



ASHRAE Guideline 1-1996 (Supersedes ASHRAE Guideline 1-1989)

ASHRAE® GUIDELINE

The HVAC Commissioning Process

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(This foreword is provided for information only and is not part of this guideline.)

FOREWORD

This guideline places a high emphasis on commissioning as a process. Its goal is a fully functional, fine-tuned HVAC system with complete documentation and an adequately trained operating and maintenance staff. It provides a structured methodology for implementing the commissioning process for HVAC systems and components in new and existing buildings. It provides guidance for owners, design professionals, construction managers, contractors, manufacturers, suppliers, and building system operating and maintenance personnel to achieve quality and efficient and effective HVAC systems. Emphasis is placed on the owner's program, design intent, documentation, and the proper transfer of ideas and design concepts from one party to the next. It also requires that the building operation and maintenance personnel be provided with full system training and receive documentation on how the system was designed, installed, and intended to operate. Owners can use the process to achieve quality from the start in lieu of inspecting for quality or modifying the system after the facility is occupied.

Owners and design professionals may implement the commissioning process at any stage of the project. This guideline recommends that commissioning be implemented early in the program phase, and it provides general information required in the full commissioning process from program phase to post-acceptance. The body of the guideline provides the general structure and requirements to carry out the commissioning process.

This guideline strongly suggests that a new professional, the commissioning authority, be part of the HVAC project process. The commissioning authority represents the owner's needs from project program phase through occupancy. This is typically through the first year of operation; however, for complex and critical HVAC projects, the commissioning authority may continue with the project for a number of years. The commissioning authority is logically an employee of the owner; however, the authority can be an independent professional. Appropriate experience includes facilities operation and maintenance, design, testing-adjusting-balancing, construction management, and total quality.

Appendices have been included with this guideline to assist all participants in further understanding the commissioning process. They are based on specific project experience, with suggestions from experienced commissioning authorities and owners on ways to improve the current practice. They are not essential to implementing the requirements of the commissioning process, but they are deemed necessary if wide application of the commissioning process is to be a part of all HVAC projects. It is recommended that the appendices be used as guidance to develop documents and to define the owner's needs, design intent, Basis of Design, design concepts, verification and functional performance testing require-

ments, and operator training. However, the appendices are only general examples and should not be used in lieu of the guideline.

The commissioning process requirements that follow in clauses 5 through 10 have been structured to coincide with the phases of a typical design-bid-construct project. This includes program, design, construction, acceptance, and future modification. Clause 11 describes the requirements for a training program for operating and maintenance personnel for successful HVAC system performance. Clause 12 describes the documentation necessary to meet the guideline requirements given in clauses 5 through 10.

1. PURPOSE

The purpose of this guideline is to describe the commissioning process that will ensure heating, ventilating, and air-conditioning (HVAC) systems perform in conformity with design intent.

2. SCOPE

2.1 The procedures, methods, and documentation requirements in this guideline cover each phase of the commissioning process for all types and sizes of HVAC systems, from pre-design through final acceptance and post-occupancy, including changes in building and occupancy requirements after initial occupancy.

2.2 This guideline provides procedures for the preparation of documentation of

- (a) owner's assumptions and requirements;
- (b) design intent, Basis of Design, and expected performance;
- (c) verification and functional performance testing; and
- (d) operation and maintenance criteria.

2.3 This guideline specifically details the process for

- (a) conducting verification and functional performance testing and
- (b) maintaining system performance to meet the current design intent after initial occupancy.

2.4 This guideline includes a program for training of operation and maintenance personnel.

3. UTILIZATION

3.1 The implementation of the commissioning process will depend on the owner's requirements and how the project will be designed, built, and occupied. This guideline establishes procedures for implementation of the commissioning process no matter how the project is staged or scheduled or when the process is begun. It must be noted that if the commissioning process is initiated later than the program phase, some procedures listed in earlier phases will need to be performed.