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|---|---------------------------|--|---|
| 4 | ENERGY USE | 4.4 PROVISIONS FOR ENERGY MANAGEMENT | |
| | | EU 10 TESTING AND COMMISSIONING | |
| | EXCLUSIONS | None. | |
| | OBJECTIVE | Commissioning the electrical and mechanical systems to ensure the impact on energy use of the systems is adequate, the systems performance is as specified and the systems operation is as intended. | |
| | CREDITS ATTAINABLE | 4 + 1 BONUS | |
| | PREREQUISITES | None. | |
| | CREDIT REQUIREMENT | <p>a) Commissioning specifications</p> <p>1 credit for provision of appropriate specifications and/or cost provisions in contract documents detailing the commissioning requirements for all systems and equipment that impact on energy use and indoor environmental quality.</p> <p>b) Commissioning plan</p> <p>1 credit for the appointment of a commissioning authority and provision of a detailed commissioning plan that embraces all specified commissioning work.</p> <p>c) Commissioning</p> <p>1 credit for ensuring full and complete commissioning of all systems, equipment and components that impact on energy use and indoor environmental quality.</p> <p>d) Commissioning report</p> <p>1 credit for providing fully detailed commissioning reports for all systems, equipment and components that impact on energy use and indoor environmental quality.</p> <p>e) Independent Commissioning Authority</p> <p>1 BONUS credit for engagement of an independent commissioning authority in the Testing and Commissioning process.</p> | |
| | ASSESSMENT | <p>a) Commissioning specifications</p> <p>The Client shall submit copies of detail specifications on the commissioning requirements for each system and equipment, and/or the details of the cost provisions for the commissioning work.</p> <p>The credit shall be awarded where it can be shown that the specifications meet the requirements given in Section 8.5.1 as a minimum or cost provisions are sufficient to carry out the intended work.</p> <p>b) Commissioning plan</p> <p>There shall be appropriate cost provisions for the appointment of a commissioning authority and for the commissioning processes. The commissioning authority shall be a Registered Professional Engineer with adequate expertise in the commissioning of electrical and mechanical systems, equipment and components. A suitably qualified member of the organization that performed the design may act as the commissioning authority. Reporting of all conditions and findings must be immediate and direct from the commissioning authority to the Client. The commissioning authority shall be responsible for:</p> <ul style="list-style-type: none"> review and approval of commissioning specifications; the development of a commissioning plan; and | <p>A1</p> <p>A2</p> <p>A3</p> <p>B1</p> <p>B2</p> <p>B3</p> <p>B4</p> |

- determining and documenting whether systems, equipment and components are functioning in accordance with the design intent and in accordance with the construction documents.

Where the Client can provide evidence that the commissioning plan meets the requirements detailed in Section 8.5.2 as a minimum the credit shall be awarded.

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c) Commissioning

Where the Client appoints a commissioning agent to be responsible for performing the functional testing of systems and equipment, as documented by the commissioning authority, using forms approved by the commissioning authority, and all of which meet the requirements of Section 8.5.3 as a minimum, the credit shall be awarded.

C1

C2

d) Commissioning report

Where the Client demonstrates that after all commissioning tasks except seasonally deferred testing have been completed, and a commissioning report is provided covering as a minimum the items given in Section 8.5.4, the credit shall be awarded.

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D2

e) Independent Commissioning Authority

Where the Client demonstrates that the commissioning authority shall fulfill the following requirements:

- the commissioning authority must have relevant experience in at least 2 building projects;
- the individual must not be responsible for any aspect of the project design or construction management or supervision for the subject building;
- the individual must not be an employee of the design firm;
- the individual must not be an employee of, or contracted through, a contractor or construction manager dealing with construction contracts; and
- the individual may be a qualified employee or consultant of the owner.

BACKGROUND

Commissioning is a quality assurance process for buildings from pre-design through design, construction, and operations. It involves achieving, verifying, and documenting the performance of each system to meet the building's operational needs within the capabilities of the documented design and equipment capacities, according to the owner's functional criteria. Commissioning includes preparing project operational and maintenance documentation and training operation and maintenance personnel. The result should be fully functional systems that can be properly operated and maintained throughout the life of the building.

CIBSE [1,2,3], BSRIA [4] and ASHRAE [5] publications provide guidance on commissioning requirements and procedures, such as management, design for commissioning, access, testing, measurements and tolerances, installed transducers, specification for portable measuring equipment, etc. The Architectural Services Department publishes

- 1 The Chartered Institution of Building Services Engineers. Air distribution systems. CIBSE. Commissioning Code A. <http://www.cibse.org/index.cfm>
- 2 The Chartered Institution of Building Services Engineers. Water distribution systems. CIBSE Commissioning Code W.
- 3 The Chartered Institution of Building Services Engineers. Automatic controls. CIBSE Commissioning Code C.
- 4 Building Services Research and Information Association. Commissioning air systems. Application procedures for buildings. <http://www.bsria.co.uk/>
- 5 ASHRAE. New Building Commissioning. <http://www.ashrae.org/>



Circular Letter No.: 2019.154 (Revision 1)

Issue Date: 21 January 2019

Revision Date: 12 February 2019

Application: BEAM Plus NB Version 1.1 & 1.2

Effective Date: 12 February 2019

EU 10 Testing and Commissioning

1. The Circular Letter provides a further interpretation on the requirement of Commissioning Authority (CxA) and Independent Commissioning Authority (iCxA) under the captioned credit.

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2. The **qualification** and **responsibilities** of the CxA and iCxA are outlined in the table below:

B7 E2

| | Qualifications | Responsibilities¹ |
|--------------------------------------|---|--|
| Commissioning Authority (CxA) | <ul style="list-style-type: none">• Have the experience in testing & commissioning for at least 2 building projects;• Have adequate expertise in the commissioning of electrical and mechanical systems, equipment and components;• Cannot be involved in the construction or installation of any building services installations of the project²;• May be the project owner³ or his/her employee; and• Possesses the qualification of a Registered Professional Engineer or MHKIE under the discipline of building services, mechanical, electrical, energy or environmental at the time of the assessment submission⁴. | <ul style="list-style-type: none">• Involve in pre-design and design process;• Review project design to meet owner's requirement;• Incorporate all testing and commissioning requirements into the tender documents (i.e. commissioning specifications);• Develop and endorse the Commissioning Plan;• Supervise the Contractors to implement the Commissioning Plan;• Develop the procedures and checklists of the functional test;• Witness the functional test;• Document and endorse the result of functional test;• Confirm that the systems, equipment and components are functioning in accordance with the design intent and in accordance with the construction documents;• Verify that all findings are documented into the Commissioning Report; and |

¹ The responsibilities listed under this table is a general summary of Appendices 8.5.1 to 8.5.4 of the BEAM Plus Manual. Should the Applicant decide to attempt credit EU 10, the Applicant should observe the testing and commissioning requirements specified under Appendices 8.5.1 to 8.5.4 of the BEAM Plus Manual.

² The wording of this paragraph has been updated on 12 February 2019.

³ Project owner refers to the party that oversees the overall management of the project. For a design-bid-build project, this could be the project manager acting on behalf of the building owner or the building owner him/herself. For a design and build project, this could be the project manager acting on behalf of the building owner.

⁴ Assessment submission refers to the date when the assessment package is formally accepted by BSL.

| | Qualifications | Responsibilities ¹ |
|---|---|---|
| | | <ul style="list-style-type: none"> Report all findings directly to project owner, if the commissioning works are not conducted by the project owner⁵. |
| Independent Commissioning Authority (iCxA) | <ul style="list-style-type: none"> Have the experience in testing & commissioning for at least 2 building projects; Have adequate expertise in the commissioning of electrical and mechanical systems, equipment and components; Cannot be responsible for the pre-design and design process; Cannot be involved in the construction or installation of any building services installations of the project⁶; Cannot be appointed as a design consultant or contractor for the project; May be the project owner or his/her employee; Maybe an independent consultant appointed by the project owner; and Possesses the qualification of a Registered Professional Engineer or MHKIE under the discipline of building services, mechanical, electrical, energy or environmental at the time of the assessment submission. | <ul style="list-style-type: none"> Involve in pre-design and design process; Verify that all testing and commissioning requirements are fully incorporated into the tender documents (i.e. commissioning specifications) Verify that the Commissioning Plan has included the owner's requirement; Endorse the Commissioning Plan; Review the functional test procedures and verify the result of the functional test; Verify and endorse all findings in the Commissioning Report; and Report all findings directly to project owner, if the commissioning works are not conducted by the project owner⁷. |

3. To ensure the due diligence within the testing and commissioning process, the Applicant should take note of the following requirement when appointing the CxA and iCxA:

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- i. The same personnel or entity could not be qualified for the dual role of CxA and iCxA. For example, if a project owner has assigned the design consultant as the CxA, then the project owner should assign someone else other than the design consultant as the iCxA.
 - ii. A single design consultancy firm could not be appointed for the dual role of CxA and iCxA. For example, if a project owner has appointed design consultancy firm A as the CxA, then the project owner should assign the role of iCxA to a different firm.
 - iii. There can only be one CxA and one iCxA responsible for the testing and commissioning works for each project. If there are changes in CxA and/or iCxA during the design and construction timeline, the Applicant should make reasonable effort in ensuring that there is a seamless transfer of testing and commissioning tasks between the old and the new CxA and/or iCxA and to ensure that the new CxA and/or iCxA confirms that the project complies with all testing and commissioning requirements.
4. The Applicant is encouraged to file a Credit Interpretation Request for clarifications if he/she is in doubt whether a candidate can qualify for the role of CxA or iCxA.

⁵ The Applicant should provide an organization chart to show that the CxA is a subordinate to the project owner.

⁶ The wording of this paragraph has been updated on 12 February 2019.

⁷ The Applicant should provide an organization chart to show that the iCxA is a direct subordinate to the project owner.

5. For the avoidance of doubt, the Applicant is requested to submit the following document on top of the standard enclosures (e.g. commissioning specification, commissioning plan, commissioning records, commissioning report, etc.) for the credit assessment:
- i. For Provisional Assessment and all re-assessment(s) commenced before Final Assessment: Undertaking letter from the project's CxA and/or iCxA committing his/her involvement in the testing and commissioning process together with his/her CV. B9
E4
 - ii. For Final Assessment and all re-assessment(s) afterward: Confirmation letter from the project's CxA and/or iCxA confirming that the electrical and mechanical systems, equipment and components have been fully tested and commissioned together with his/her CV. B10
E5
6. Sample undertaking and confirmation letter demonstrating the CxA/iCxA's involvement in the project are provided in Appendix A of this Technical Circular for reference. The Applicant is encouraged to refer to these samples when preparing the undertaking or confirmation letter for submission.
7. Approved PA projects: For projects that have already completed PA where certain personnel has been approved as a CxA or iCxA, the Applicant may continue to have the same personnel as the CxA or iCxA for the subsequent assessments (FA or Re-assessment in the PA stage). For the avoidance of doubt, the Applicant shall provide PA evidences (e.g. extract of the PA report, documents submitted for assessment in PA, etc). in subsequent assessments to support the intention having the same personnel as CxA or iCxA as in PA.



Mr KM So
Chairperson of Standards Sub-committee



Appendix A:

**Sample Undertaking/Confirmation Letter on Commissioning Authority (CxA)/
Independent Commissioning Authority (iCxA)**

1. The Applicant may refer to the sample undertaking/confirmation letter in the subsequent pages to undertake their intention/confirm their compliance to the Commissioning Authority (CxA)/Independent Commissioning Authority (iCxA) requirement under BEAM Plus New Buildings v1.1/v1.2.
2. To make use of the letter template, the Applicant shall complete all fields highlighted in yellow. Once all fields have been filled in, the letter should then be printed with the letterhead and be submitted as part of the assessment package.
3. Please note that all data specified in the letter templates will be used for the following purposes:
 - (a) Facilitate BEAM Plus applicants to undertake their intention or confirm their compliance on the CxA/iCxA requirement;
 - (b) Enable Technical Review Committee to assess the Applicant's compliance with the CxA/iCxA requirement; and
 - (c) For any other purposes related to BEAM Plus assessments ONLY.
4. All enquiries relating to the personal data of the CxA/iCxA, including making access and correction, should be submitted by post to BEAM Society Limited, 1/F Jockey Club Environmental Building, 77 Tat Chee Avenue, Kowloon Tong, Hong Kong, or via email to enquiry@beamsociety.org.hk



Appendix A1:

Undertaking to Act as Commissioning Authority (CxA)/Independent Commissioning Authority (iCxA)

Our reference:

Your reference:

<Insert Date Here>

BEAM Society Limited
1/F, Jockey Club Environmental Building,
77 Tat Chee Avenue,
Kowloon Tong, Hong Kong
(Attn: Chairperson of Assessment Sub-committee)

Dear Sir/Madam,

Undertaking to Act as <Commissioning Authority (CxA)/Independent Commissioning Authority (iCxA)>
for <Insert The Project Name>

I, <Insert The Name of The CxA/iCxA>, hereby undertake to act as the <CxA/iCxA> for the captioned project and is committed to observing all testing and commissioning requirements specified under BEAM Plus New Buildings <v1.1/v1.2>. My CV demonstrating that I possess the necessary qualification to act as <CxA/iCxA> is enclosed for your review.

Should there be any other queries, please do not hesitate to contact the undersigned (tel.: <Telephone of The CxA/iCxA> or e-mail: <E-mail of The CxA/iCxA>).

Your faithfully,

<Signature>
<RPE/MHKIE> Membership Number: <Insert Membership Number>

Encl. CV of the <CxA/iCxA>



Appendix A2:

Confirmation to Act as Commissioning Authority (CxA)/Independent Commissioning Authority (iCxA)

Our reference:

Your reference:

<Insert Date Here>

BEAM Society Limited
1/F, Jockey Club Environmental Building,
77 Tat Chee Avenue,
Kowloon Tong, Hong Kong
(Attn: Chairperson of Assessment Sub-committee)

Dear Sir/Madam,

Confirmation to Act as <Commissioning Authority (CxA)/Independent Commissioning Authority (iCxA)>
for <Insert The Project Name>

I, <Insert The Name of The CxA/iCxA>, hereby confirms that I have acted as the <CxA/iCxA> for the captioned project. I have confirmed that the captioned project complies all testing and commissioning requirements specified under BEAM Plus New Buildings <v1.1/v1.2>. My CV demonstrating that I possess the necessary qualifications to act as <CxA/iCxA> is enclosed for your review.

Should there be have any other queries, please do not hesitate to contact the undersigned (tel.: <Telephone of The CxA/iCxA> or e-mail: <E-mail of The CxA/iCxA>).

Your faithfully,

<Signature>

<RPE/MHKIE> Membership Number: <Insert Membership Number>

Encl. CV of the <CxA/iCxA>

Circular Letter No.: 2019.164

Issue Date: 29 November 2019

Application: BEAM Plus NB Version 1.1 and 1.2

Effective Date: 29 November 2019

EU 10 Testing and Commissioning

1. The Technical Circular Letter hereby announces an update to the credit content for the following credits under BEAM Plus NB v1.1 and v1.2:
 - EU 10a Commissioning specifications
 - EU 10b Commissioning plan
 - EU 10c Commissioning
 - EU 10d Commissioning report
2. The requirement given in Appendices 8.5.1 to 8.5.4 of the BEAM Plus Manuals is hereby updated with the enclosures in Annex A and Annex B of this Technical Circular.
 - Pages Annex A-1 to A-2 shall replace all contents specified in Page 8-15 to 8-18 under BEAM Plus NB v.1.1; and
 - Pages Annex B-1 to B-2 shall replace all contents specified in Page A-15 to A-18 under BEAM Plus NB v1.2.
3. For the clarity of the assessment, the Applicant should provide a summary table with cross-referencing between the sub-items listed in the annexes against the relevant sections in the submitted document (i.e. commissioning specification, plan, checklist, report).
4. Approved PA projects: For projects that have already completed PA and have certain assessment approach approved, the Applicant may opt to adopt the same assessment criteria for FA or voluntarily comply with this Technical Circular. For the avoidance of doubt, the Applicant shall provide PA evidences (e.g. extract of the PA report, documents submitted for assessment in PA, etc) in subsequent assessments to support the intention of using the same assessment methodology as in PA.

A handwritten signature in blue ink, appearing to be "KM So", is written above a horizontal line.

Mr KM So
Chairperson of Standards Sub-committee

Annex B:
Updated Credit Content for Appendices 8.5.1 to 8.5.4 under BEAM Plus NB v.1.2

8.5 PROVISIONS FOR ENERGY MANAGEMENT

8.5.1 COMMISSIONING SPECIFICATIONS

8.5.2 COMMISSIONING PLAN

8.5.3 COMMISSIONING

8.5.4 COMMISSIONING REPORT

8.5.5 INDEPENDENT COMMISSIONING AUTHORITY

8.5.6 OPERATIONS AND MAINTENANCE MANUAL

8.5.7 ENERGY MANAGEMENT MANUAL

8.5.8 OPERATOR TRAINING AND FACILITIES

8.5.1 COMMISSIONING SPECIFICATIONS

Commissioning specifications shall be included in the construction documents and embrace the following content:

A4

- i. Scope and details of the commissioning process;
- ii. Qualifications and skills required by the commissioning agent;
- iii. Detailed description of the responsibilities of all parties included in the commissioning process;
- iv. Systems, equipment and components to be commissioned;
- v. Requirements for functional checklists and start-up;
- vi. Functional performance testing process;
- vii. Specific functional performance test requirements, including testing conditions and acceptance criteria for each piece of equipment being commissioned;
- viii. Provisions for resolving deficiencies (e.g. defects liability period, contractor's responsibility); and
- ix. Requirements for reporting and documentation for commissioning.

8.5.2 COMMISSIONING PLAN

To execute commissioning in a comprehensive and orderly manner a commissioning plan, covering a given system, equipment or component shall be prepared.

B11

The commissioning plan shall include the following content:

- i. Goals and objectives;
- ii. General project information;
- iii. Systems to be commissioned;
- iv. Description of the Commissioning team, including team members, roles and responsibility;
- v. Description of the Commissioning team's communication protocol, coordination, meetings and management;
- vi. Development of system (if applicable) functional test procedures for the following:
 - HVAC&R systems and associated controls;
 - Light and daylighting controls;

- Domestic hot water systems (including swimming pool if heating is provided);
 - Lift and escalator systems; and
 - Renewable energy systems;
- vii. Verification of system performance;
 - viii. Reporting deficiencies and the resolution process; and
 - ix. Acceptance of the building systems.

8.5.3 COMMISSIONING

Start-up and inspection checklist should comprise the checks and tests to determine that all components, equipment, subsystems, systems, and interfaces between systems operate in accordance with specifications and construction documents.

C3

The results of the start-up and check-out should be documented and must be performed according to the manufacturer's written instructions for the systems and equipment being commissioned, and the as-fitted construction documents.

8.5.4 COMMISSIONING REPORT

The Commissioning report shall include the following content:

D3

- i. Executive summary of commissioning process and results, system deficiencies identified and resolutions, outstanding issues identified;
- ii. List of participants and their respective roles;
- iii. Brief building description;
- iv. Commissioning process scope;
- v. Installation verification checklist;
- vi. List of systems commissioned;
- vii. Equipment documentation;
- viii. Functional performance tests including date and time of test, individuals present during testing, visual inspection observations, sensor checks, device checks, operating mode tests and results;
- ix. List of outstanding commissioning issues and any testing that is scheduled on a later date, with justifications on the deferral of test; and
- x. All outstanding deficiencies identified during or as a result of commissioning activities should be listed and highlighted, with justifications on the deferral to rectify deficiencies.