

(This annex is not a mandatory part of the referring ASHRAE SSPC 300 standard or guideline. It is merely informative and does not contain requirements necessary for conformance to the standard or guideline.)

(The following informative annex is provided to illustrate, explain, or support the ASHRAE SSPC 300 commissioning process. The information presented herein represents consensus good practice but does not contain mandatory commissioning process provisions. This informative annex supports more than one ASHRAE SSPC 300 commissioning standard or guideline and is not intended to serve as a standalone document. See the referring ASHRAE SSPC 300 standard or guideline for mandatory commissioning process requirements and guidance.)

## ASHRAE SSPC 300 INFORMATIVE ANNEX 19—COMMISSIONING PROCESS REQUEST FOR QUALIFICATIONS

This annex suggests elements that should be included when requesting qualifications from a Cx Provider and includes an example of a Request for Qualifications (RFQ) for commissioning services. Practitioners applying the Cx should be aware of and follow applicable ASHRAE commissioning guidelines and standards and apply them to the client's specific project.

### 19.1 Criteria for Inclusion in Cx Provider RFP

Before commencing a project, it is important that the CxP can fulfill the tasks the Owner has in mind.

For small projects, this may largely include the ability to help the Owner navigate the requirements of code, LEED, and similar sets of prerequisites for project completion. For larger projects, the Owner may have very specific requirements, company guidelines and established standards that need to be followed, and these may require a more sophisticated CxP.

Evaluating the level of services that a CxP will bring to the project may be especially difficult for Owners who have not yet had much experience in the realm of commissioning. How can an Owner ask for specifics when they are unaware of the specifics involved?

This informative annex suggests primarily asking for CxP qualifications, records, and references that will show the CxP's ability to provide value to the Owner; by comparing this information from various providers, the Owner should be able to discern differences in their capabilities.

One parallel example might be someone purchasing a car; even if unaware of the various criteria involved, comparing data from various makes and models on common websites can allow a potential buyer to evaluate these, using just the information provided, even if the buyer would not necessarily have known all of the details to ask for.

There are two main areas in which the CxP should have competency:

- The Cx Process: understanding how to deal with the major process steps through design and construction, and how to ensure that communication and recordkeeping are managed
- Technical competency: being able to provide value on a technical level when reviewing, testing, and evaluating complex systems

These two areas require different skill sets which is why a CxP Team generally includes multiple practitioners with different skills, even for relatively small projects.

#### 19.1.1 Process Competency

There are a variety of commissioning certifications available; refer to SSPC 300 Informative Annex 16, "Commissioning Resources" for a list of organizations providing such certifications.

Most Cx certifications are aimed at making providers knowledgeable about the process of commissioning, not about the technical content of a particular system. Being certified should ensure that a provider has the ability to understand the importance and function of major deliverables like the OPR and BoD and can use Cx tools like Issues and Resolution Logs and Systems Manuals.

Such Cx certifications may thus be a good idea to request, although practical experience and evidence of documentation from similar and relevant past projects are also good indicators of competency.

In either case, the abilities and skills addressed by this aspect of provider qualifications are still fairly readily understood by non-technical staff on the owner's side, as they relate primarily to basic organizational and management skills, and the ability to establish a good project track record for transparency to all project members.

### 19.1.2 Technical Competency

It may be much more difficult to select CxPs for their technical skills, just as it may be difficult to pick a family doctor when one is not a doctor. Thus, similar methods of assessing the provider's skills are necessary in this case, and involve reputation (reviews by other providers), publications and teaching, membership in professional organizations.

More critically, they involve a sense of what particular technically-related abilities a provider has mastered, without the owner necessarily understanding the actual technical details. These come into play in all the major project activities and deliverables listed below. Further information on each activity or deliverable can be found in the Informative Annexes indicated below:

- Informative Annex 02, "Quality Based Sampling Process" (as directed by the owner in the OPR)
- Informative Annex 07, "Commissioning Specifications"
- Informative Annex 08, "Design Review and Report"
- Informative Annex 09, "Submittal Review"

Rather than specifying the skills or review steps a provider should employ during a design review, it may be simpler to ask the provider "What steps would you perform during a design review for a project like ours," or to ask "Please provide examples of design reviews you conducted for a project like ours." Such materials may be accompanied by a non-disclosure agreement (NDA) or written from the owners of the previous projects.

An easy method of getting a sense of technical capabilities may be a bullet-point list of items a provider might review during a mechanical systems review. Two providers might issue different lists (this example is slightly contrived, but aims to illustrate a point):

Provider 1 Proposed Review Items	Provider 2 Proposed Review Items
Review all duct sizes for every duct and provide comments	Review riser and main duct sizing, spot check five run-outs to terminals
Review major equipment sizing with parallel load calculation and comment on selections	
Review equipment schedule for internal consistency (do chilled water pumps match sizes required for chillers?)	Review equipment schedule to ensure all equipment shown on drawings is listed

Clearly, the approach of Provider 1 looks like it is more detailed, and perhaps it is too detailed, resulting in pricing that is too high. Getting a listing of review steps is the point of this request in the RFP and reveals differences between providers.

- This may lead to questions to Provider 1 such as "we like your approach, what would be the deduct if you employed sampling on the duct size review and checked only a subset of ducts?"
- Or it might lead to a question for Provider 2 that says, "we like your price, but could you extend your review of the equipment schedule to cross-checking equipment listed for consistency of capacities rather than just checking for presence on drawings?"

For small projects, the overhead involved in the approach above may not be worth executing. It may also be that providers do not have checklists for their activities readily available. As an owner conducts more of these RFPs, his/her ability to assemble his/her own checklists may grow, and providers may simply be asked to confirm that they can execute those steps that the owner considers important.

In the absence of simple-to-use certifications for technical knowledge, the above steps are meant to illustrate possible steps the owner may undertake to get a better sense of a provider's capabilities, and to use

the provider's own statements and examples to compile a strategy for subsequent RFPs that become more refined over time.

### 19.1.3 Sampling

Of particular importance in this regard is the definition of sampling; does a provider review and check every single element of a system, or is a sample selected for review and testing? If so, how is this sample determined, and how do negative results of reviews or tests affect the subsequent process? Sampling is described in detail in Informative Annex 02, "Quality Based Sampling Process," with examples illustrating how various sampling methodologies can be described. Sampling is also referenced in other SSPC 300 Informative Annexes. Note that its application will have a significant effect on the price of commissioning services quoted by various providers.

Owners should be careful in evaluating provider proposals if they do not include a sense of how much sampling will be employed and whether the sampling intentions of multiple providers are comparable.

There is no current industry consensus on a "correct" level of sampling in the Cx. Thus, the decision about how much sampling is to be employed is left to the owner. Making a provider check 50% of all equipment will be more expensive than making the same provider check 10% of all equipment in a system.

Expecting a provider to test 100% of a system and finding out toward the end of the project that the provider tested only 15% of the system's components will also be an unsatisfactory experience. Therefore, a decision should be made by the owner about how much sampling will be required, and this should be clearly included in the RFP to ensure that the prices received from providers are comparable.

Alternatively, the owner may request pricing for a particular project using a lower and a higher sampling rate, to get a sense of the variation in cost. Note again that sampling can occur in design reviews, submittal reviews, observation, and testing.

### 19.1.4 Project Delivery Method

There are many different methods of bringing a project to completion. For the building construction sector in particular, two methods rank among the most common. These are discussed below in the context of a commissioning RFP, although many other methods also exist. The methods below are singled out because many projects employ them:

- Design-Bid-Build, also called Plan and Spec
- Design-Build

In the design-bid-build approach, the owner hires a design team whose members fully design a project and allow the owner to obtain pricing based on a package of plans and specifications that describe the project. The owner's AE team are the architect and engineers of record and carry the responsibility for design decisions, typically by signing documents with the stamps required for registered professionals.

In the design-build approach by contract, a design team may or may not be involved. The owner may decide to have a design team establish some preliminary guidelines for a contractor to adhere to, although this is not strictly necessary. An owner may engage a contractor directly, and the contractor's own engineering staff, or engineering staff subcontracted to the contractor, provide the permit drawings and necessary licenses for registered professionals.

There are a few key differences in the processes, and they are listed below to allow the owner to consider these in detail to determine whether they affect the creation of the Cx RFP.

#### 19.1.4.1 OPR

In a design-bid-build process, the owner relies on a team of professionals to establish detailed requirements for the contractor. This is not the case in the design-build process. For this reason, the design-build process requires some other vehicle for transferring transformation that is important in project execution to the contractor. The OPR is a good vehicle in this regard and should be established before the contractor is brought on board, such that the owner's requirements are included in the contractor's scope.

This places more emphasis on a well-written OPR than in the design-bid-build approach, where the owner is relying on the combined experience of the design team to ensure that requirements are met.

Without the experience of the design team, the owner must rely more heavily on the experience of the CxP before the project is bid out. Therefore, examples of OPRs, an understanding of the role a particular CxP had in assisting the Owner in writing these, and examples of where an OPR delivered value to the owner could be included as particular requests for a design-build project.

#### 19.1.4.2 Submittal Review

In a design-build process, the contractor submitting equipment is also the engineer of record. The review from the owner's A&E team which is present in the design-bid-build approach is therefore absent. Documents showing reviews of engineering staff may still be present, but there is less contractual independence in this case than in the reviews created by a team of engineers with no affiliation to the contractor. For this reason, the owner may decide to rely more on the submittal review by the CxP than they would in the design-bid-build method, where the AE team has the power to reject submitted materials or equipment that do not comply with the project documents.

In the design-bid process, it is typically just the owner who can decide to reject submittals that they find unacceptable. For this to happen, they may need to rely on the review of the CxP, and they may need to rely on criteria outlined in the OPR as part of the original bid process. The CxP cannot typically take the role of the owner's AE team to reject submittals, since they are not the engineer of record.

### 19.2 Example Request for Proposal (RFP)

#### 19.2.1 Background

[*Owner Name*] is seeking the services of services of a qualified CxP for [*Project Name*]. The project is a [*number*] gross ft<sup>2</sup>, [*number*] story, Class [*type*] [*type*] building in [*city*], [*state*], with a project budget of \$[*number*] million. The facility is expected to be composed of [*number*]% [*space type*], [*number*]% [*space type*], and [*number*]% [*space type*].

The project is currently in the early predesign phase. The expected schedule is to start design by [*date*], start construction by [*date*], and occupy by [*date*].

The management structure is traditional design/bid/build with full design documents and specifications being developed by an architectural/engineering firm. The construction documents will be let out to bid and a general contractor will be hired to complete the construction. The Owner's primary construction representative on site will be provided by the separately contracted services of a construction manager. The CxP will be hired by and report directly to the Owner.

#### 19.2.2 Scope of Work

The Owner has adopted the Commissioning Process (Cx) as his/her quality process to plan, design, construct, and operate this facility. As with any quality process, the Cx provides tools to enable everyone involved in the construction of the facility to verify that the final facility meets the OPR.

The following is a summary of the Cx that the Owner intends to implement on this project. The proposer is free to suggest changes and improvements to this process. However, for this proposal, the following process will be assumed.

##### 19.2.2.1 Commissioning Process During the Predesign Phase. The Cx activities completed by the CxP during the Predesign Phase include the following:

- a. Developing and documenting the OPR
- b. Identifying a scope and budget for the Cx
- c. Developing the initial Cx Plan
- d. Acceptance of Predesign Phase Cx activities

##### 19.2.2.2 Commissioning Process During the Design Phase. The Cx activities completed by the CxP during the Design Phase include the following:

- a. Working with the CxP Team to document the OPR for the facility
- b. Working with the design professionals in documenting the BoD
- c. Verifying the BoD with regard to the OPR
- d. Developing a Cx Plan encompassing the Design, Construction, and Occupancy and Operations

#### Phases

- e. Determining the commissioning requirements and activities to include in the construction documents, with review by the Design Team, for integration into the project's construction specifications
- f. Reviewing the in-depth design documentation developed by the design professionals
- g. Performing statistically-based quality design review at 35%, 50%, 95%, and 100% completion of the drawings and specifications

#### **19.2.2.3 Commissioning Process During the Construction Phase.** The Cx activities completed by the CxP during the Construction Phase include the following:

- a. Organizing the Cx components and conducting a prebid and preconstruction meeting where the Cx requirements are reviewed with the CxP Team
- b. Organizing and conducting periodic CxP Team meetings necessary to plan, develop the scope, coordinate, schedule activities, and resolve problems
- c. Reviewing submittals concurrent with the design professional's review
- d. Working with contractors in completing construction checklists and tracking of checklist completion
- e. Statistically sampling completion of construction checklists on a periodic basis to verify that contractor's quality process is achieving the OPR
- f. Developing specific test procedures, to be reviewed by the contractors
- g. Directing the execution of the tests by contractors
- h. Documenting the results of the tests
- i. Documenting the correction and retesting of noncompliance items by the contractor
- j. Reviewing the Systems Manual for achieving the OPR
- k. Reviewing, preapproving, and verifying the training provided by the contractors
- l. Verifying delivery of the Systems Manual

#### **19.2.2.4 Commissioning Process During the Occupancy and Operations Phase.** The Cx activities completed by the CxP during the Occupancy and Operations Phase include the following:

- a. Scheduling and verifying deferred and seasonal testing by the contractor
- b. Verifying continuing training
- c. Reviewing warranties with the operations and maintenance staff two months prior to expiration of warranty
- d. Scheduling, organizing, and attending a lessons-learned workshop. The workshop is facilitated by an independent member of the CxP's firm
- e. Completing the final Cx Progress Report

#### **19.2.3 Limit of Responsibilities**

The CxP is not responsible for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The CxP may assist with problem-solving or resolving nonconformance or deficiencies, but ultimately that responsibility resides with the general contractor and design professionals.

#### **19.2.4 Focus of the Commissioning Process**

The following systems and assemblies are the focus of the Cx:

- a. *[Insert lists of systems and assemblies]*

#### **19.2.5 Desired Qualifications**

It is desired that the person designated as the CxP satisfy as many of the following requirements as possible:

- a. Has acted as the principal CxP for at least three projects during the past year. (**Note:** the size of the



- project should be accounted for. Whereas one proposer may have done ten projects, all small in size, another proposer may have done one large and complex project, and both may have equal credentials.)
- b. Is experienced in quality processes
  - c. Is knowledgeable in building operation and maintenance training
  - d. Has excellent verbal and written communication skills. Highly organized and able to work with both management and trade contractors
  - e. Has a bachelor's degree in [insert discipline] is strongly preferred and [insert type] certification or professional license is desired.
  - f. The CxP's firm will demonstrate depth of experienced personnel and capability to sustain loss of assigned personnel without compromising quality and timeliness of performance.
  - g. The CxP has obtained one or more of the qualifications listed in [insert desired certifications/accreditations].
  - h. In lieu of the listed accreditations, the independent CxP has demonstrated experience on more than four projects for this Owner, or relevant similar projects for other Owners. CxPs who are familiar with the Owner's work can bring value to a project. The CxP should provide names of the Owner's staff that the CxP has worked with as references, with a short description of relevant roles and projects.
  - i. The CxP should have a minimum of <x> years of commissioning experience on similar projects.
  - j. [Insert any qualifications or special requirements for a specific system or assembly]

#### 19.2.6 Instructions to Proposers

A proposer must propose to execute all phases of the Cx in a single proposal. The proposal must be signed by an officer of the firm with the authority to commit the firm, and must include the following information:

- a. The key individual who will be the CxP for the contract and his/her relevant qualifications and experience. This information is required in addition to any detailed resumes the proposer submits. The contract will require that this individual be committed to the project for its duration.
- b. Project and professional references and experience for three to five commissioning projects for which the proposer was the principal CxP in the last three years; include descriptions of the projects, when the proposer came into the projects, and descriptions of the involvement of each individual on the proposer's team in the projects. For each project, include a sheet that lists the name and telephone number of the Owner's project manager, construction manager, building facility administrator, design professionals, and contractors.
- c. Description of any experience of the proposer's team in the following areas, including lists of each party's involvement:
  - 1. Quality process experience
  - 2. Operation and maintenance experience
  - 3. Design experience
  - 4. Life-cycle costing
  - 5. [Insert other system or assembly specific experience requirements]
- d. Description of proposed approach to expert and efficient project management, including team participation. Description of approach that will be taken to integrate the Cx into the normal design and construction process in order to make it "business as usual."
- e. Description of what will be done to foster teamwork and cooperation from contractors and designers, and what will be done to minimize adversarial relationships.
- f. Description of how the CxP's work will facilitate the use of the CxP's product as a prototype that might subsequently be used by the Owner in future projects, including access to electronic versions of all documents and forms.
- g. An attachment providing the follow work products that members of the proposer's team wrote:
  - 1. Cx Plan that was executed
  - 2. Integrated commissioning specifications

3. Electronic issues and resolution log
4. Construction checklists
5. Test procedure that was executed
- h. [Any other desired instructions]

#### 19.2.7 Instructions to Proposers

The submitted proposals will be reviewed and ranked according to the following:

- |   |                  |
|---|------------------|
| a. Key individual experience              | 20 points        |
| b. Staff experience                       | 15 points        |
| c. Similar project experience             | 20 points        |
| d. Team experience in related skill areas | 15 points        |
| e. Management approach                    | 20 points        |
| f. Work examples                          | <u>10 points</u> |
|   | 100 points       |

The reference checks will not be scored individually but may be used to supplement all categories. The Owner reserves the right to eliminate or change the weight of extremely high or extremely low fee proposals.

#### 19.2.8 Submission and Selection

CxPs will submit [quantity] copies of the written proposal, to be received in the Owner's office at [address] by [date and time]. Late proposals will not be accepted.

Review and selection process...

Requirement of personal interview for finalists...

#### 19.2.9 Limitations and Provisions

[Insert wording on right to reject, to seek clarifications, to negotiate a final contract; cost of proposal preparation not reimbursable; primary contact for questions; other necessary legal language, etc.]

#### 19.2.10 Minimum Requirements for Contract Execution

**19.2.10.1 General Conditions.** Miscellaneous as required...

**19.2.10.2 Insurance.** The CxP's firm shall obtain, at the firm's expense, and keep in effect during the term of the project, \$[list required insurance amount].