ASHRAE GUIDELINE

The Commissioning Process

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b. participation in the next review of the Guideline,
c. offering constructive criticism for improving the Guideline,
d. permission to reprint portions of the Guideline.

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NOTE

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FOREWORD

The Commissioning Process is a quality-oriented process for achieving, verifying, and documenting that the performance of facilities, systems, and assemblies meets defined objectives and criteria.

The Commissioning Process assumes that owners, programmers, designers, contractors, and operations and maintenance entities are fully accountable for the quality of their work. The Commissioning Team uses methods and tools to verify that the project is achieving the Owner's Project Requirements throughout the delivery of the project. For example, the contractor is responsible for fully constructing, testing, and ensuring that its employees' work has provided the level of quality expected. The Commissioning Authority then randomly samples the contractor's work to verify that it is achieving the Owner's Project Requirements. If systemic issues are identified, then the contractor is expected to recheck all of his/her work and correct any deficiencies. This quality-oriented process is different than when the Commissioning Authority does 100% checking or non-quality-based sampling. Guideline 0 has been developed to present an approach based on these assumptions.

The Commissioning Process begins at project inception (during the Pre-Design Phase) and continues for the life of the facility (through the Occupancy and Operations Phase). Because this Guideline details a process, it can be applied to both new and renovation projects. The Commissioning Process includes specific tasks to be conducted during each phase in order to verify that design, construction, and training meet the Owner's Project Requirements. This Guideline describes the overall Commissioning Process in order to provide a uniform, integrated, and consistent approach for delivering and operating facilities that meet an owner's ongoing requirements.

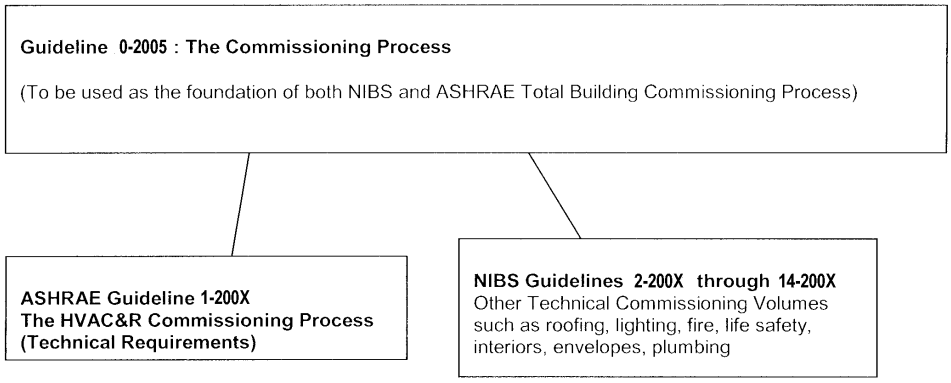
The Commissioning Process is a quality-based method that is adopted by an Owner to achieve successful construction projects. It is not an additional layer of construction or project management. In fact, its purpose is to reduce the cost of delivering construction projects and increase value to owners, occupants, and users. This Guideline has been developed to assist those who are adopting or plan to adopt a better quality-based and cost-effective process.

Development of guidelines for the Commissioning Process began formally in 1982 when the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) formed a committee to document best practices to achieve facilities that performed according to the owner's project requirements. ASHRAE published its original commissioning guideline in 1989 and an updated version in 1996. The Commissioning Process detailed in these guidelines is the result of experience on projects requiring that systems and assemblies worked from the first day the project was turned over to the owner. This Commissioning Process is further based upon experience with projects that met the requirements of owners, occupants, users of processes, and facility operating-maintenance-service organizations at a high level of satisfaction and that reduced the cost to deliver the project.

Guideline 0 is an integral part of the National Institute of Building Sciences (NIBS) total building commissioning guideline series. The relationship of this guideline to other technical commissioning guidelines is shown below.

Guideline 0 presents details on the Commissioning Process without focusing upon specific systems or assemblies. Supplementary technical guidelines are being developed to provide specific and detailed information on how to implement the Commissioning Process for each major building/facility system or assembly. For example, this Guideline details what is required for a high-quality and effective Systems Manual and how and when it is developed, whereas a technical guideline details what specific information for a given system or assembly must be included in the Systems Manual.

The use of a common content organization and the focus upon specific information achieve a closely coordinated set of documents that can be used together or in any combination to accommodate varying owner requirements. This Commissioning Process guideline allows the technical commissioning guidelines to avoid repeating information on the commissioning process, making them more concise and focused relative to their technical requirements.



The fundamental objectives of the Commissioning Process are to:

(a) *Clearly document Owner's Project Requirements;*

(b) *Provide documentation and tools to improve the quality of deliverables;*

(c) *Verify and document that systems and assemblies perform according to the Owner's Project Requirements;*

(d) *Verify that adequate and accurate system and assembly documentation is provided to the owner;*

(e) *Verify that operation and maintenance personnel and occupants are properly trained;*

(f) *Provide a uniform and effective process for delivery of construction projects;*

(g) *Deliver buildings and construction projects that meet the owner's needs, at the time of completion;*

(h) *Utilize quality-based sampling techniques to detect systemic problems, as such sampling provides high value, efficient verification, accurate results, and reduced project costs; and*

(i) *Verify proper coordination among systems and assemblies, and among all contractors, subcontractors, vendors, and manufacturers of furnished equipment and assemblies.*

Due to the integration and interdependency of facility systems, a performance deficiency in one system can result in less than optimal performance by other systems. Implementing the Commissioning Process is intended to reduce the project capital cost through the first year of operation and also reduce the life-cycle cost of the facility. Using this integrated process results in a fully functional, fine-tuned facility, with complete documentation of its systems and assemblies and trained operating and maintenance personnel.

Emphasis is placed on documentation of the Owner's Project Requirements at the inception of the project and the proper transfer of this information from one party to the next. Owners adopt the Commissioning Process to achieve their stated objectives and criteria—starting with the inception of a project instead of after a facility is occupied.

While circumstances may require owners to adopt the Commissioning Process during the Design or Construction Phase of a project, such later implementation must capture the information that would have been developed had the Commissioning Process begun at project inception. Beginning the Commissioning Process at project inception will achieve the maximum benefits.

Annexes to this document have been included to assist in further understanding the Commissioning Process and to aid in the development of the technical guidelines. The Annexes are based on specific project experience, with details on what is current best practice. Annexes illustrate varying applications of the Commissioning Process for all projects. Therefore, Annexes should be viewed as examples of how to develop documents and to define Owner's Project Requirements, Basis of Design, Commissioning Plan, benefits and roles in the Commissioning Process, verification, testing requirements, documentation, and training.

The Commissioning Process has been structured to coincide with the phases of a generic project with Pre-Design, Design, Construction, and Occupancy and Operations phases.

This guideline describes the Commissioning Process; the responsibilities of Commissioning Team participants; the role of the Commissioning Authority; and a model framework for developing a Commissioning Plan, specifications, and reports. This guideline also describes the general requirements for a training program for continued successful system and assembly performance. Documentation necessary to meet the guideline requirements is also described.

1. PURPOSE

1.1 The purpose of this guideline is to describe the Commissioning Process capable of verifying that a facility and its systems meet the Owner's Project Requirements.

2. SCOPE

2.1 The procedures, methods, and documentation requirements in this guideline describe each phase of the project delivery and the associated Commissioning Processes from pre-design through occupancy and operation, without regard to specific elements, assemblies, or systems, and provide the following:

(a) overview of Commissioning Process activities,

(b) description of each phase's processes,

(c) requirements for acceptance of each phase,

(d) requirements for documentation of each phase, and

(e) requirements for training of operation and maintenance personnel.

2.2 These *Commissioning Process* guideline procedures include the Total Building Commissioning Process (TBCxP) as defined by National Institute of Building Sciences (NIBS) in its *Commissioning Process Guideline 0*.

3. UTILIZATION

3.1 The application of this guideline will depend upon the Owner's Project Requirements and how the project will be designed, built, and operated. The process described in this guideline is written for a generic project and must be adapted to each project.

3.2 This guideline describes the Commissioning Process, and is supplemented by companion technical guidelines. A technical guideline describes the specific details to properly implement the Commissioning Process relative to a specific facility system or assembly. Annex A in this guideline provides the required format for developing technical guidelines for the Commissioning Process.

4. DEFINITIONS

Acceptance: A formal action, taken by a person with appropriate authority (which may or may not be contractually defined) to declare that some aspect of the project meets defined requirements, thus permitting subsequent activities to proceed.