

COMMISSIONING (Cx) CERTIFICATION PROGRAMS

Association of Energy Engineers (AEE)

The Association of Energy Engineers (AEE) is a nonprofit professional society. AEE provides training in energy and management. AEE has many certification titles, with a particular focus on energy performance and sustainability topics. AEE certifications are recognized by utility companies, real estate management companies, government agencies, manufacturers, engineering and architectural firms.

Certified Building Cx Professional (CBCP)

CBCP: Certification program examines all aspects of building commissioning, including project scheduling, roles and responsibilities of the project team, new building commissioning, retro and re-commissioning of existing buildings, system by system commissioning requirements, TAB and verification procedures, the LEED rating system, building code issues, and commissioning tools and technologies.

Fees

- Application \$200
- Required Training:
 - Onsite \$1150 Member, \$1250 Non-member
 - Web based \$1595 Member, \$1795 Non-member
- Renewal \$200/3yrs

Prerequisites

CBCP candidate must meet one of the following criteria which are verified by letters of reference and verification of employment letter:

- A. A four-year degree from an accredited university or college in science, engineering, architecture, business, law, finance, or related field, **or** be a registered professional engineer (P.E.), **or** registered architect (R.A.) **and** at least three years experience in HVAC or process engineering design, architecture, construction project management, facilities management, testing, adjusting and balancing, or building commissioning; **OR**
- B. A two-year technical degree, or four-year non-technical degree from an accredited university or college in a field not specified above **and** five years experience in HVAC or process engineering design, architecture, construction project management, facilities management, or testing, adjusting and balancing, or building commissioning; **OR**
- C. Ten years + verified experience in HVAC or process engineering design, architecture, construction project management, facilities management, or testing, adjusting and balancing, or building commissioning; **OR**
- D. The current status of **Certified Energy Manager (CEM)**.

Requirements

- A. AEE established application and documentation; **AND**
 - B. AEE established preparatory training seminar (available onsite and online) ; **AND**
 - C. The four-hour CBCP exam is given in conjunction with the AEE's preparatory training seminars. The exam is administered at the seminar site following each scheduled seminar. The examination questions are based on concepts and experiences basic to the building commissioning process. The exam is open book, and the questions are a mixture of multiple choice and true or false.
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Contact: Sonal Kemkar, Technical Program Manager, IMT

1. Typical Project Schedule – Commissioning Perspective
2. Project Team
3. Concept / Programming Phase Objectives
4. Design Phase Objectives
5. Construction Phase Objectives
6. Acceptance Plan Objectives
7. RCx & ReCx Concept/Programming Phase Objectives
8. Investigation Phase Objectives
9. Project Turnover Objectives: Final Report
10. Building Envelope
11. Electrical Systems
12. Site & Landscape Systems
13. Other Systems
14. USGBC & the LEED Rating System
15. Commissioning Guidelines
16. Commissioning & the Federal Government
17. Commissioning Tools & Technologies

Continuing Education & Recertification

- A. A CBCP must accumulate ten (10) professional credits every three years to maintain certification.
 1. Continued employment in building commissioning activities = 1 credit/yr
 2. Membership in a professional engineering society = 1 credit/yr (3 max)
 3. Continuing education in building commissioning related seminars and college courses (including onsite or online) = 2 credits/CEU or 2 credits/10 contact hours or 1 credit/LEED AP
 4. Professional awards or papers presented and published re: building commissioning = 2 credits each
 5. Offices held in a professional engineering society = 1 credit/yr

AABC Commissioning Group (ACG)

The AABC Commissioning Group (ACG) is a non-profit association of certified commissioning authorities, related to the advancement of professional, independent commissioning services through education, training, and certification of qualified firms and individual architects and engineers.

Certified Commissioning Authority (CxA)

CxA: Membership and certification are open to independent commissioning companies that meet the requirements for membership. The company's designates an individual that will be eligible to take the ACG certification exam. If the candidate passes the examination, the individual and company for which he or she works is granted certification as an ACG Certified Commissioning Authority (CxA). Certification is issued in the name of the company and designated individual.

(Associate Membership is available to individuals who subscribe to the goals and objectives of ACG, but are not actively engaged in providing services as a commissioning authority. Associate membership does not require or imply ACG Certification.)

Fees

- Application/Examination \$250
- Firm Renewal \$1500/yr
- Designated Professional CxA Renewal \$100/each/yr

Prerequisites

- A. Firm must be a member of ACG and qualify as an independent commissioning firm.
 - 1. To qualify as independent, a commissioning company must have no affiliation with manufacturers of equipment or system components, general or installing contractors, or any other person or company which could affect the ability of the member to render an independent commissioning report; **AND**
- B. The firm must employ at least one registered architect (R.A.), professional engineer (P.E.) or certified Test and Balance Engineer (TBE), who will be the company's designated representative, who is responsible for overseeing all commissioning activities.
 - 1. Exceptions may be made on case by case method by ACG Board; **AND**
- C. Firm must have completed at least three documented commissioning projects.

Requirements

- A. ACG established application and documentation; **AND**
- B. Designated representative who is responsible for overseeing all commissioning activities must pass CxA exam on site or with optional training. The 3-hour, multiple-choice examination is based on material contained in the *ACG Commissioning Guideline*.
 - 1. HVAC Cx Cost/Benefit Analysis
 - 2. Selecting a Cx Provider
 - 3. The HVAC Commissioning Team
 - 4. Comprehensive HVAC Cx
 - 5. Construction HVAC Commissioning
 - 6. HVAC Cx in Existing Buildings
 - 7. Cx of Non-HVAC Building Systems
 - 8. Sample Request for Proposal for Commissioning Services
 - 9. Sample Specification Covering Contractor Responsibilities for HVAC
 - 10. Commissioning
 - 11. Sample Format for System Verification and Start-up Checklists
 - 12. Sample Functional Performance Test Checklists

Continuing Education & Recertification

None.

Certified Commissioning Technician (CxT)

CxT: ACG's second-tier certification: the Certified Commissioning Technician (CxT) – for those who do not yet possess the technical, industry, or commissioning experience to qualify for the CxA.

Fees

Application/Examination \$200
Annual individual renewal \$50

Prerequisites

- A. CxT candidates must work for an ACG member company, under the supervision of a CxA; **AND**

- B. Minimum of two years field testing experience, with at least 6 months working for the ACG member company at which the candidate is presently employed; **AND**
- C. Endorsement by a designated professional who has passed CxA exam at ACG firm.

Requirements

- A. AABC established application and documentation; **AND**
- B. CxT candidate must attend an ACG workshop or webinar; **AND**
- C. Must pass CxT examination. The CxT exam is a 3-hour, closed-book, multiple-choice examination based on material in the ACG Commissioning Guideline and the CxT Study Guide.

Continuing Education & Recertification

None.

Building Commissioning Association (BCA)

The Building Commissioning Association (BCA) provides resources on commissioning. In 1999, the BCA–Northwest became the BCA, which has expanded into a national professional association. The BCA provides technical resources and hold an annual conference related to building Cx in addition to managing a certification program for credentialed Cx professionals. The BCA focuses on identifying critical commissioning attributes and elements, rather than attempting to dictate a rigid commissioning process.

Certified Commissioning Professional (CCP)

CCP: The Building Commissioning Certification Board (BCCB) was formed in 2004 as an independent arm of the BCA for the purpose of recognizing building commissioning professionals who meet the standards of the BCA. The BCCB offers certification to individuals. The BCCB also recertifies CCP’s who demonstrate evidence of continued professional competence.

Fees

- Application \$350 Members, \$550 Non-members
- Examination \$150
- Renewal \$225-325/3 yrs

Prerequisites

<i>Education</i>	<i>Experience</i>
<p>A. Four-year undergraduate degree or higher in a building sciences field.*</p> <ul style="list-style-type: none"> o <i>*Fields of study in building science include mechanical engineering, electrical engineering, construction science, construction management, architecture, and other majors/fields of study designed to train people for careers in the building industry.</i> 	<p>✓ Have served for three continuous years as a Cx provider, acting in a lead role.</p> <p>OR</p>

<p>B. Four-year undergraduate degree or higher in a non building sciences field*; or</p> <p>Two-year undergraduate degree in a building sciences field*; or</p> <p>Completed an apprenticeship program in a building sciences field.*</p>	<p>✓ Have five years of building-related experience, and have served for three continuous years as a commissioning provider, acting in a lead role.</p> <p>OR</p>
<p>D. High School diploma or GED</p>	<p>✓ Have 12 years of building-related* experience, and have served for three continuous years as a commissioning provider, acting in a lead role.</p> <p>OR</p>
<p>E. All Levels of Education</p>	<p>✓ Have served as the lead commissioning provider for three qualifying projects³, from the design phase through the completion of the construction phase</p> <ul style="list-style-type: none"> ○ A qualifying project is defined as a commissioning project where the applicant has actively and substantially participated in the following phases of the project: Projects where the applicant has not participated at this mandatory level should not be submitted; AND <p>✓ Buildings commissioned must total a minimum of 150,000 square feet and \$30,000,000 construction cost.</p> <ul style="list-style-type: none"> ○ At any educational level, the completion of the BCA Commissioning Provider training course or the University of Wisconsin Commissioning training course reduces the experience requirement by one.

AND

- F. Minimum of thirty-six continuous months of experience as a commissioning services provider in a lead project role within the five years, preceding the date of your application.

Requirements

- A. BCA established application and documentation; **AND**
- B. 2 hour examination with 125 multiple choice questions.
1. *Pre-Design 5 Questions, 4% of Exam*
 - Participate in the development of the Design Intent Document
 - Develop a preliminary Cx plan
 - Review program documents
 2. *Design 23 Questions, 18% of Exam*
 - Review design development documents
 - Develop Cx specifications
 - Review final construction documents
 3. *Construction 66 Questions, 53% of Exam*
 - Pre-bid meeting
 - Develop contractor checklist
 - Review submittals
 - Create a master list of Cx equipment & systems that were defined in the statement of work
 - Create final commissioning plan
 - Conduct initial on-site Cx coordination meeting

Contact: Sonal Kemkar, Technical Program Manager, IMT

- Develop functional performance documents
 - Monitor contractor start-up & test
 - Conduct ongoing commissioning coordination meetings
 - Conduct installation verification
 - Review balancing report
 - Verify balancing report
 - Functional performance tests
 - Re-testing and issue resolution
 - Review contractor record documents and operation and maintenance manuals
 - Organize and coordinate training of the operation staff
 - Develop maintenance, operation, and/or energy management manuals
 - Re-commissioning management manual
- 4. *Occupancy and Operations 16 Questions, 13% of Exam*
 - Final report
 - Seasonal testing
 - Near warranty-end testing
 - Post-occupancy review
 - 5. *Additional Commissioning Related Content 15 Questions, 12% of Exam*
 - USGBC LEED Certification, as it relates to Fundamental and Additional Commissioning only.
 - BCA Essential Attributes
 - Construction document process (protocol, RFI, submission, shop drawings, etc.)
 - ASHRAE Guidelines

Continuing Education & Recertification

- Recertification/3yrs
- Renewal of certification requires completing a recertification application and approval.
- Evidence of continued competence, as demonstrated by additional work experience and other related professional activities. BCCB provided Recertification Handbook.

National Environmental Balancing Bureau (NEBB)

NEBB certifies firms that meet certain criteria, including owning a complete set of instruments required for the techniques and procedures necessary to conduct commissioning of a building, and have a NEBB Certified Professional as a full-time employee.

Retro-commissioning Certification

RCx: NEBB certification programs follow NEBB Procedural Standards that provide guidelines for work to be performed. Firms interested in the Retro-Commissioning program must have certification in TAB. This certification is for the firm and for select individuals within the firm who complete an exam. All employees of firm do not have to be certified.

Fees

- Varies, contact local chapter for application and certification details. [Listing of chapters.](#)

Prerequisites

- A. Retro-Commissioning Certification for a Firm:
 1. Firm must be a Certified Firm in [Testing, Adjusting, and Balancing](#) (TAB); **AND**
 2. Firm must be a member of and in good standing with a local NEBB Chapter; **AND**

3. Firms must possess the various instruments and equipment which are required; the local NEBB Chapter must visually confirm compliance; **AND**
 4. Possess the current NEBB *Procedural Standards for Retro-Commissioning of Existing Buildings*.
- B. Retro-Commissioning Certification for an individual:
1. Be employed by a NEBB certified firm on a full time basis; **AND**
 2. Hold a management position in the firm, be able to represent the firm on retro-commissioning.

Requirements

- A. NEBB established application and documentation; **AND**
- B. Firm must confirm in writing that it will conform to the NEBB guidelines for the calibration and maintenance of the instruments and equipment required; **AND**
- C. Firm must designate in writing one or more certified professionals who will represent the firm and be responsible for the supervision of retro-commissioning work; **AND**
- D. NEBB exam for Building Systems Commissioning (in Procedural Standards, HVAC and Controls) ; **AND**
- E. Firm must review annually NEBB produced Retro-Commissioning materials.
- F. Individual must pass an annual recertification examination.
- G. Attendance at the NEBB RCx Seminar is optional.

Continuing Education & Recertification

Must pass annual certification exam.

University of Wisconsin – Madison (UWM)

The University of Wisconsin—Madison, Department of Engineering Professional Development offers certification as a professional knowledgeable in the commissioning process. Three certifications have different levels of skill recognition.

The certifications include:

- CxAPSM – Accredited Commissioning Process Authority Professional (also CAPSM). Acknowledges applicants who have served as the primary commissioning authority during all project stages (pre-design through occupancy) on a minimum number and size of projects.
- CXMSM – Accredited Commissioning Process Manager: Distinguishes applicants who have managed commissioning process activities within their organizations, such as university or government in-house programs.
- CxTSSM – Accredited Commissioning Process Technical Support Provider (also CTSSM): Highlights the skill and experience of applicants who have provided commissioning services primarily in select project stages, on small or limited scope projects, or who provide key technical support to commissioning activities.

Accredited Cx Process Authority Professional (CxAP or CAP)

CxAP or CAP: Accredited Commissioning Process Authority Professional (also CAPSM). The CxAP designation is meant to recognize individuals who have led the Commissioning Process from pre-design through the first year of

occupancy, which normally includes developing a lifetime CxP plan for the life of the facility. This can include both employees of the project owner and contract service providers.

Fees

- Orientation/Review Session, Study Guide and Examination \$675
- Certification fee, currently waived \$75
- Re-certification \$195/5yrs

Prerequisites

- A. Complete documentation on two new construction or major rehab projects or equivalent existing building projects, including letters of reference by project owners.
 1. The Commissioning Process applied to an existing building may be substituted for new construction projects, as long as the projects meet the size criteria.
 2. When the size criteria are not met, then at least four projects where CxP fees were greater than \$20,000.
 3. ASHRAE Guidelines 0.2 and 1.2, when complete, should be used as the guideline methods for commissioning existing buildings.

Requirements

- A. University of Wisconsin Madison established application and documentation; **AND**
- B. Five days of UWM Commissioning Process education or training (Also offered for BCA certification); **AND**
- C. UW Commissioning Process examination which includes four parts. Two parts consist of multiple choice questions, and other two parts involve non-multiple choice exercises. To be successful, a candidate must achieve an overall score of 80 on the combination of the four exam parts. At this time, the exam is only offered during scheduled exam dates at specific locations (no remote or computer testing).

Continuing Education & Recertification

Re-certification form includes a survey and short multiple-choice examination

American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

ASHRAE is a membership society related to the science of heating, ventilation, air conditioning and refrigeration. ASHRAE's certification programs are developed by a voluntary committee of industry practitioners who are knowledgeable and experienced in the specific field of the program.

Commissioning Process Management Professional (CPMP)

CPMP: This certification tests the capability of individuals to manage the whole building commissioning process. The Commissioning Process Manager oversees and coordinates the commissioning process and communicates on

behalf of the building owner with the commissioning provider and the commissioning team. For some projects, the commissioning provider may perform the function of the commissioning process manager, but for other projects, another individual performs these functions.

Fees

- Examination \$295 for Members, Non-members \$415
- Recertification \$125/3yrs for Members, Non-members \$195/3yrs

Prerequisites

- Must have been involved with at least three projects utilizing the commissioning process; **AND**
- Government-issued license as a professional engineer or architect with at least three years of facilities operations/management, construction, design, or consulting experience; **OR**
- Bachelor's degree in engineering, architecture, or related field from an accredited institution of higher learning and at least six years of facilities operations/management, construction, design, or consulting experience; **OR**
- Associate's degree or technical diploma in building design, construction, construction management, facility operation, or a related field from an accredited institution of higher learning and at least seven years of facilities operations/management, construction, design, or consulting experience; **OR**
- High school diploma or equivalent or construction-related trades training or building operations training from a nationally or internationally recognized trade association with at least ten years facilities operations/management, construction, design, or consulting experience.

Requirements

- ASHRAE established application and documentation; **AND**
- Examination for the CPMP program is a proctored, closed book/closed notes, 2.5-hour, 115-item multiple-choice test. A candidate's score is based on 100 of the items; the other 15 items, which are interspersed throughout the examination, are included for trial.
 - Cx process for New Buildings
 - Pre-Design Phase
 - Design Phase
 - Construction Phase
 - Occupancy and Operations Phase
 - Cx process for Existing Buildings
 - Discovery Phase
 - Investigation Phase
 - Implementation Phase
 - Ongoing Cx process
 - Construction Phase
 - Occupancy and Operations Phase
 - Discovery Phase
 - Investigation Phase
 - Implementation Phase
 - Construction Phase
 - Occupancy and Operations Phase

Continuing Education & Recertification

- 45 ASHRAE Continuing Education (ACE) units/3yrs

ENERGY AUDITOR CERTIFICATION PROGRAMS

Association of Energy Engineers (AEE)

The Association of Energy Engineers (AEE) is a nonprofit professional society. AEE provides training in energy and management. AEE has many certification titles, with a particular focus on energy performance and sustainability topics. AEE certifications are recognized by utility companies, real estate management companies, government agencies, manufacturers, engineering and architectural firms.

Certified Energy Manager (CEM)

CEM: CEM program is intended to identify persons with acceptable knowledge of the principles and practices of energy management related disciplines and laws governing and affecting energy managers through completing an examination and fulfilling prescribed standards of performance and conduct.

Fees

- | | |
|--|---|
| - Application:
Onsite \$200
Web based \$300 | - Reexamination:
Onsite \$100
Web based \$150 |
| - Required Training:
Onsite \$1,595 Member/gov't, \$1795 Non-member
Web based \$995 Member or
non-profit, \$1095 Non-member | - Renewal \$200/3yrs
- Reinstatement fee \$250 |

Prerequisites

CEM candidate must meet one of the following criteria which are verified by letters of reference and verification of employment letter:

- A. Four-year engineering/architectural degree **and/or** be a registered Professional Engineer (P.E.) or Registered Architect (RA), with at least three years experience in energy engineering or energy management; **OR**
- B. Four-year business/related degree **and** at least five years experience in energy engineering/energy management; **OR**
- C. Two-year technical degree **and** eight years experience in energy engineering or energy management; **OR**
- D. Ten years + verified experience in energy engineering or energy management.

Requirements

- A. AEE established application; **AND**
- B. Additional documents, **either 2 professional references and employment verification and/or client verification and college transcripts** at least 4 weeks prior to the date of the examination; **AND**
- C. AEE established preparatory training seminar (available onsite and online), mandatory only as of July 1, 2009. There is the possibility for an AEE local chapter or individual CEM to conduct the training if prior consent has been granted by AEE Executive Director (770 447 5083) ; **AND**
- D. AEE established four hour, written, **open-book** exam. 11/17 sections must be completed, including **three required (R) sections**. Proctored by an approved exam administrator.

1. Codes & Standards/Indoor Air Quality **R**
2. Energy Accounting and Economics **R**
3. Energy Audits and Instrumentation **R**
4. Electrical Systems
5. HVAC Systems
6. Motors and Drives
7. Industrial Systems
8. Building Envelope
9. Cogeneration and CHP Systems
10. Energy Procurement
11. Building Automation and Control Systems
12. Green Buildings, LEED & Energy Star
13. Thermal Energy Storage Systems
14. Lighting
15. Boiler and Steam Systems
16. Maintenance & Commissioning
17. Alternative Financing

Continuing Education & Recertification

- A. Each certification holder must earn **ten (10) professional credits every three years** to maintain certification.
 1. Continued employment in energy management/energy engineering activities = 1 credit/yr
 2. Membership in a professional engineering society = 1 credit/yr (3 max)
 3. Continuing education in energy management/engineering related seminars and college courses (including onsite or online) = 2 credits/CEU or 2 credits/10 contact hours
 4. Professional awards or papers presented and published re: energy engineering/management = 2 credits each
 5. Offices held in a professional engineering society = 1 credit/yr

Certified Energy Auditor (CEA)

CEA: The CEA program was established to identify persons with acceptable knowledge of the principles and practices of energy auditing through completing an examination and fulfilling prescribed standards of performance and conduct.

Fees

- Application:
 - Onsite \$200
 - Web based \$300
- Required Training:
 - Onsite \$1,250 Member, \$1,350 Non-member
 - Web based \$995 Member or \$1095 Non-member
- Renewal \$200/3yrs
- Reinstatement fee \$250

Prerequisites

CEA candidate must meet one of the following criteria which are verified by letters of reference and verification of employment letter:

- A. Four-year engineering/architectural degree **and/or** be a registered Professional Engineer (P.E.) or Registered Architect (RA), with at least three years experience in energy auditing, energy management, facility management, or experience related to energy management; **OR**

- B. Four-year non-engineering degree **and** at least four years experience in energy auditing, energy management, facility management, or experience related to energy management; **OR**
- C. Two-year technical degree **and** five years experience in energy auditing, energy management, facility management, or experience related to energy management; **OR**
- D. Ten years + verified experience in energy auditing, energy management, facility management, or experience related to energy management; **OR**
- E. The current status of **Certified Energy Manager (CEM)**.

Requirements

- A. AEE established application; **AND**
- B. Additional documents, **either 2 professional references and employment verification and/or client verification and college transcripts** at least 4 weeks prior to the date of the examination; **AND**
- C. Must receive a pass rate of 70% on an onsite or web based AEE CEA examination. The applicant is given four hours to complete the exam and it is open book.
 - 1. Building Envelope
 - Heat flow concept
 - R and U values
 - Walls, roofs, windows, Low E glass
 - Infiltration
 - Energy management opportunities
 - 2. Lighting Systems
 - Measurement of light
 - Efficiency / efficacy / light color-CCT/CRI
 - Lamp lumen depreciation
 - Lamp types and characteristics
 - Controls
 - Energy management opportunities
 - 3. Air Conditioning Systems
 - HVAC basics / load estimating / efficiencies
 - Components
 - Chillers — electric, gas-driven, absorbers
 - Piping arrangements
 - Energy savings opportunities
 - 4. Heating Systems
 - Boilers: fire tube, water tube, cast iron
 - Distribution systems and thermal units
 - 5. Motors and Drives
 - Boiler energy management opportunities
 - Furnaces — electric, gas, pulse, condensing
 - Furnace energy management opportunities
 - 6. Heat Pumps
 - Operation / efficiencies
 - Classifications
 - Energy management opportunities
 - 7. Ventilation Systems
 - Types / characteristics
 - Heat recovery methods
 - Energy management opportunities
 - 8. Domestic Hot Water Systems
 - Types / efficiencies
 - Circulating pumps
 - Heat pump water heaters
 - Energy management opportunities

9. Water Conservation and Audits

- Rate structures
- Water conservation methods
- Irrigation and landscaping
- Leak detection
- Water audit

10. Utility Analysis

- Demand and energy
- Rates classifications
- Identifying billing errors
- Energy accounting

Continuing Education & Recertification

- A. Each certification holder must earn **ten (10) professional credits** every three years to maintain certification*.
1. Continued employment in energy auditing activities = 1 credit/yr
 2. Membership in a professional engineering society = 1 credit/yr (3 max)
 3. Continuing education in energy auditing related seminars and college courses (including onsite or online) = 2 credits/CEU or 2 credits/10 contact hours
 4. Professional awards or papers presented and published re: energy auditing = 2 credits each
 5. Offices held in a professional engineering society = 1 credit/yr
 6. *An actively certified CEA, upon retiring and reaching the age of sixty-two, is certified for life. No further reporting is necessary except to notify the certification director of meeting the age requirement by sending a copy of your driver's license.

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)

ASHRAE is a membership society related to the science of heating, ventilation, air conditioning and refrigeration. ASHRAE's certification programs are developed by a voluntary committee of industry practitioners who are knowledgeable and experienced in the specific field of the program.

High Performance Building Design Professional (HPBDP)

HPBDP: The HBDP examination is designed to assess an individual's understanding of how the management of HVAC&R operations helps to achieve and maintain building performance goals.

Fees

- Examination \$295 for Members, Non-members \$415
- Recertification \$125/3yrs for Members, Non-members \$195/3yrs

Prerequisites

- A. Licensed as a Professional Engineer (P.E.); **OR**
- B. Bachelor's degree in engineering or a related field from an accredited institution of higher learning and a 5 + years of experience in HVAC&R design; **OR**
- C. Associate's degree or Technical degree or certificate in design, construction, or a related field from an accredited institution of higher learning and 7 + years of experience in HVAC&R design; **OR**
- D. High School diploma or equivalent and 10 + years of experience in HVAC&R design.

Requirements

- A. ASHRAE established application and documentation; **AND**

B. Each examination is closed book with the use of a scientific calculator and consists of 115 multiple-choice, single-correct-answer items, of which 100 will be graded. The additional 15 items are interspersed throughout the examination and are used for “pre-test” purposes. Candidates have 2.5 hours in which to complete the exam.

1. General
 - Sustainability Concepts
 - HVAC Processes
 - Sustainable Processes

 - Environmental Improvement Programs and Rating Systems
2. Energy Analysis
 - Preliminary Energy Analysis
 - Envelope / Massing / Orientation Optimization
 - Ventilation
 - Energy Compliance Modeling
3. Indoor Environment
 - Lighting
 - Air Quality
 - Thermal Comfort
4. Controls and Monitoring
 - Optimizing Control Strategies
 - Control Hardware
5. Benchmarking w/ Performance Metrics
 - Project Performance Measurement
 - Energy Performance Verification
 - Environmental Performance Measurement
6. Water Conservation
 - Storm Water Management
 - Domestic Water Management
 - Process / Wastewater Management
7. Commissioning in Sustainable Construction
 - Documentation
 - Commissioning Process
8. Operations & Maintenance of High Performance Buildings
 - Energy Use and Management
 - Environmental Control and Management

Continuing Education & Recertification

- 45 ASHRAE Continuing Education (ACE) units/3yrs

Building Performance Institute (BPI)

BPI is a non-profit organization that develops technical standards for home performance and weatherization retrofit work in North America. BPI also provides related training programs, professional credentialing for individuals and company accreditations.

Multi-Family Building Analyst (MFBA)

MFBA: This certification is intended for those individuals who conduct multi-family building performance audits, including measurement and verification services with related building analysis. Individuals may also specify, sell, and coordinate and/or install certain building performance work.

Fees

- Examination \$225
- Optional 3rd Party Training: \$500 - \$2000
- Renewal: Cost of 30 Continuing Education units/3yrs – varies

Prerequisites

- A. Candidates for any BPI certification do not need to meet specific prerequisites, although related experience is recommended.
- B. Optional 3rd party training available.

Requirements

- A. BPI established application; **AND**
- B. 100-question written exam with a time limit of two hours. > 70% required to pass. BPI does not require that the written exam be attempted before field assessment; **AND**
- C. Field assessment
- D. Topics examined include:
 1. Overview of Multifamily Audit Process
 2. Data Collection & Data Management
 3. Building Envelope
 4. Ventilation & building Air Flow
 5. Heating and Hot Water Systems
 6. Cooling Systems
 7. Energy End Use Allocation
 8. Electrical Systems & Metering Schemes
 9. Building Energy Modeling
 10. Energy Measure Analysis
 11. Combined Heat and Power (CHP)
 12. Audit Reporting
 13. Energy Modeling
 14. Blueprint Evaluation
 15. Moisture Analysis
 16. HVAC System Analysis
 17. CAZ Testing

Continuing Education & Recertification

- A. A MFBA must accumulate ten (30) Continuing Education Units (CEU) every three years and pass a field exam; 10-29 CEU and pass a 50 question written exam and field exam; or < 10 and pass 100 question written exam and field exam to maintain certification.
 1. BPI recognized training = unlimited units/yr
 - o Whole-house session = 1 CEU/1 hour
 - o Specialized software = 1 CEU/2 hours
 - o Construction services = 1 CEU/2 hours
 - o Sales and Marketing = 1 CEU/3 hours
 - o Building code session = 1 CEU/3.5 hours
 - o Primary certification training = 1CEU/4 hours
 2. Online approved CE = unlimited units/yr
 3. Magazine article = 0.5 CEU/article (8 max)
 4. Training conducted as a trainer = unlimited/yr
 5. Author of published related book = 36 CEU/book (36 max)
 6. Write BPI approved educational article = 2 CEU/article (8 max)
 7. Presentation of BPI approved material = 1 CEU/hour

NEW Credentialing Programs as of January 2010 (review pending):

Energy Modeling

AEE – BESA

ASHRAE – BEMP

Energy Auditing

AEE - Certified Residential Energy Auditor (REA)

Commissioning

AEE - Existing Building Commissioning Professional (EBCP)

Credentialing Programs in Development as of January 2010:

Energy Auditing

ASHRAE – Energy Auditor

Retro-commissioning

BCA - EBCx
