Specifications and specifics: how to write good commissioning specifications

Bruce Pitts and Jeff Yirak
Wood Harbinger, Inc.
AIA Quality Assurance

The Building Commissioning Association is a Registered Provider with The American Institute of Architects Continuing Education Systems (AIA/CES). Credit(s) earned on completion of this program will be reported to AIA/CES for AIA members. Certificates of the Completion for both AIA members and non-AIA members are available upon request.

This program is registered with AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.
At the end of this session participants will be able to:

- Utilize AIA/CSI 3-part spec format and standards
- Identify strengths and weaknesses in ASHRAE Standard 202, Guideline 0, and Guideline 1.1 requirements for specification preparation
- Develop a bulletproof commissioning specification
Specification Basics
What goes into the Project Manual?

- Procurement Requirements (Division 00)
- Contracting Requirements (Division 00)
- Specifications (Divisions 01-49)
AIA/CSI 3-part specifications

Audience

Speaking to “the” contractor

CSI specification structure applies to:

DBB
DB
GC/CM
Gov’t

Organization

Divisions,
sections,
parts,
articles,
paragraphs
Specification Divisions

- Division 01 General Requirements
- Division 02-19 Facility Construction
- Division 20-29 Facility Services
- Division 30-39 Site & Infrastructure
- Division 40-49 Process Equipment
Breakdown of a Section

PART 1  GENERAL
PART 2  PRODUCTS
PART 3  EXECUTION
PART 2 PRODUCTS

2.01 ARTICLE

A. Paragraph

1. Subparagraph

a. Subparagraph

1) Subparagraph

EXAMPLE

FANS

Centrifugal

Blade

Steel

Forward Curve
Spec Do’s and Don’ts

Do

• Include the statement “The mention of a subcontractor is not meant to usurp the Contractor’s responsibility to assign the work”
• Use conventional spec language like “shall” (not will, is to)
• Cross-reference to other applicable sections

Don’t

• Describe the work as to be completed by specific subcontractors
• Insert things in Cx specs that belong in other sections, such as financial procedures, scheduling, submittals, etc.
1.01 SECTION INCLUDES

- The Work of this Section includes the commissioning process and the relationships of the Owner, Contractor, Architect, and Commissioning Authority.

- The mention of a subcontractor is not meant to usurp the Contractor’s responsibility to assign the work. The commissioning team is assigned tasks to be completed to demonstrate completion and operation of the systems. The tasks described in this Section will be performed by the commissioning team. Contractor shall ensure the responsible subcontractor performs the assigned Cx tasks.
  
  - Ensure subcontractor’s scope includes commissioning tasks outlined in this Section.
  
  - If Contractor delegates work to a subcontractor, Contractor shall ensure that the subcontractor designates a representative to the Cx Team.
Why do you need a strong Cx specification?

- So the OPR is achieved
- So the contractor can adequately bid the amount of time and effort to support the commissioning process
- So other program objectives (rating system, training requirements) are met
What should the Cx Specs Cover?

- Cx Contract: Scope
- Cx Plan: Plan
- Cx Specs: Requirements
ASHRAE to the rescue!

- Standard 202 – 2013
- Guideline 0 – 2013
- Guideline 1.1 - 2007
Specifications are discussed in an appendix, not in the Standard itself.
“For construction or renovation projects requiring contract documents, the owner shall require, by agreement, the design/construction team to include Cx specifications in the project contract documents. The Cx specification shall include the meeting of all requirements defined in the OPR applicable to the contracted parties and follow the Cx Process contained in the project's Cx Plan as detailed in Section 9 of this standard.”

-ASHRAE Standard 202, section 5.2.7, Commissioning Specifications
Guideline 0 - 2013

• Still refers to a five-digit CSI specification scheme (pre-2004).
• Informative Annex L offers a decent division 1 guide specification, but doesn’t offer any division 2-48 examples.
• Doesn’t address training.
Guideline 1.1 - 2007

- Generally refers to Guideline 0.
- Includes allowances.
- Only applies to HVACR Commissioning
- Has a decent Division 23 example in Informative Annex L.
What should your spec contain?

All commissioning program requirements of the contractor

- List the CxA and other *non-contractor* team member responsibilities (Owner, Design Team); clearly delineate between the contractor responsibilities and the responsibilities of the rest of the team

- Include requirements for:
  - Submittals
  - Cx Meetings
  - Startup and testing, including deferred or seasonal testing
  - Training and O&M/System Manual documentation
Division 1 – General Requirements

SECTION [019100] [01 9100] [01 91 00] - COMMISSIONING

Talks to entire contract
Means and methods
Expansion of general conditions
  • Description
  • Proposed activity sequencing and expected durations
  • Process and procedures

Complimentary to Facility Services Sections (Div 2-48)
Division 1 Cx content

Part 1
- Responsibilities - who
- Scope - what

Part 2
- Not used

Part 3
- Process - how
PART 3 - EXECUTION

3.01 MEETINGS

A. Initial Meeting. Within 10 days of the Notice to Proceed (NTP), the CxA, through the owner/CM, will schedule, plan and conduct an initial commissioning meeting. The contractor and its responsible parties are required to attend.

B. Miscellaneous Meetings. Other meetings will be planned and conducted by the CxA as construction progresses. These meetings will cover coordination, deficiency resolution, and planning issues. These meetings will be held at least monthly, until the final 3 months of construction, when they may be held as frequently as once per week.

Example Division 1, Part 3 Language

Not in ASHRAE!
Technical Sections

Division 23, for example

For Installation and Start-up, include requirements for involvement of factory-authorized service representatives
Trend log requirements
Training requirements
Documentation (Systems Manual) requirements

Division 26

Trend log requirements
Egress lighting performance testing
Fire Detection and Notification / Mass Notification
3.08 GENERAL TESTING REQUIREMENTS

A. Provide technicians, instrumentation, and tools to perform commissioning tests at the direction of the CxA.

B. Scope of HVAC&R testing shall include entire HVAC&R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing shall include measuring capacities and effectiveness of operational and control functions.

C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.

D. ...
Provide actual or representative Installation Checklists
Provide one or more representative functional test forms to illustrate the scope and rigor of the functional testing and allow the contractor to bid the work
Provide these as attachments
What goes into the Project Manual?

- Procurement Requirements (Division 00)
- Contracting Requirements (Division 00)
- Specifications (Divisions 01-49)

Project Manual
Who writes the Cx Specifications?

ASHRAE 202-2013 allows design team or CxA

Q for the audience:

Should the author be a PE?
The commissioning specifications are akin to the design documents the Engineer of Record is writing. The commissioning specifications become part of the contract and must be an integrated, cohesive document of quality.
Should you edit other sections?

Yes, except you probably can’t.
Provide recommended edits to other sections, similar to a design review. The PE is still responsible for Project Manual.

Examples:

- Trend log requirements in the DDC section
- System manual documentation in other equipment sections
- Special testing requirements for integration testing
- Systems that require seasonal testing
Do you need a Cx Plan if you have good specs?

Yes

No
Plan vs. specs

- Cx Plan
  - Pre-design: OPR, Cx Plan
  - Design: BoD, Plans and Specs
  - Construction: O&M, Training
  - Post Occ: Follow-up

- Cx Specs
What else can you do?

Cx activities added as separate line items to Schedule of Values
• Architects may be reluctant
Or, have CxA review pay applications
Have a way to tie commissioning progress and milestones to payment

Don’t put penalties or financial stipulations in the Div 2-48 specs.
Illustrate non-contractor responsibilities in attachments and provide sample commissioning documentation.

For each project, the commissioning purpose and scope shall be clearly defined in the CxA contract.

The CxA recommends the commissioning roles and scope in the specifications for each system and component for which the supplier’s support is required.

Use ASHRAE and BCA for inspiration, but don’t expect them to feed it to you.
Discussion

Bruce Pitts  Jeff Yirak  Rick Vance