

STANDARD

ANSI/ASHRAE/ACCA Standard 180-2018
(Supersedes ANSI/ASHRAE/ACCA Standard 180-2012)

Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems

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CONTENTS

ANSI/ASHRAE/ACCA Standard 180-2018 Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems

SECTION	PAGE
Foreword	2
1 Purpose	3
2 Scope	3
3 Definitions	3
4 Implementation	4
5 Required Inspection and Maintenance Tasks	6
Informative Appendix A: Indicators of Unacceptable Conditions	32
Informative Appendix B: Sources of Program Objectives	33
Informative Appendix C: Situations Requiring Review of the Maintenance Plan	34
Informative Appendix D: Reasons for Adjusting Maintenance Task Frequency	35
Informative Appendix E: Bibliography	36

NOTE

Approved addenda, errata, or interpretations for this standard can be downloaded free of charge from the ASHRAE website at www.ashrae.org/technology.

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FOREWORD

2018 Revision

This 2018 edition of ANSI/ASHRAE/ACCA Standard 180 represents a complete revision of the standard. A thorough review of the 2012 edition of the standard using the continuing maintenance process resulted in improvements, revisions, and updates to the tables in Section 5. These changes were necessary to eliminate duplication, add additional tasks, list equipment tables in alphabetical order for easier reference, and consolidate similar equipment.

After publication of the 2012 edition, on recommendation of the committee, the standard was removed from continuous maintenance, and the Project Committee became inactive. In 2014, the committee received, along with requests for a user's manual, a request for clarification of how the standard might be used in conjunction with utility maintenance incentives. Subsequently, the ASHRAE Standards Committee reactivated the SPC 180 Project Committee to perform a full review of the document.

Specific effort was expended to make the standard easier to implement, with the understanding that many of the responsible parties would be contracting out their maintenance. Definitions were added to differentiate between inspection, maintenance, service, and repair tasks. The process section of the standard was modified to eliminate ambiguity and to clarify how a maintenance program was to be initiated and implemented. The nonnormative language in the 2012 edition was moved to the appendix. Tables were improved by adding columns to clarify which actions were required inspections, which were required maintenance, and which were recommendations. Lastly, the appendices were updated for clarity.

With these improvements the committee felt that a user's manual would not be required for the time being. They also agreed that continuous maintenance would not be required but that funds should be reserved for the development of a user's manual if later evidence warranted.

About Standard 180

Standard 180 was created in a collaborative effort between ASHRAE and Air Conditioning Contractors of America (ACCA). Its intent is to address the often inconsistent practices for inspecting and maintaining HVAC systems in commercial, institutional, and other buildings where the public may be exposed to the indoor environment. Current practices in such buildings vary widely. Many facilities choose to follow rigorous policies that maintain the system in new or nearly new condition. Others either lack policy in this area or have adopted a run-to-failure approach, where the system or components of the system are only attended to when there is a failure.

To provide consistency and improve the thermal comfort, energy efficiency, and indoor air quality of commercial HVAC systems, a standard practice for their inspection and maintenance is needed. When there is no routine inspection and sub-

sequent adjustment or maintenance of system components, the system is typically found operating outside its optimum performance parameters. When systems are not maintained, they do not continue to provide the level of performance for which they were designed.

A standard practice is also needed to guide maintenance of HVAC systems, because often the maintenance information supplied by manufacturers applies only to the discrete components that they provide rather than to the entire system. This document considers the integration of those components and the way they interact, as well as each component separately.

For the public good, it is essential that the HVAC systems in all buildings where people work, visit, or reside support a high-quality indoor environment. In addition, sustainability mandates that those conditions be maintained in a manner as energy efficient as possible.

This document describes the minimum acceptable level of maintenance for commercial building HVAC systems. Other standards or guidance documents may establish more specific or rigorous requirements that apply to certain buildings. Where applicable, those requirements should be followed or considered (if guidelines). This document is not intended to limit the level of service provided or recommendations made by a service provider. Those delivering HVAC maintenance are encouraged to consider and recommend energy conservation measures or technology improvements that would help maintain or increase thermal comfort, the energy efficiency of the HVAC system, and indoor air quality.

Much of the information that will be required to prepare the maintenance program that is mandated by this standard can most conveniently be obtained from the building commissioning (recommissioning or retrocommissioning) documents. Although recommissioning is not a requirement of this standard, it should be considered where the commissioning data are either unavailable or outdated. Additionally, ASHRAE Guideline 4, Preparation of Operating and Maintenance Documentation for Building Systems, and ASHRAE Guideline 32, Sustainable, High-Performance Operations and Maintenance, may be helpful to practitioners seeking to develop or expand maintenance programs. ASHRAE continues to provide industry reference documents and is in the process of preparing other guidelines on commissioning and training. Refer also to this standard's Informative Appendix C, "Bibliography," which lists many reference documents by ASHRAE and other organizations as well as industry technical papers and publications. Some of these documents include ideas regarding best practices or reliability-centered maintenance or other means and methods above the minimum standard.

This standard is written in code-intended language so it may be referenced or adopted by enforcement authorities as the minimum acceptable level of performance within their jurisdictions.

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

Dedication

This edition of ANSI/ASHRAE/ACCA Standard 180 is dedicated to the memory of Robert G. Baker, F-ASHRAE, the visionary who recognized and championed the need for an ANSI/ASHRAE/ACCA maintenance standard. Mr. Baker served as Chairman of the committee that developed the first version of this standard in 2008.

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 provides minimum requirements for the HVAC system inspection and maintenance practice in new and existing buildings. Where specifically noted in this standard, different requirements apply.

2.2 The provisions of this standard do not apply to

- a. single-family houses or multifamily structures of three or fewer stories above grade;
- b. HVAC *equipment* and portions of building systems that primarily provide for industrial, manufacturing, or *commercial processes*; or
- c. other building HVAC systems or elements of building HVAC systems 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 *ASHRAE Terminology of Heating, Ventilation, Air-Conditioning, and Refrigeration*. Additional terms used in this standard are defined below.

Basis of Design (BoD): a guidance document that stipulates or lists the desired or intended function and *performance* of the HVAC system. It lists the needs, requirements, flexibility, efficiency, limits, *performance*, desired condition, etc., of the space served by the HVAC systems, and it is intended to communicate this information from the HVAC system designer to the HVAC systems owner to the operator or to subsequent owners and operators.

building management system (BMS): an energy management system relating to the overall operation of the building in which it is installed. It often has additional capabilities, such as *equipment* monitoring, protection of *equipment* against power failure, and building security. It may also be a direct digital control (DDC) system (programmable computer or microprocessor *equipment* executing the HVAC system operation) where the mode of control uses digital outputs to control processes or elements directly.

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 nonprocess or manufacturing-related HVAC application, including, but not limited to, applications for governmental and educational facilities, health care and hospitality facilities, institutional buildings, offices, places of assembly, restaurants, and 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.

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 standard. *Condition* is also the measurement of the delivery of the intended output capacities of the *equipment* that are compared to agreed-upon *condition* standards. These assessments and measurements shall be documented. (**Informative Note:** Unacceptable *condition* is determined by comparing the findings to the agreed-upon baseline *condition indicator* values.)

condition history: the documentation over time of the assessments and measurements of *equipment* and systems inspections. Changes in *condition*, and rate of change in *equipment condition*, may require further investigation to determine proper response, such as revised *task* frequencies, revised *task* procedures, or scheduled replacement.

condition indicators: descriptions and measures of the physical characteristics and delivery *performance* of *equipment*. The described characteristics and *performance* are outcomes of operation and maintenance work. Actual outcomes, when compared to the desired standard, serve to measure the effectiveness of the systems and *equipment condition* and *performance*, and the effectiveness of the *maintenance program*. These are developed by responsible party (owner) in collaboration with the maintenance providing party. (**Informative Note:** For example, the amount of rust on interior surfaces of an air handler is a measure of a physical characteristic, and when compared to a desired standard, such as new *condition*, establishes the *condition* of the asset. The air volume flow rate of the air handler compared to design rate is an indicator of a *performance* characteristic.)

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

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

inspection frequency: time period or interval in which occurrences of inspections are to be made. The period of *inspection frequency* may be 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 plan*.

inventory: the orderly documentation of system and *equipment* data that are used to provide detailed identification of