Introduction to the Commissioning Process for Buildings and Systems

ASHRAE Standard 202-2013

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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 for HVAC
- 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/NIBS Guideline 3 published
- 2007 – Existing Building Guideline committee formed.
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**
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
- List systems or assemblies requiring commissioning
- Include enforcement provisions
ASHRAE Standard 202

Organization

- Process listed by 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
15. Training
16. Post Occupancy Operation
17. Commissioning Report
## Commissioning Process

<table>
<thead>
<tr>
<th>Activity</th>
<th>Deliverable</th>
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</thead>
<tbody>
<tr>
<td>Initiate Commissioning Process</td>
<td>Roles and Responsibilities</td>
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<tr>
<td>Project Requirements</td>
<td>Owner’s Project Requirements (OPR)</td>
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<tr>
<td>Develop Commissioning Plan</td>
<td>Commissioning Process Plan (CxP)</td>
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<tr>
<td>Design Approach to Requirements (BOD)</td>
<td>Basis of Design</td>
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## Commissioning Process

<table>
<thead>
<tr>
<th>Activity</th>
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<tbody>
<tr>
<td>Set Contractor Cx Requirements</td>
<td>Cx Specifications</td>
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<tr>
<td>Requirements</td>
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<tr>
<td>Design Review</td>
<td>Design Review Report</td>
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<td>Review Submittals</td>
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<td>Observation &amp; Testing</td>
<td>Construction Checklists &amp; Reports</td>
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<tr>
<td>Activity</td>
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<td>Issues Resolution Log</td>
<td>Issues and Resolution Log</td>
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<tr>
<td>Conduct Training</td>
<td>Training Plans and Report</td>
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<td>Post Occupancy Operation</td>
<td>End of Warranty Cx Report</td>
</tr>
<tr>
<td>Assemble Commissioning</td>
<td>Commissioning Report</td>
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</tbody>
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Standard 202
Chapter 1

• 1. PURPOSE

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

• 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
• **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
  - CxA is not required to “accept” design or construction for owner or jurisdiction.
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
6. OWNER'S PROJECT REQUIREMENTS

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

• 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
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

• 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
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

• 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

• 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
• **14. SYSTEMS MANUAL**
  - Collection of Project Documents
    - Facility Design and Construction Data
    - Systems and Assemblies Information
    - Facility Operations Requirements
    - Test and Balance Report for Systems
    - Training
    - Final Commissioning Report
  - Used for Operator and Maintenance Training
  - Provides Baseline for Operation and Changes
  - Updated as Building Evolves
Standard 202
Chapter 15

• 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

• 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
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 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
Standard 202 Annexes

- 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
COMMISSIONING SUMMARY

• Process and not an Event
• Requires Plans and Documentation
• Requires Testing Equipment
• Providers Require Experience, Skills, Knowledge, and Abilities