of the relief dampers or power exhaust fan.	Adjust and lubricate to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-13 Engines—Micro-turbines

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>	<i>Recommended Corrective Action</i>
a	Check oil level and pressure.	Add and adjust lubricate to preserve required operation.	Quarterly	Yes or No	Repair, restore, or replace as needed to ensure proper operation.
b	Inspect fuel filter.	Clean or replace lubricate to preserve required operation.	Quarterly	Yes or No	Repair, restore, or replace as needed to ensure proper operation.
c	Check for particulate accumulation on turbine intake air filters.	Clean or replace lubricate to preserve required operation.	Quarterly	Yes or No	Repair, restore, or replace as needed to ensure proper operation.
d	Inspect flexible connections.	Clean and lubricate to preserve required operation.	Annually	Yes or No	Repair, restore, or replace as needed to ensure proper operation.
e	For systems using fuel oil, check fuel pump for proper operation.	Clean and verify proper operation.	Annually	Yes or No	Repair or replace to ensure proper operation.
f	Check control box for dirt, debris, and/or loose terminations.	Clean, lubricate, and verify proper operation.	Annually	Yes or No	Repair or replace to ensure proper operation.
g	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections and lubricate to preserve required operation.	Annually	Yes or No	Repair, restore, or replace as needed to ensure proper operation.
h	Check open drive couplings, bearings, and seals for evidence of wear or alignment problems.	Lubricate and align lubricate to preserve required operation.	Annually	Yes or No	Repair, restore, or replace as needed to ensure proper operation.

i	Check exhaust system for corrosion.	Clean and restore lubricate to preserve required operation and to ensure acceptable <i>condition</i> .	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
j	Verify proper operation of safety devices per manufacturer's recommendations.	Clean, lubricate, adjust.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
k	Assess field-serviceable bearings.	Lubricate to preserve required operation.	Annually	Yes or No	Replace as needed.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-14 Fan (e.g., Exhaust, Supply, Transfer, and Return)

	Normative	Normative	Normative	Normative	Informative
	Inspection Task	Maintenance Task	Frequency*	Documentation Required	Recommended Corrective Action
a	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment and <i>condition</i> .	Correct tension and sheave alignment.	Annually	Yes or No	Replace belts and sheaves as needed to ensure proper operation.
b	Check variable-frequency drive for proper operation.	Clean housing and tighten connections to preserve required operation. Clean or replace air filter.	Annually	Yes or No	Repair, restore, or replace as needed to ensure proper operation.
c	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Annually	Yes or No	Repair or replace components as needed to ensure operation.
d	Check fan drive for <i>condition</i> (poor alignment or poor bearing seating).	Adjust and lubricate to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
e	Check fan blades and fan housing for <i>condition</i> and cleanliness.	Clean to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure operation.
f	Check field-serviceable bearings for <i>condition</i> .	Lubricate to preserve required operation.	Annually	Yes or No	Repair, restore, or replace as needed to ensure proper operation.

g	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, restore, or replace as needed to ensure proper operation.
h	Check motor contactor for <i>condition</i> (pitting or other signs of damage) and wire connections.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, restore, or replace as needed to ensure proper operation.
i	Check integrity of all panels on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/finish of <i>equipment</i> .	Annually	Yes or No	Repair or replace damaged panels.
j	Inspect exposed and accessible ductwork and external piping for insulation and vapor barrier integrity.	Record location of damage.	Annually	Yes or No	Repair or replace as needed.
k	Check damper for <i>condition</i> , setting, and operation.	Adjust and lubricate to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
l	Inspect flexible connections.	Clean to preserve required operation.	Annually	Yes or No	Repair, restore, or replace as needed to ensure proper operation.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-15 Fan Coils—Hot-Water, Steam and Refrigeration

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Required Documentation	Recommended Corrective Action
a	Check for particulate accumulation on coils and filters.	Clean or replace to preserve required operation.	Annually	Yes or No	Evaluate frequency of change requirement.
b	Check P-trap.	Prime as needed to ensure proper operation.	Annually	Yes or No	Replace damaged P-trap.
c	Check steam system traps, pumps, and controls.	Clean and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.

d	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Annually	Yes or No	Repair or replace components as needed to ensure proper operation.
e	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment and condition.	Correct tension and sheave alignment.	Annually	Yes or No	Replace belts and sheaves as needed to ensure proper operation.
f	Check for condition and evidence of leaks on the refrigeration-cycle indoor heat exchanger, chilled-water-coil heat exchanger, or steam or hot-water coil heat-exchanger surfaces.	Clean and restore to preserve required operation and to ensure required <i>condition</i> . Find and record the location of identified leaks.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
g	Check air-filter fit and housing seal integrity.	Clean to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
h	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
i	Check motor contactor for condition (pitting or other signs of damage) and wire connections.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
j	Check fan blades and fan housing for condition and cleanliness.	Clean to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
k	Check refrigerant system temperature difference across coil.	When outside of recommended levels, find and record the cause.	Annually	Yes or No	Repair and adjust refrigerant to achieve optimal operating levels.
l	Check integrity of all panels on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/ finish of <i>equipment</i> .	Annually	Yes or No	Repair or replace damaged panels.
m	Check field-serviceable bearings for condition.	Lubricate to preserve required operation.	Annually	Yes or No	Replace as needed.

n	Check for proper fluid flow.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No	Repair and adjust to achieve optimal operating flows.
o	Check drain pan, drain line, coil, and other areas of moisture accumulation for visible signs of biological growth.	Clean and verify proper operation.	Annually	Yes or No	Disinfect as needed.
p	Check for fin damage and evidence of fouling on the refrigeration-cycle indoor heat exchanger, chilled-water-coil heat exchanger, or steam or hot-water-coil heat-exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
q	Inspect for evidence of moisture carryover beyond the drain pan from cooling coils.	Clean to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
r	Check damper for <i>condition</i> , setting, and operation.	Adjust and lubricate to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
s	Check condensate pump.	Clean and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-16 Furnaces—Combustion Unit Heaters

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	Frequency*	Required Documentation	Recommended Corrective Action
a	Check for particulate accumulation on coils and filters.	Clean or replace to preserve required operation.	Annually	Yes or No	Evaluate frequency of change requirement.
b	For systems using fuel oil, inspect fuel filter.	Clean or replace to preserve required	Annually	Yes or No	Repair or replace as needed to

		operation and verify proper operation.			ensure proper operation.
c	For systems using fuel oil, check fuel pump for proper operation.	Check pressure and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
d	Check combustion air intake.	Preserve required operation. Clean and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
e	Check burner(s) and check for proper combustion.	Clean and adjust per manufacturer's instructions. Verify proper operation.	Annually	Yes or No	Repair or replace burner and components as needed to ensure proper operation.
f	Check control system and devices for evidence of improper operation.	Clean, lubricate, and verify proper operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
g	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore to ensure proper operation
h	Check air-filter fit and housing seal integrity.	Clean and verify proper fit/ finish.	Annually	Yes or No	Repair, replace, or restore to assure proper operation.
i	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment and condition.	Correct tension and sheave alignment.	Annually	Yes or No	Replace belts and sheaves.
j	Check fan blades, impeller, and fan housing for condition and cleanliness.	Adjust and lubricate to preserve required operation.	Annually	Yes or No	Repair or replace to ensure proper operation.
k	Check fan drive for problems due to poor alignment or poor bearing seating.	Adjust and lubricate to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
l	Check combustion air intake.	Clean to preserve required operation and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.

m	Check fan drive for problems due to poor alignment or poor bearing seating.	Adjust and lubricate to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
n	Check field serviceable bearings.	Lubricate as necessary.	Annually	Yes or No	Replace as needed.
o	Check integrity of all panels on equipment.	Replace fasteners as needed to ensure proper integrity and fit/ finish of equipment.	Annually	Yes or No	Repair or replace as needed to ensure proper function.
p	Check damper for condition, setting, and operation.	Adjust and lubricate to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure required operation.
q	Check combustion chamber, burner, and flue for deterioration, leaks, and moisture problems, condensation, and combustion products.	Patch refractory eroded by combustion. Tighten fittings.	Annually	Yes or No	Repair or replace refractory lining to ensure safe operation.
r	Check pressure vessel for leaks, thermal damage, or structural damage.	Document required repairs.	Annually	Yes or No	If required, engage service person with proper stamp to do the work or other qualified technician.
s	Verify proper operation of safety devices per manufacturer's instructions.	Clean, lubricate, adjust.	Annually	Yes or No	Verify proper operation of safety devices per manufacturer's instructions.
t	Check condition of heat-exchanger and evidence of leaks on the heat-exchanger surfaces.	Clean to preserve required operation. Find and record the condition and location of identified leaks.	Annually	Yes or No	Check condition of heat-exchanger and evidence of leaks on the heat-exchanger surfaces.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-17 HVAC Water Distribution System

	Normative	Normative	Normative	Normative	Informative
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	Inspection Task	Maintenance Task	Frequency*	Documentation	Recommended Corrective Action
a	Perform chemical testing of system water.	Treat to preserve required operation for ensuring water chemistry and freeze protection target levels are being maintained.	Quarterly	Yes or No	Repair <i>equipment</i> and treat as needed to ensure proper water chemistry.
b	Check chemical injector device.	Verify water treatment target levels are being maintained.	Quarterly	Yes or No	Repair <i>equipment</i> and treat as needed to ensure proper water chemistry.
c	Check make-up water system for pressure and operation.	Clean and adjust to preserve required operation.	Quarterly	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
d	Vent air from system high points. Check for proper fluid flow and check piping for leaks.	When leaking, or when outside of recommended flow range, find and record the location of identified leaks.	Quarterly	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
e	Inspect pumps and associated electrical components.	Clean and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
f	Check for evidence of fouling on the water-cooled heat-exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
g	Check strainers.	Correct to preserve required operation. Clean housing and tighten connections to preserve required operation. Clean strainers.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
h	Inspect accessible external piping insulation and vapor barrier for condition.	Record location of damage.	Annually	Yes or No	Repair or replace as needed.

i	Check freeze stats, relief valves, flow and float switches, low-water cutoffs, and other safety devices for proper operation.	Clean, lubricate, and adjust. Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
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*Refer to Section 4.11 for procedure to modify frequency.

Table F-18 Indoor Section Duct-Free Splits

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>	<i>Recommended Corrective Action</i>
a	Check for particulate accumulation on filters.	Clean dirt and debris or replace media to ensure proper operation.	Annually	Yes or No	Evaluate frequency of change requirement.
b	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust and calibrate. Change batteries if possible, reset controls and record <i>condition</i> .	Annually	Yes or No	Repair or replace components as needed to ensure proper operation.
c	Check condensate drain P-trap.	Prime as needed to ensure proper operation.	Annually	Yes or No	Replace damaged P-trap.
d	Check air-filter fit and housing seal integrity.	Clean and remove dirt and debris to preserve required condition and operation. Document perforations and other damage to housing.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
e	Check for damage or evidence of leaks on the indoor refrigeration-cycle heat exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> . Record location of identified leaks.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
f	Check fan blade, housing, and blower.	Clean to remove accumulated dirt and debris to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.

g	Check refrigerant system pressures and temperature difference across coils.	When outside of recommended levels, find and record the cause.	Annually	Yes or No	Repair and adjust refrigerant to achieve optimal operating levels.
h	Check integrity of all panels on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/ finish of <i>equipment</i> .	Annually	Yes or No	Repair or replace damaged panels.
i	Check field-serviceable bearings for noise, vibration, and temperature.	Lubricate to preserve required condition. Document excessive noise, vibration, or temperature.	Annually	Yes or No	Replace as needed.
j	Check condensate drain pan and drain line for proper drainage.	Clean drain pan and condensate drain line as required for proper operation.	Annually	Yes or No	Repair and adjust to achieve optimal operating flows.
k	Check drain pan, drain line, coil, and other areas of moisture accumulation for visible signs of biological growth.	Clean and remove moisture to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
l	Check for fin damage and evidence of fouling on the indoor refrigeration-cycle heat-exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
m	Check condensate pump.	Clean, and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-19 Outdoor-Air Heat-Exchanging Systems

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>	<i>Recommended Corrective Action</i>
a	Check for particulate accumulation on filters.	Clean or replace as needed to ensure proper operation.	Semiannually	Yes or No	Evaluate frequency of change requirement.

b	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Semiannually	Yes or No	Repair or replace components as needed to ensure proper operation.
c	Check P-trap drain.	Prime as needed to ensure proper operation.	Semiannually	Yes or No	Replace damaged P-trap.
d	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment or evidence of wear.	Correct tension and sheave alignment.	Semiannually	Yes or No	Replace belts and sheaves as needed to ensure proper operation.
e	Check for proper operation of sensible heat exchanger.	Clean and adjust to ensure proper operation.	Semiannually	Yes or No	Repair or replace components as needed to ensure proper operation.
f	Check for proper operation of enthalpy exchanger.	Clean, and adjust to ensure proper operation.	Semiannually	Yes or No	Repair or replace as needed to ensure proper operation.
g	Check drain pan, drain line, coil, and other areas of moisture accumulation for visible signs of biological growth.	Clean and verify proper operation.	Semiannually	Yes or No	Disinfect as needed.
h	Check damper for <i>condition</i> , setting, and operation.	Adjust and lubricate to preserve required condition and operation.	Semiannually	Yes or No	Repair or replace as needed to ensure proper operation.
i	Check <i>condition</i> , setting, and operation of damper motors.	Adjust and lubricate to preserve required operation.	Semiannually	Yes or No	Repair or replace as needed to ensure proper operation.
j	Check air-filter fit and housing seal integrity.	Clean and verify proper fit/finish.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
k	Check control box for dirt, debris, and/or loose terminations.	Clean, lubricate, and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.

l	Check integrity of all panels on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/ finish of <i>equipment</i> .	Annually	Yes or No	Repair or replace damaged panels.
m	Check field-serviceable bearings for noise, vibration, and temperature.	Lubricate and align to preserve required condition. Document excessive noise, vibration, or temperature.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
n	Inspect exposed accessible ductwork for insulation and vapor barrier integrity.	Record location of damage.	Annually	Yes or No	Repair or replace as needed.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-20 Package Terminal Air Conditioners/Heat Pumps (PTACs/PTHPs)

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>	<i>Recommended Corrective Action</i>
a	Check for particulate accumulation on filters.	Clean or replace as needed to ensure proper operation.	Annually	Yes or No	Evaluate frequency of change requirement.
b	Check condensate slinger and/or drain system.	Clean and verify proper operation.	Annually	Yes or .No	Disinfect as needed.
c	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Annually	Yes or No	Repair or replace components as needed to ensure proper operation.
d	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No	Repair and adjust to achieve optimal operating flows.
e	Check air-filter fit and housing seal integrity.	Clean and verify proper fit/ finish.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.

f	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required condition and operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
g	Check fan blades, fan housing, blower wheel, and fan housing for proper condition	Clean dirt and debris and document any imbalance noise or vibration to preserve required condition.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
h	Check temperature difference across refrigerant system coils.	When outside of recommended levels, find and record the cause.	Annually	Yes or No	Repair and adjust refrigerant to achieve required operating levels.
i	Check integrity of all panels on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/ finish of <i>equipment</i> .	Annually	Yes or No	Repair or replace damaged panels.
j	Check drain pan and drain line for proper condensate drainage.	Check coil for required face velocity and drain for required flow to preserve required operation. Clean and verify proper operation.	Annually	Yes or No	Disinfect as needed.
k	Check for fin damage and evidence of fouling on the indoor refrigeration-cycle heat exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
l	Check for damage or evidence of leaks on the indoor refrigeration-cycle heat-exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
m	Inspect for evidence of moisture carryover beyond the drain pan from cooling coils.	Clean and remove excess moisture. Check coil for required face velocity and drain for required flow to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
n	Check for damage or evidence of leaks on the outdoor refrigeration-cycle heat-exchanger surfaces.	Check for damage or evidence of leaks on the outdoor refrigeration-cycle heat exchanger surfaces.	Annually	Yes or No	Check for damage or evidence of leaks on the outdoor refrigeration-cycle heat-exchanger surfaces.

o	Check for evidence of fouling on the outdoor refrigeration-cycle heat-exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
p	Inspect areas of moisture accumulation for biological growth.	Clean, and verify proper operation.	Annually	Yes or No	Disinfect as needed.
q	Check field-serviceable bearings for noise, vibration, and temperature.	Lubricate to preserve required condition. Document excessive noise, vibration, or temperature.	Annually	Yes or No	Replace as needed.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-21 Pumps

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>	<i>Recommended Corrective Action</i>
a	Check variable-frequency drive for proper operation.	Correct as needed. Clean housing and tighten connections as needed. Clean or replace air filter.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
b	Inspect pumps and associated electrical components.	Clean and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
c	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Annually	Yes or No	Repair or replace components as needed to ensure proper operation.
d	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required condition and operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
e	Check pump drive for wear or problems due to poor alignment or poor bearing seating.	Lubricate, adjust, and record evidence of wear.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.

f	Check for proper fluid flow. Clean, adjust, and repair as needed to restore proper flow.	Clean, adjust, as needed to restore proper flow.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
g	Check field-serviceable bearings for noise, vibration and temperature.	Lubricate to preserve required condition. Document excessive noise, vibration, or temperature.	Annually	Yes or No	Replace as needed.
h	Check insulation, vibration isolators, and flexible connectors for integrity.	Record location of damage.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-22 Packaged Heat/Cool Units

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation</i>	<i>Recommended Corrective Action</i>
a	Check for particulate accumulation on filters.	Clean or replace as needed to ensure proper operation.	Quarterly	Yes or No	Evaluate frequency of change requirement.
b	Check condensate drain pan for proper drainage.	Clean drain pan and condensate drain line for required operation.	Annually	Yes or No	Replace as needed to ensure proper operation.
c	Check P-trap.	Prime as needed to ensure proper operation.	Quarterly	Yes or No	Replace damaged P-trap.
d	Check drain pan, drain line, coil, and other areas of moisture accumulation for visible signs of biological growth.	Clean and verify proper operation.	Annually	Yes or No	Disinfect as needed.
e	Check steam system traps, pumps, and controls.	Clean and verify proper operation.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
f	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Annually	Yes or No	Repair or replace components as needed to ensure proper operation.

g	Check fan-belt tension, check for belt wear, and check sheaves for evidence of improper alignment or evidence of wear.	Correct tension and sheave alignment.	Semiannually	Yes or No	Replace belts and sheaves as needed to ensure proper operation.
h	Check variable-frequency drive for proper operation.	Correct to preserve required operation. Clean housing and tighten connections to preserve required operation. Clean or replace air filter.	Semiannually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
i	Check for fin damage and evidence of fouling on the indoor refrigeration-cycle heat exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Semiannually	Yes or No	Repair or replace as needed to ensure proper operation.
j	Check for fin damage and evidence of fouling on the outdoor refrigeration-cycle heat exchanger surfaces	Clean and restore as needed to ensure acceptable <i>condition</i> .	Semiannually	Yes or No	Repair or replace as needed to ensure proper operation.
k	Check air-filter fit and housing seal integrity.	Clean and verify proper fit/ finish.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
l	Check control box for dirt, debris, insects, rodents, and for loose electrical terminations.	Clean and tighten electrical connections to preserve required condition.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
m	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to preserve required operation.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
n	Check fan blades, blower wheel, and fan housing for proper condition.	Clean dirt and debris and document any imbalance noise or vibration.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
o	Check refrigerant system temperature differences across refrigeration-cycle heat-exchanger surfaces.	When outside of required levels, find and record the cause.	Annually	Yes or No	Repair and adjust refrigerant to achieve optimal operating levels.

p	Check fan drive for wear or problems due to poor alignment or poor bearing seating.	Adjust alignment and lubricate to preserve required operation. Document improper bearing configuration.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
q	Check integrity of all panels and curbs on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/ finish of <i>equipment</i> .	Annually	Yes or No	Repair or replace damaged panels.
r	Check field-serviceable bearings for noise, vibration, and temperature.	Lubricate to preserve required condition. Document excessive noise, vibration, or temperature.	Annually	Yes or No	Replace as needed.
s	Check for damage or evidence of leaks on the indoor refrigeration-cycle heat-exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> . Find and record the location of identified leaks.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
t	Inspect for evidence of moisture carryover beyond the drain pan from cooling coils.	Clean and remove excess moisture. Check coil for required face velocity and drain for required flow to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
u	Check damper for <i>condition</i> , setting, and operation.	Adjust and lubricate to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
v	Check for damage or evidence of leaks on the outdoor refrigeration-cycle heat-exchanger surfaces.	Check for damage or evidence of leaks on the outdoor refrigeration-cycle heat exchanger surfaces.	Annually	Yes or No	Check for damage or evidence of leaks on the outdoor refrigeration-cycle heat-exchanger surfaces.

w	Check low ambient head pressure control sequence for proper operation.	Clean and adjust components or modify software/algorithm to ensure proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
x	Check combustion, burner, and flue for deterioration, leaks, moisture problems, and condensation. Check gas pressure, combustion products controls, and safety devices.	Clean and adjust combustion process for proper operation. Find and record the location of identified leaks.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
y	Check for damage or evidence of leaks on the gas heat section heat-exchanger surfaces.	Clean debris and test for harmful gases and inspect for surface perforations to preserve required condition. Find and record the location of identified leaks.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
z	Inspect insulation and areas of moisture accumulation for biological growth.	Remove moisture and biological growth to preserve required condition.	Annually	Yes or No	Disinfect, repair, or replace as needed to ensure proper operation.
aa	Check compressor voltage and amp draw.	Record readings and document any <i>condition</i> adversely affecting its <i>performance</i>	Annually	Yes or No	Locate source of voltage deviation and repair.
bb	Check compressor oil levels and/or pressure on refrigerant systems having oil level and/or pressure measurement means.	When outside of recommended levels, find and record the cause.	Annually	Yes or No	Repair and adjust refrigerant to achieve optimal operating levels.
cc	Inspect accessible and exposed ductwork and external piping for insulation and vapor barrier for integrity.	Record location of damage.	Annually	Yes or No	Repair or replace as needed.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-23 Steam Distribution Systems

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	Documentation Required	Recommended Corrective Action
a	Perform chemical testing of system condensate and feed water.	Verify water treatment target levels are being maintained.	Quarterly	Yes or No	Repair equipment and treat as needed to ensure proper water chemistry.
b	Check piping for leaks.	Record location of identified leaks.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
c	Check safety devices per manufacturer's recommendations.	Clean, lubricate, adjust.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
d	Check piping anchors for integrity, and check piping for alignment and expansion fittings for proper operation.	Adjust and lubricate as needed.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
e	Inspect blowdown or drain valve.	Clean and verify proper operation.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
f	Check chemical injector device.	Verify water treatment target levels are being maintained.	Quarterly	Yes or No	Repair equipment and treat as needed to ensure proper water chemistry.
g	Check steam system traps, pumps, and controls.	Clean and verify proper operation.	Quarterly	Yes or No	Repair or replace as needed to ensure proper operation.
h	Check for evidence of build-up, fouling, corrosion, or degradation on heat exchange surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
i	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No	Repair and adjust to achieve optimal operating flows.

j	Check strainers.	Clean housing and tighten connections as needed. Clean strainers.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
k	Inspect external piping insulation and vapor barrier for integrity.	Record location of damage.	Annually	Yes or No	Repair or replace as needed.
l	Check interior of condensate return piping for wall thickness integrity.	Record location of damage.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-24 Terminal and Control Boxes (e.g., VAV, Fan-Powered, Bypass)

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	Documentation Required	Recommended Corrective Action
a	Check for particulate accumulation on filters.	Clean or replace as needed to ensure proper operation.	Semiannually	Yes or No	Evaluate frequency of change requirement.
b	Check control system and devices for evidence of improper operation.	Clean, lubricate, calibrate, and adjust to meet required function.	Semiannually	Yes or No	Evaluate frequency of change requirement.
c	Check for evidence of build-up, fouling, corrosion, or degradation on heat exchange surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Semiannually	Yes or No	Repair or replace components as needed to ensure proper operation.
d	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Semiannually	Yes or No	Repair or replace as needed to ensure proper operation.
e	Check air-filter fit and housing seal integrity.	Clean and verify proper fit/ finish.	Annually	Yes or No	Repair and adjust to achieve optimal operating flows.

f	Check fan blades and fan housing.	Clean as needed.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
g	Check integrity of all panels on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/ finish of <i>equipment</i> .	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
h	Check damper for <i>condition</i> , setting, and operation.	Adjust and lubricate as necessary.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
i	Inspect areas of moisture accumulation for biological growth.	If biological growth is present, remove from surface.	Annually	Yes or No	Disinfect as needed.
j	Inspect accessible exposed ductwork and external piping for insulation and vapor barrier for integrity.	Reattach loose elements. Record location of damaged ductwork, insulation, and piping.	Annually	Yes or No	Repair or replace as needed.

*Refer to Section 4.11 for procedure to modify frequency.

Table F-25 Water-Source Heat Pumps

	Normative	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Documentation Required</i>	<i>Recommended Corrective Action</i>
a	Check for particulate accumulation on filters.	Clean or replace as needed to ensure proper operation.	Semiannually	Yes or No	Repair or replace components as needed to ensure proper operation.
b	Check P-trap and drain pan for proper drainage.	Prime as needed to ensure proper seal.	Semiannually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
d	Check drain pan, drain line, coil, and other areas of moisture accumulation for visible signs of biological growth.	Clean and verify proper operation.	Semiannually	Yes or No	Repair or replace components as needed to ensure proper operation.

e	Check control system and devices for evidence of improper operation.	Clean, lubricate, adjust.	Semiannually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
f	Check for damage or evidence of leaks on the water-cooled heat-exchanger surfaces.	Record location of identified leaks.	Semiannually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
g	Check variable-frequency drive for proper operation.	Correct as needed. Clean housing and tighten connections as needed. Clean or replace air filter.	Semiannually	Yes or No	Repair or replace components as needed to ensure proper operation.
h	Check air-filter fit and housing seal integrity.	Clean and verify proper fit/finish.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
i	Check fan blades and fan housing for <i>condition</i> and cleanliness	Clean to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
j	Check integrity of all panels on <i>equipment</i> .	Replace fasteners as needed to ensure proper integrity and fit/ finish of <i>equipment</i> .	Annually	Yes or No	Repair or replace damaged panels.
k	Inspect areas of moisture accumulation for biological growth.	When present, remove moisture and biological growth.	Annually	Yes or No	Disinfect as needed.
l	Check fan drive for wear or problems due to poor alignment or poor bearing seating.	Adjust to required alignment and lubricate.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
m	Check field-serviceable bearings for noise, vibration, and temperature.	Lubricate to preserve required condition	Annually	Yes or No	Replace as needed.
n	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections to	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.

		preserve required operation.			
o	Check refrigerant system pressures differences across refrigerant heat exchangers.	When outside of required levels, find and record the cause.	Annually	Yes or No	Repair and adjust refrigerant to achieve optimal operating levels.
p	Check for damage or evidence of leaks on the indoor refrigeration-cycle heat exchanger surfaces.	Record location of identified leaks.	Annually	Yes or No	Repair, replace, or restore as needed to ensure proper operation.
q	Check for fin damage and evidence of fouling on the indoor refrigeration-cycle heat-exchanger surfaces.	Clean and restore as needed to ensure acceptable <i>condition</i> .	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
r	Check for proper fluid flow and for fluid leaks.	Adjust flow when outside of recommended flow range. When leaking, find and record the location of identified leaks.	Annually	Yes or No	Repair and adjust to achieve optimal operating flows.
s	Inspect for evidence of moisture carryover beyond the drain pan from cooling coils.	Clean moisture outside drain pan. Check drain pan for proper flow. Confirm coil face velocity meets requirements to preserve required operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
t	Check condensate pump.	Clean and verify proper operation.	Annually	Yes or No	Repair or replace as needed to ensure proper operation.
u	Check compressor voltage and amp draw.	Record readings and document any <i>condition</i> adversely affecting its <i>performance</i> .	Annually	Yes or No	Repair or replace to restore proper operation.

*Refer to Section 4.11 for procedure to modify frequency.