

BPI Multifamily Building Analyst Testing Knowledge List

MODULE	TASK/SKILL DESCRIPTION
BUILDING SCIENCE	
1	Understand basic heat transfer mechanisms
1	Understand moisture transport mechanisms
1	Understand multifamily building airflow characteristics (single zone, parallel floor, compartmentalization, etc.)
1	Understand and Identify typical multifamily ventilation system design strategies and applications
1	Associate interaction of stack effect and airflows in ventilation stacks
1	Understand air leakage issues related to elevators
1	Define effective R-value
1	Demonstrate how to use the psychrometric chart
1	Understand IAQ pollutant transport mechanisms
1	Understand basic combustion science
1	Understand combustion technologies
1	Understand how heat recovery works for ventilation systems
1	Understand how heat recovery works for domestic hot water systems
1	Identify correct lumen requirements for light levels in different areas of the building
1	Associate relationship between lighting/appliance retrofits with internal gains and heating/cooling loads
1	Be familiar with proper de-manufacturing and disposal procedures for appliances and lighting components
1	Calculate heating (and cooling) degree days
1	Know the heat content of typical fuels
1	Define sensible and latent loads
1	Understand interactivity of energy efficiency measures and predicted savings
AUDITING SKILLS	
2	Written communication skills
2	Verbal communication skills
2	Knowledge of and ability to use word processing software
2	Knowledge of and ability to use spreadsheet software
2	Determine who the decision-maker is for the building

2	Determine who has the information needed to provide the data needed to conduct a complete audit
2	List items for pre-interview data collection
2	Demonstrate ability to obtain accurate, appropriate, relevant information from all parties
2	Demonstrate ability to apply LAYER technique during interviews (Listen, Acknowledge, Explore, Respond)
2	Demonstrate ability to communicate information to a variety of audiences (residents, staff, management, etc.)
2	Understand the cultural context of each building's housing environment
2	Understand and apply appropriate confidentiality protections when interviewing people and inspecting living units
2	Obtain and evaluate the existing maintenance schedule and capital replacement schedule
2	Educate building occupants and staff to ensure good decisions and practices are maintained post-audit
2	Determine purpose of audit: energy, IAQ, etc.
2	Identify common elements of an audit document
2	Ability to read and understand operating manuals for mechanical systems
2	Determine appropriate retrofit options based on observed and analyzed data
2	Determine when additional outside expertise is required to complete the inspection, analysis, and/or report
2	Demonstrate ability to accurately collect and record observed data
2	Demonstrate ability to review and analyze data to form logical conclusions
2	Estimate costs of installed measures
2	Estimate labor requirements for installation of measures
2	Predict results of installed measures
2	Prioritize installation of measures unique to multifamily buildings
2	Evaluate cost-effectiveness of measures
2	Evaluate savings opportunities related to demand reduction
2	Evaluate savings opportunities related to fuel switching
2	Determine energy consequences of IAQ control
2	Develop a work scope and project report based on audit results
2	Identify typical multifamily building structural systems and construction types
2	Identify components of multifamily building envelope systems
2	Identify typical multifamily building mechanical systems (heating, cooling, hot water, ventilation)
2	List and define comprehensive list of typical energy savings opportunities for the building type
2	Identify building envelope component assemblies

2	Identify types of unitary heating and cooling equipment (wall furnace, electric furnace, heat pump, wall A/C, etc.)
2	Identify motor types AC/DC
2	Demonstrate ability to develop a full mechanical equipment schedule
2	Demonstrate ability to develop a schedule of existing electrical fixtures and appliances
2	Determine appropriate recommendations for motor replacement schedules
2	Evaluate cost-effectiveness of motor replacement
2	Evaluate cost-effectiveness of advanced technologies for energy savings
2	Evaluate electrical savings for lighting retrofits in all areas of the building (living units, common areas, exterior)
2	Evaluate electrical savings from installation of energy efficient lighting controls
2	Evaluate daylighting opportunities for energy savings
2	Evaluate electrical savings for appliance replacement (refrigerators, window/wall AC units, washers, dryers, etc.)
2	Identify typical metering configurations
2	Determine how the metering configuration impacts the recommendations in the project report
2	Evaluate electrical savings opportunities using electrical use indices
2	Evaluate cost-effectiveness of demand reduction strategies
2	Evaluate opportunities for renewable energy retrofits
2	Demonstrate ability to produce a complete project report (evaluation of existing conditions, scope of proposed work, savings estimates, job cost estimates, other recommendations, etc.)

INSPECTION AND DIAGNOSTIC SKILLS

3	Select appropriate tools and equipment to perform tasks required for the audit
3	Demonstrate proper use of tools and equipment to perform tasks required for the audit
3	Identification and diagnosis of moisture issues
3	Ability to read blueprints
3	Using blueprints, identify where important airflow paths may be
3	Visual inspection procedures for mechanical equipment (heating, cooling, hot water, ventilation)
3	Inspect condition and effectiveness of ventilation systems
3	Measure flow rates of mechanical ventilation systems
3	Inspect and verify type and condition of insulation in building envelope components
3	Locate building air leakage paths and bypasses contributing to stack effect and/or uncontrolled infiltration/exfiltration
3	Locate airflow communication paths between units

3	Associate elevator location and system design to airflow performance in the building
3	Evaluate when ventilation of elevator shafts may be sealed to improve building performance, energy savings, etc.
3	Window and door inspections for proper fit, operation, and performance
3	Evaluate estimated U-value of windows
3	Evaluate effective R-value of building envelope components
3	Identify locations of thermal bridges in the building envelope
3	Determine retrofit options for thermal envelope improvements
3	Identify mechanical system components and their functions for: hydronic, steam, forced air heating and cooling systems
3	Combustion efficiency testing
3	Determine if combustion equipment is operating within acceptable operating ranges
3	Assess heating plant operation and conditions
3	Understand mechanical system controls and their impact on system performance
3	Identify and assess condition of HVAC distribution systems
3	Identify fire suppression systems
3	Determine if EEM's will compromise operation of fire suppression systems
3	Identify water circulation systems and evaluate potential energy savings
3	Understand pump sizing criteria
3	Identify point of use water saving measures (low flow devices, toilets, clothes washers, etc.)
3	Measure domestic hot water temperature at the point of use
3	Measure light levels using lumen meter

INSTALLATION/ANALYSIS SKILLS

4	Collect utility consumption data (energy and water usage)
4	Graph monthly energy source usage
4	Apply unit-by-unit analysis
4	Apply whole building (or complex) analysis
4	Apply dual fuel analysis
4	Calculate heating, cooling, and base loads
4	Understand weather-dependent results of usage analysis
4	Compare usage analysis results to observed conditions in the building
4	Compare computer model to utility data

4	Know what to do when consumption data is not available or incomplete
4	Understand utility rate structures
4	Identify consumption patterns indicating savings opportunities
4	Establish energy use indices
4	Determine who pays for the utilities in the building
4	Establish fuel and energy load baselines
4	Attribute energy consumption to end uses
4	Establish proper fuel unit costs
4	Calculate heat loss and heat gain
4	Differentiate between bin/DD/hourly analysis
4	Calculate heating and cooling loads
4	Demonstrate ability to collect, prepare, and input data accurately
4	Calibrate the model and verify results are realistic
4	Know typical modeling algorithms
4	Understand how models work and how to troubleshoot
4	Identify existing software tools and their appropriate applications
4	Justify the model against actual consumption
4	Compare the cost of the predicted energy savings against the actual highest unit usage
4	Calculate the estimated energy savings for recommended EEM's
4	Demonstrate life cycle analysis for recommended EEM's
4	Quantify non-energy savings or costs related to recommended retrofits
4	Determine non-economic benefits of measures
4	Understand various cost-effectiveness criteria (BLCC, ROI, SIR, etc.) and when to use them
4	Determine financing options and include benefits in economic analysis
4	Understand economic impacts of demand rates and retrofit strategies
4	Understand inflation and discount factors
4	Document cost-estimates
HEALTH AND SAFETY	
5	Visual inspection for health and safety issues in the living units, common areas, and mechanical rooms
5	Personal safety procedures

5	Identify all combustion sources in the building
5	Identify and address health and safety issues that may be impacted by energy saving measures
5	Be familiar with material safety data sheets
5	Comply with OSHA requirements related to the auditor's work
5	Identify types, sources, and health effects of exposure for commonly found contaminants (CO, mold, asbestos, lead)
5	Identify building connections to pollutant sources (garages, commercial use areas, etc.)
5	Recognize IAQ related conditions including chemicals, moisture, mold, etc.
5	Assess IAQ problems and sources
5	Relate the observed IAQ to the building conditions to determine sources and mitigation strategies
5	Identify IAQ contaminant transport paths
5	Know CO detector requirements and applications
5	Combustion safety testing procedures for large systems
5	Evaluate the combustion air supply
5	Assess burner modulation and cycling