



**COMMISSIONING PROCESS  
FOR BUILDINGS AND SYSTEMS**  
*ASHRAE STANDARD 202*

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21<sup>st</sup> National Conference on Building Commissioning

21<sup>st</sup> NCBC Conference

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# Presentation Description

The new ASHRAE Standard 202, The Commissioning Process for Buildings and Systems, is nearing completion and is about to be published. This standard will set the minimum requirements for the Commissioning Process. It is derived from the process in ASHRAE Guideline 0-2005. This seminar will explain the organization and contents of the standard along with its relationship to other standards and guidelines and application to construction projects.



# Learning Objectives

- ▶ Understand the history and development of the commissioning process.
- ▶ Understand the basics of the Commissioning Process.
- ▶ Recognize that Commissioning is a process and not just a single event.
- ▶ Be able to apply the Commissioning Process for design and construction of building elements and systems.
- ▶ Be able to utilize the commissioning process deliverable documents.
- ▶ Recognize the use of the Commissioning Standard to codes and standards in the industry.



# What is the Commissioning Process?

A quality-focused process for enhancing the delivery of a project. The process focuses upon verifying and documenting that all of the commissioned systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the Owner's Project Requirements (ASHRAE Std. 202-2013)

# History of Commissioning Documents

1982 – ASHRAE forms Cx committee

1989 – ASHRAE Guideline 1 first published

1996 – First revision ASHRAE Guideline 1

2000 – ASHRAE joins with NIBS to develop  
a universal process for commissioning

2005 –ASHRAE/NIBS Guideline 0 published

2007 – ASHRAE Guideline 1 revised

2007 – Existing Building Guideline committee formed.

2010 - Standard 202, The Cx Process for Buildings and  
Systems formed

# Current ASHRAE Commissioning Guideline Documents

**Guideline 0-2005, The Commissioning Process**

**Guideline 1.1-2007 HVAC Commissioning**

**Guidelines 0.2 and 1.2, Existing Buildings –  
under development**

**Guideline 1.3, Training of Building Staff –  
under development**

**Guideline 1.4, Systems Manual, under development**

**Guideline 1.5, Commissioning Smoke Control Systems –  
published**

# ASHRAE/ANSI/IES Standard 202

## What is it?

- Process Document
- Minimum Requirements for the Commissioning process using ASHRAE Guideline 0-2005 as the base process
- Consensus Development



# Standard 202

## What it will **NOT** do?

- ✓ Define process for existing building projects
- ✓ Define qualifications of commissioning providers
- ✓ List building size, type or usage or list process variations for these
- ✓ List systems or assemblies requiring commissioning
- ✓ Include enforcement provisions

# ASHRAE Standard 202 Organization

- Process listed as 13 functional steps and not by project phase
- Each of 13 functional steps has deliverables
- The main body of the Standard has 17 chapters
- There will be 16 informative annexes explaining the deliverables.

# Standard 202 Chapters

1. Purpose
2. Scope
3. Definitions
4. Utilization
5. Initiating the Commissioning Process
6. Owner's Project Requirements
7. Commissioning Plan
8. Basis of Design
9. Contractor, Supplier, and Manufacturer Commissioning Requirements

# Standard 202 Chapters

10. Design Review
11. Commissioning Submittal Review
12. Construction Observation and Testing
13. Issues Documentation and Resolution
14. Systems Manual
15. Training
16. Post Occupancy Operation
17. Commissioning Report

# Commissioning Process

## Activity

## Deliverable

- **Initiate Commissioning Process** ↓ **Roles and Responsibilities**
- **Project Requirements** ↓ **Owner's Project Requirements (OPR)**
- **Develop Commissioning Plan** ↓ **Commissioning Process Plan (CxP)**
- **Design Approach to Requirements** ↓ **Basis of Design**

# Commissioning Process

## Activity

- Set Contractor Cx Requirements
- Design Review Report
- Review Submittals
- Observation & Testing



## Deliverable

Cx Specifications



Design Review



Submittal Review Report



Construction Checklists  
and Reports

# Commissioning Process

## Activity

## Deliverable

- **Issues Resolution** ↓ **Issues and Resolution Log**
- **Assemble Systems Manual** ↓ **Systems Manual**
- **Conduct Training** ↓ **Training Plans and Records**
- **Post Occupancy Operation** ↓ **End of Warranty Cx Report**
- **Assemble Commissioning Report** **Commissioning Report**

# Standard 202

## Chapter 1

### **PURPOSE**

The purpose is to identify the minimum acceptable Commissioning Process for Buildings and Systems.



# Standard 202

## Chapter 2

### SCOPE

This standard provides procedures, methods, and, documentation requirements for each activity for project delivery from pre-design through occupancy and operation, including:

- Overview of Commissioning Process activities,
- Description of each process step's minimum activities,
- Minimum documentation requirements, and
- Acceptance requirements

# Standard 202

## Chapter 3

### DEFINITIONS

- 27 Updated Guideline 0-2005 Definitions
- 7 New Definitions
  - Mostly on Design Review and Documentation
- Covers New and Existing Buildings for Definitions
- Establishes Base for Other Documents on Commissioning

# Standard 202

## Chapter 4

### UTILIZATION

- Establishes Chapter format using sections for Introduction, Requirements and Acceptance
- Provides Outline for Commissioning Process
- Establishes Minimum Activities
- Lists Deliverables for Each Activity

Acceptance Required for Each Activity

- In 202, CxA is not required to “accept” design or construction for owner or jurisdiction.

# Standard 202

## Chapter 5

### INITIATING THE COMMISSIONING PROCESS

- Owner's Responsibilities
  - ❖ Review and Approval
  - ❖ Select Systems and Assemblies to be Commissioned
  - ❖ Selecting Project CxA and Commissioning Team
  - ❖ "Agreement" Required for Each Activity and Deliverable

# Standard 202

## Chapter 6

### OWNER'S PROJECT REQUIREMENTS

- Base Document for Building Performance and Commissioning Process
  - ❖ Facility Requirements
  - ❖ Documentation
  - ❖ Commissioning
  - ❖ Training
- Updated as Project Evolves

# Standard 202

## Chapter 7

### COMMISSIONING PLAN

- Written Plan that Evolves with the Project
- Includes: - Project Specific Cx Process Description
  - ❖ List of Systems and Assemblies to be Commissioned
  - ❖ Roles and Responsibilities
  - ❖ Schedules for Commissioning
  - ❖ Documentation and Checklists
  - ❖ Process for Resolving Problems and Deficiencies

# Standard 202

## Chapter 8

### BASIS OF DESIGN

- Designer's Approach to Owner's Project Requirements
- Basic Design Information and Assumptions Defined
- Platform for Review and Response During Project
- Updated as Project Evolves

# Standard 202

## Chapter 9

### CONTRACTOR, SUPPLIER, and MANUFACTURER COMMISSIONING REQUIREMENTS

- Commissioning Included in Project as Required
- Commissioning Included in Specifications
- Contracts Include Commissioning
- Documentation Provided



# Standard 202

## Chapter 10

### DESIGN REVIEW

- Compliance with Owner's Project Requirements
- Include Commissioned Systems and Assemblies
- Complete Review Before Construction
- Design Team to Respond
- Commissioning Design Review is NOT
  - ❖ PEER Review
  - ❖ Code Review
  - ❖ Regulatory Review
- Approved Quality Sampling or Expert Review

# Standard 202

## Chapter 11

### COMMISSIONING SUBMITTAL REVIEW

- Compliance with OPR and Cx Plan
- Does Not Replace Designer's Review
- Concurrent with Designer Review
- Covers Commissioned Systems and Assemblies

# Standard 202

## Chapter 12

### CONSTRUCTION OBSERVATION AND TESTING

- Compliance with OPR, Cx Plan and Construction Documents
- Approved Technical Procedures and Documents for Commissioned Systems and Assemblies
- Kick Off and Scoping Meeting
- Evaluate Equipment, Installation and Performance
- Approved Sampling Process

# Standard 202

## Chapter 13

### ISSUES AND RESOLUTIONS DOCUMENTATION

- Written Report Documents
- List Issues, Dates and Responsibilities
- Show Resolutions when Complete
- Intermediate Issue Logs as Required
- Final Issue and Resolution Log Included in Final Commissioning Report

# Standard 202

## Chapter 14

### SYSTEMS MANUAL

- Collection of Project Documents
  - ❖ Facility Design and Construction
  - ❖ Systems and Assemblies Information
  - ❖ Facility Operations
  - ❖ Training
  - ❖ Final Commissioning Report
- Used for Operator and Maintenance Training
- Used for Building Operation
- Provides Baseline for Operation and Changes
- Updated as Building Evolves

# Standard 202

## Chapter 15

### TRAINING

- O&M Personnel and Occupants
- Written Plan
  - ❖ Instructional Requirements
  - ❖ Locations and Facilities
  - ❖ Instructor Qualification
- Commissioned Systems and Assemblies
- Records and Reports Retained

# Standard 202

## Chapter 16

### POST OCCUPANCY OPERATION

- During Warranty Period
- Commissioned Systems and Assemblies
- Delayed and Seasonal Testing
- Update OPR and Cx Plan
- Update Systems Manual
- Update Training

# Standard 202

## Chapter 17

### COMMISSIONING REPORT

- Summary of Commissioning Process
- Final Commissioning Plan
- Review Reports
- Commissioning Progress Reports
- Issue and Resolution Reports
- Checklists and Testing Reports
- Open Items
- Systems and Assemblies not meeting OPR and construction Documents Requirements



# STANDARD 202 ANNEXES

- ▶ **A – Commissioning Process Documentation Matrix**
- ▶ **B – Quality Based Sampling Process**
- ▶ **C – Initiating the Commissioning Process**
- ▶ **D – Owner’s Project Requirements**
- ▶ **E – Commissioning Plan**
- ▶ **F – Basis of Design**
- ▶ **G – Commissioning Specifications**
- ▶ **H – Design Review and Report**
- I – Submittal Review and Report**
- J – Construction Observation and Testing Checklists and Reports**
- K – Issues and Resolution Log**
- L – Systems Manual**
- M – Training Plans and Records**
- N – End of Warranty Commissioning**
- O – Commissioning Report**
- P – Commissioning Information**

Annexes

# Informative Annex A

## Commissioning Process Documentation Matrix

- Commissioning Activity during Initiation-  
Design- Construction- Operations
- Suggests Participants by Document for:
  - Input By
  - Provided By
  - Reviewed/Approved By
  - Used By
  - Notes

# Informative Annex B

## Quality Based Sampling Process

- ❖ Design Review
- ❖ Construction Review
- ❖ Submittal Reviews
- ❖ Site Visits

Complexity Factor Guidance and suggested sample rates

Owner Must Approve Sampling Process

# Informative Annex C

## Initiating the Commissioning Process

Suggested Contract Language for Agreement to Produce:

- OPR, Cx Plan, BOD
- CX Specs, Cx Design and Submittals Review
- Observation and Testing, Issue Log
- Systems Manual, Training
- End of Warranty and Final Cx Reports

# Informative *Annex D*

## Owner's Project Requirements

- Obtaining the Information
  - ❖ OPR Workshop, Interviews
- Suggested Contents
  - ❖ Facility Requirements
  - ❖ Documentation
  - ❖ Commissioning
  - ❖ Training
  - ❖ Maintenance
- Document Format

# Informative Annex E

## Commissioning Plan

- Pre-Design, Design, Construction
- Contents
  - ❖ Overview and Process Description of Cx
  - ❖ Pre-Design Activities
  - ❖ Design Activities
  - ❖ Construction Activities
  - ❖ Occupancy and Operations Activities
- Schedules and Checklists
- Appendix List – Attached Documents
- Commissioning Plan Evolves into Commissioning Report

# Informative Annex F

## Basis of Design

- Process to Develop BoD
- Suggested Contents
- Format and Organization
- Review and Updating

# Informative Annex G

## Commissioning Specifications

- Guidance for Developing Cx Specifications
- Commissioning Authority Responsibilities and Functions
- Commissioning Organizational Strategy for Commissioning Team Members
- Commissioning Process Activities



# Informative Annex H

## Design Review and Report

- Design Submissions
- General Review
- Coordination Review
- Field Specific Review
- Specification Review
- Design Review Reports
- Design Professional's Actions

# Informative Annex I

## Submittals Review and Report

- Executive Summary
- List of Submittals Reviewed
- Issues, Comments and Variances from OPR
- Coordination with Project Systems
- Conformance to Functional Requirements and Maintainability

# Informative Annex J

## Construction Observation and Testing Checklists and Reports

- Overview and Types of Testing
- Performance
- Levels of Complexity
- Active and Passive Tests
- Checklists
- Reports

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# Informative Annex K

## Issues and Resolutions Log

- Formats
- Contents
- Resolutions
- Records

# Informative Annex L

## Systems Manual

- Use and Preparation Requirements
- Document Collection
- Contents and Format
  1. Executive Summary
  2. Facility Design and Construction
  3. Building, Systems, and Assemblies Information
  4. Facility Operations
  5. Training
  6. Commissioning Report

# Informative Annex M

## Training Plans and Records

### Activities, and Roles and Responsibilities

- Pre-Design
- Design Phase
- Construction Phase
- Occupancy and Operation

### Reports and Records

# Informative Annex N

## End of Warranty Commissioning

- Commissioning Functions during Warranty
  - ❖ Delayed and Seasonal Testing
  - ❖ Guidance to Operations and Owner
  - ❖ Additional Training
- Others Responsibilities
- Updates to OPR, Systems Manual, Testing and Commissioning Reports



# Informative Annex O

## Commissioning Report

- Summary of Commissioning Process for the Project Executive Summary
- Collection of All Commissioning Documentation
  - ❖ Final Commissioning Plan
  - ❖ Design Review Reports
  - ❖ Testing Reports
  - ❖ Cx Progress Reports
  - ❖ Issues and Resolutions Logs
  - ❖ Open Items
- Appendixes - Documents

# Informative Annex P

## Commissioning Information

ASHRAE Commissioning Guidelines

Other Organization Resources Websites

- 17 Resources with Information and Background on Commissioning.



# THANK YOU

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