

CHAPTER 16
COMMISSIONING

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16.1 GENERAL

This chapter provides general guidance regarding commissioning of building systems and applies to both design-bid-build and design-build projects. The specific commissioning team members, activities, and level of rigor should be tailored to individual projects based on size, complexity, and the planned quality management. The requirements or guidelines in this chapter are specifically written for medium-high complexity MILCON projects. Lower levels of commissioning may be suitable for small, low-complexity projects. Example: a project with several small split-systems with no direct digital controls may only require the typical USACE contractor quality control and quality assurance along with building acceptance testing. Higher levels of commissioning may be necessary for large, very complex projects. Example: Complex laboratory projects or hospitals.

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16.2 CRITERIA

Commissioning requirements for Army, Air Force, and other Department of Defense facilities are outlined by UFC 1-200-02 High Performance and Sustainable Building Requirements, ASHRAE Standard 189.1 Standard for the Design of High-Performance Green Buildings, and Engineering Regulation 1110-345-723 Total Building Commissioning Procedures. If a project has a Leadership in Energy and Environmental Design (LEED) requirement, additional commissioning requirements are also imposed by the LEED Rating Systems.

16.3 PROJECT SIZE AND COMPLEXITY

Coordinate with the USACE PE/A to determine the level of commissioning required for the project. Typical military construction projects do not necessitate special requirements. More advanced commissioning procedures may be necessary for large, complex projects; such procedures may include the use of contracted commissioning services (AE), development of more rigorous commissioning plans and checklists in design phase, and higher degree of oversight or leadership during construction.

16.4 COMMISSIONING SPECIALIST

By default, the construction contract shall require the construction or design-build contractor to hire a contractor's commissioning specialist (CxC) for the project. USACE will provide quality assurance level oversight of the process and participate as an Owner's representative in the commissioning procedures.

A Government Commissioning Specialist (CxG) is required for all projects over 5000 sf and \$3 million construction cost. USACE, Louisville District, will use in-house personnel, normally from Construction Division's Quality Management Section, to perform this role for typical construction projects. For very large, complex projects, this role may be contracted to an A-E firm. Consult with in-house personnel to develop scope for A-E firm performing the CxG role. The CxG performs commissioning activities during pre-solicitation/award phase of a project and provides oversight and quality assurance for the construction phase activities performed by the CxC.

ER 1110-325-723 Total Building Commissioning Procedures requires a design commissioning specialist (CxD) to be part of the design phase project team for design-bid-build projects. For typical construction projects, this role will be filled by the CxG instead to avoid unnecessary funds expenditures. For very large, complex projects, this role must be added to the contract scope of the A-E design team.

16.4.1 CONTRACTOR HIRED COMMISSIONING SPECIALIST

The construction contractor's specialist (CxC) will be required to organize and coordinate the entire commissioning process while the USACE CxG ensures that the processes and procedures implemented conform to contract requirements and participates as the Owner's representative.

16.4.2 GOVERNMENT COMMISSIONING SPECIALIST

USACE in-house personnel, typically from Construction Division's Quality Management Section, have first right of refusal as the Government commissioning specialist for any project. In the event the in-house personnel do not have sufficient capacity or capability, the Government commissioning specialist will be sought from another USACE District or hired through the A-E IDIQ, as appropriate.

An A-E task order to hire a Government commissioning specialist must be developed for each individual project where determined to be necessary. Applicable criteria and needs vary from project to project; therefore, the task order scope of work must be tailored specifically for each project. Early in pre-solicitation phase of the project, the USACE PE/A should engage a commissioning subject matter expert to support development of an appropriate scope of work for the Government commissioning specialist.

16.5 SPECIFICATIONS

Use the LRL specifications 01 46 00.00 06 Total Building Commissioning for Construction or Design-Build projects in the Louisville District. For very large, complex projects, use UFGS 01 91 00.15 10 Total Building Commissioning if determined necessary by the project team and CxG. Coordinate specification section selection with USACE PE/A.

The appropriate specification shall be **edited in accordance with the specifier notes therein** and shall be included in the solicitation of the construction or design-build contract.

16.6 COMMISSIONING DESIGN REVIEW

The Government commissioning specialist (CxG) must review the interim and final design documents along with the Owner's Project Requirements and Basis of Design documents and backcheck comments. Commissioning comments must be entered and addressed through DrChecks similar to other required design reviews.

16.7 COMMISSIONING DOCUMENTS

16.7.1 OWNER'S PROJECT DOCUMENTS

The AE preparing the construction contract documents must develop the Owner's Project Requirements (OPR); this includes both full design projects and design-build RFP. A design-build RFP does serve as the OPR document. The OPR includes the information required by LEED and ASHRAE Standard 189.1 and must be attached to the project commissioning specification as an appendix. Limited referencing from the OPR to the rest of the design-build RFP may be appropriate.

For design-bid-build projects, the AE must complete the OPR prior to the interim submission of the design documents for review by the commissioning specialist, and the OPR must be incorporated into specification section 01 46 00.00 06 as an attachment with the final design submittal. For design-build projects, the AE must have the OPR complete and included in the final design-build RFP with specification section 01 46 00.00 06 Total Building Commissioning as an attachment.

16.7.2 BASIS OF DESIGN

The Basis of Design (BOD) document must be developed by the designer of record. The AE must prepare the BOD for design-bid-build projects and include it as an appendix to the project commissioning specification. A draft BOD must be completed prior to the interim submission of the design documents for review by the commissioning specialist. For design-build projects, the design-build contractor's design team develops the BOD.

Typically, the design analysis narratives for commissioned systems may be compiled for the BOD, if they include all requirements for the BOD in accordance with applicable criteria. Otherwise, a separate BOD would be required.

16.7.3 COMMISSIONING PLAN

The Commissioning Plan will be developed by the contractor's commissioning specialist. For large, complex projects, a draft commissioning plan must be developed by the design commissioning specialist (CxD) and included in the construction contract specifications; the construction contractor's commissioning specialist (CxC) will update the commissioning plan post-award.

16.7.4 CHECKLISTS

Example commissioning checklists are referenced from the commissioning specification templates. For large, complex projects, the design commissioning specialist (CxD) or designer must develop example checklists based on the project and require their use for update by the contractor's commissioning specialist. The contractor's commissioning specialist will update, refine, or develop more checklists as necessary during construction.

16.8 LEED

Projects with a LEED certification requirement must meet the requirements for the LEED prerequisite for commissioning at a minimum. If additional points are sought for commissioning, the requirements for the selected credits must be met. This may require updating the specifications to address the specific requirements for the LEED prerequisite and credits.

For typical design-bid-build projects, the LEED commissioning authority must be involved during design phase of the project. Therefore, the CxG will act as the LEED commissioning authority. This requires design, OPR, and BoD review and ensuring the commissioning specifications are correct. For very large, complex design-bid-build projects or when CxG capacity is insufficient, this role must be contracted out, normally through an AE contract. The CxG must be involved in reviewing and approving construction submittals, commissioning plans/checklists, systems manual, some on-site inspection, some of the testing, and be involved in post-construction activities.

16.9 SMALL, LOW COMPLEXITY PROJECTS

Projects below 5000 square feet and \$3 million construction cost that do not warrant a full commissioning effort or team may use building acceptance testing. Be aware that projects below these thresholds may warrant a more robust commissioning effort; such depends on the scope of work. The USACE PE/A should engage a commissioning subject matter expert to determine extent of commissioning or building acceptance testing to apply. For building acceptance testing, the construction contract documents must require a test plan to be developed and submitted for approval, notification to the Government prior to testing (typically 14 days), Government present as witness, and development and submittal of a test report including summary of system performance, any outstanding deficiencies, and any forms used to document testing.

----END OF SECTION----