Instructions

for Participating in
ASHRAE's

High-Performance Building Design Professional (HBDP)

Certification
Program

®

Effective date: 04/22/2009

Related Resources

Resources available to help prepare for the HBDP examination include, but are not limited to, the following:

- ASHRAE GreenGuide: The Design, Construction, and Operation of Sustainable Buildings, 2nd Edition (2006)
- ASHRAE Standard 55-2004 —Thermal Environmental Conditions for Human Occupancy
- ANSI/ASHRAE Standard 62.1-2007—Ventilation for Acceptable Indoor Air Quality
- ANSI/ASHRAE/IESNA Standard 90.1-2004—Energy Standard for Buildings Except Low-Rise Residential Buildings and 2007 update
- ANSI/ASHRAE/IESNA Standard 90.1-2004 Users Manual
- ASHRAE/AIA/IESNA/USGBC/USDOE Advanced Energy Design Guide For Small Office Buildings: Achieving 30% Energy Savings Toward a Net Zero Energy Building (2004)
- ASHRAE/AIA/IESNA/USGBC/USDOE Advanced Energy Design Guide For Small Retail Buildings: Achieving 30% Energy Savings Toward a Net Zero Energy Building (2006)
- ASHRAE Guideline 0-2005 —The Commissioning Process
- ASHRAE Guideline 1-1996 —The HVAC Commissioning Process
- ASHRAE Guideline 4-1993 — Preparation of Operation and Maintenance Documentation for Building Systems
- ASHRAE Guideline 14-2002 — Measurement of Energy and Demand Savings
- Air Conditioning Contractors of America (ACCA) Manual D - Residential Duct Systems
- Air Conditioning Contractors of America (ACCA) Manu-al N - Commercial Load Calculation
- IESNA Lighting Handbook - 9thEdition
- IESNA Lighting Ready Reference
- Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) IAQ Guidelines for Occupied Buildings Under Construction (1995)
- Virginia Rainwater Harvesting Manual
- LEED® NC Reference Guide version 2.2
- The Green Building Initiative (GBI) Procedures for the Development and Maintenance of Green Building Standards
- The Green Guide to Specification (BRE)
- Fundamentals of ANSI/ASHRAE/IESNA Standard 90.1 – ASHRAE eLearning course
- Compliance with Standard 90.1– ASHRAE Seminar
- Exceeding the Requirements of Standard 90.1-2007– ASHRAE Seminar
- The Commissioning Process in New and Existing Buildings – ASHRAE Seminar
- Complying with Requirements of ASHRAE Standard 62.1-2007– ASHRAE Seminar

ASHRAE does not warrant that participation in or use of any of the above resources will guarantee successful completion of the examination. Nor does ASHRAE warrant that all information presented in all of the above resources is non-contradictory. However, ASHRAE will do its best to avoid testing contradictory, out-of-date, or inaccurate information.

The American Society of Heating, Refrigerating and Air-Conditioning Engineers

High-Performance Building Design Professional Examination
Detailed Content Outline

Open cells show an examination could include items from indicated cognitive levels.
Shaded cells prevent appearance of items on examinations.

	Cognitive Level			
	Recall	Application	Analysis	Totals
I. BACKGROUND INFORMATION	**3**	**5**	**1**	**9**
A. Sustainability Concepts	**1**	**1**	**0**	**2**
1. Describe energy efficiency (e.g., optimum start-stop, building systems, alternative energy systems)				
2. Explain				
a. commissioning (e.g., owner's-project requirements, commissioning process, measurement & verification)				
b. the design process (e.g., integration, team formation, team dynamics, documentation requirements, building information modeling)				
c. water efficiency				
d. environmental impact (e.g., emissions)				
3. Demonstrate indoor environmental quality elements (e.g., ventilation, acoustics, chemical and human pollutants, lighting, biological contaminants)				
4. Analyze the building envelope				
5. Consider capital equipment options				
6. Define a net-zero energy building				
7. Definition of life cycle options				
a. explain life cycle				
b. identify benefits and limitations of methods				
B. HVAC Processes	**1**	**1**	**0**	**2**
1. Describe system				
a. selection				
b. optimization				
2. Obtain the owner's requirements				
3. Comply with codes and standards in the design and construction documents				
4. Utilize incentives				
5. Specify operability and maintainability				
C. Sustainable Processes	**0**	**2**	**1**	**3**
1. Conserve natural resources				
2. Transport construction materials				
3. Analyze alternative/renewable energy sources				
4. Evaluate options for a net-zero energy building				
5. Justify implications of siting				

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D. Environmental Improvement Programs and Rating Systems	**1**	**1**	**0**	**2**
1. Advise customers on programs and systems				
2. Distinguish among programs and systems				
II. ENERGY ANALYSIS	**5**	**7**	**7**	**19**
A. Preliminary Energy Analysis	**1**	**2**	**2**	**5**
1. Identify				
a. deficiencies				
b. the building parameters				
2. Calculate preliminary building loads				
3. Determine system concepts				
4. Analyze energy consumption for different options (e.g., modeling)				
5. Rank alternative systems				
B. Envelope / Massing / Orientation Optimization	**0**	**2**	**2**	**4**
1. Perform tradeoffs on the cost/benefit of alternatives				
2. Determine the impact of climate on design				
3. Analyze thermal mass effect				
C. Ventilation	**1**	**1**	**2**	**4**
1. Natural				
a. analyze benefits and consequences of alternatives				
b. apply thermal gradient theories (e.g., stack effect, buoyancy)				
c. analyze wind patterns				
2. Mechanical				
a. analyze benefits and consequences of alternatives				
b. optimize zone loading with the mechanical system				
3. Integrate natural and mechanical ventilation into hybrid systems				
4. Identify key reference documents				
D. Energy Compliance Modeling	**3**	**2**	**1**	**6**
1. Apply modeling techniques to predict the following with respect to established targets				
a. code compliance				
b. energy consumption				
c. emissions impact				
2. Distinguish among modeling techniques				
3. Define energy modeling limitations and alternative calculation methods				

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III. INDOOR ENVIRONMENT	**7**	**7**	**4**	**18**
A. Lighting	**3**	**2**	**1**	**6**
1. Daylighting				
a. integrate the occupant's mission with lighting requirements				
b. analyze visual quality of daylighting integration				
c. integrate daylighting and lighting				
2. Electrical lighting				
a. analyze the visual quality of the lighted space				
b. comply with codes and standards				
B. Air Quality	**3**	**2**	**1**	**6**
1. Control indoor air contaminants/pollutants				
2. Identify outdoor air ventilation requirements				
3. Analyze air quality strategies				
4. Recognize applications requiring governmental and regulatory codes				
C. Thermal Comfort	**1**	**3**	**2**	**6**
1. Analyze effects of heat transfer mechanisms				
2. Identify				
a. comfort variables that affect the owner's mission				
b. key reference documents				
3. Zone the building to optimize comfort and energy efficiency				
4. Plan individual control and zoning strategies				
IV. CONTROLS AND MONITORING	**2**	**3**	**1**	**6**
A. Optimizing Control Strategies	**1**	**2**	**0**	**3**
1. Establish control sequences that meet the owner's objectives				
2. Integrate controls with equipment and systems				
3. Instruct building operators in system functions				
4. Define references that establish operator training requirements				
5. Establish				
a. operating and maintenance procedures				
b. reporting requirements				
6. Incorporate energy reporting capabilities				
B. Control Hardware	**1**	**1**	**1**	**3**
1. Establish sensor requirements				
2. Define the control functions in the equipment				
3. Determine the need for central monitoring				

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V. BENCHMARKING WITH PERFORMANCE METRICS	**2**	**5**	**2**	**9**
A. Project Performance Measurement	**0**	**1**	**0**	**1**
1. Assess the efficiency of information transfer on high-performance requirements				
2. Assess financial and time impact of implementing sustainable principles				
B. Energy Performance Verification	**1**	**2**	**2**	**5**
1. Measure the performance of a building				
2. Compare the performance of a building against				
a. projections				
b. similar buildings				
C. Environmental Performance Measurement	**1**	**2**	**0**	**3**
1. Compare emissions measures to goals				
2. Compare utility consumption to goals				
3. Compare material consumption and recycling to goals				
4. Compare occupant satisfaction measures to goals				
VI. WATER CONSERVATION	**5**	**6**	**2**	**13**
A. Storm Water Management	**1**	**4**	**1**	**6**
1. Analyze harvesting options				
2. Define				
a. treatment options				
b. storage methods and quantities				
3. Calculate optimum capacity and use				
4. Assess the impact of storm water on the site				
5. Apply best management practices				
B. Domestic Water Management	**2**	**2**	**1**	**5**
1. Analyze fixture selection impact				
2. Determine irrigation reductions				
3. Develop strategies to reduce potable water consumption				
a. reclaimed water				
b. non-potable water harvesting				
c. irrigation optimization				
C. Process / Wastewater Management	**2**	**0**	**0**	**2**
1. Condition and reuse processed and wastewater				
2. Comply with federal regulations				

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VII. COMMISSIONING IN SUSTAINABLE CONSTRUCTION	**6**	**4**	**4**	**14**
A. Documentation	**4**	**1**	**1**	**6**
1. Identify unique requirements for sustainable construction				
2. Determine the owner's objectives and criteria				
3. Define commissioning scope				
4. Specify systems and operations				
5. Identify the sequence of operations				
B. Commissioning Process	**2**	**3**	**3**	**8**
1. Integrate quality control into design and construction				
2. Verify quality assurance in design and construction				
3. Evaluate post-occupancy performance				
4. Develop a feedback/corrective action methodology				
5. Implement corrective actions (e.g., recommissioning, retrocommissioning)				
VIII. OPERATION AND MAINTENANCE OF HIGH PERFORMANCE BUILDINGS	**5**	**4**	**3**	**12**
A. Energy Use and Management	**3**	**2**	**1**	**6**
1. Select an energy manager for a building				
2. Identify competencies of staff who will service a building				
3. Implement a maintenance plan				
4. Encourage the owner to hire an energy manager				
B. Environmental Control and Management	**2**	**2**	**2**	**6**
1. Measure and sustain recycling programs				
2. Implement sustainable practices for				
a. housekeeping and site management				
b. purchasing				
c. renovation projects				
3. Control pests using an integrated pest management strategy				
Totals	**35**	**41**	**24**	**100**

Renewal Requirements for ASHRAE Certification Programs

Each Certificant is required to renew his/her certification every three years. The renewal process includes submittal of a renewal fee ($125 for members, $195 for non-members) and evidence of earning 45 ASHRAE Continuing Education (ACE) units during each three-year renewal period.*

The three-year renewal period starts on December 31 of the year in which the Certificant earns the certification. For example, a Certificant who earns the certification anytime in 2008 will have a renewal deadline of December 31, 2011.

Individuals who fail to submit renewal fees and evidence of the required ACEs by the December 31 deadline will be considered as "non-renewing," notified accordingly, and advised to cease using the specific certification designation after their names. The names of non-renewing Certificants will be removed from the list of Certificants on ASHRAE's website.

To be reinstated, non-renewing Certificants must submit the renewal fee, a reinstatement fee ($60), and evidence of the required ACEs by December 31 of the year following their active status. After that date, non-renewing Certificants must follow the same process as that for the initial application. Extenuating circumstances will be reviewed on a case-by-case basis by the Committee.

Acceptable Methods of Obtaining ACE credits

Type	Credits
Successful completion of a course in a related field from an accredited institution of higher learning Note: To qualify for this credit, a course must be offered regularly and must conclude with a test that sets a passing grade.	15 ACEs per credit hour (semester system) OR 10 ACEs (quarter system)
Patent Note: Credit can be claimed after a patent is issued and the inventor submits details to the board. The invention must be related to engineering.	10 ACEs
Publication of article/paper/book in recognized peer reviewed journal in relevant field (max. 3 per year). Note: A "news" article in a technical or professional bulletin is not considered a published paper.	10 ACEs per published item
Active participation in a professional or technical society relevant to the field Note: The certificant must serve as an officer and/or must actively participate in a committee of the organization. PDH credits are earned at the end of each year of service.	2 ACEs per year per organization
Writing ASHRAE certification exam items in relevant field	5 ACEs per exam
Accreditation Visit Evaluator (or ASHRAE approved equivalent)	3 ACEs per year
Professional awards	2 ACEs per award
Teaching of approved courses and workshops in relevant field Note: Teaching credit is valid for teaching a course or seminar for the first time only. It does not apply to faculty performing regular duties.	ACEs are determined by multiplying by two (2) the total number of course hours (for preparation time).
Attendance at meetings and conferences (e.g. National, Annual, Regional) or special conferences relevant to the field	Qualifying seminars and workshops will be based on one ACE unit for each hour of attendance.
Attendance and completion of approved short courses and other continued education activities in relevant field	Qualifying seminars and workshops will be based on one ACE unit for each hour of attendance.

*Certificants are not required to submit a report of Professional Development activities as part of certification renewal. A percentage of Certificants are randomly chosen for audit each year. If audited, a report of continuing professional development with documentation must be submitted to the Certification Coordinator for review.

Activities that qualify for ASHRAE's Continuing Education units **might** also qualify for continuing education credits (e.g., PDHs, CEUs, or LUs) from other credentialing bodies or organizations. The individual is responsible for contacting the relevant governing body to determine whether an activity qualifies for that body's continuing education credit.

For questions about any of the information about ASHRAE's certification renewal requirements, including clarification of acceptable and reportable qualifying activities, please contact ASHRAE's Certification Coordinator at certification@ASHRAE.org.