

Comparison of Envelope Professional Certification to Updates

The table below notes the Envelope Professional Testing Knowledge List items that are now covered by one of the following: Building Science Principles (BSP) Reference Guide, Building Analyst Technician (BA-T), Building Analyst Professional (BA-P), or Site Supervisor (SS). In some cases, separate details of a TKL item may be covered by various sources.

Where an item is no longer covered, it is noted as not applicable (N/A).

| Envelope Professional Testing Knowledge List | BSP | BA-T | BA-P | SS | N/A |
|--|-----|------|------|----|-----|
| 1.1 Building Science | | | | | |
| 1. Basic Terms & Definitions | | | | | |
| 1. Airflow in buildings/ducts: CFM, CFM50, CFM25, ACHn, ACH50, FPM | X | | X | | |
| 2. Effective leakage area | | | | | X |
| 3. Area weighted R-Value | X | | X | | |
| 4. Baseload | X | | X | | |
| 5. British thermal unit (Btu) | X | | X | | |
| 6. Condensation | X | | | | |
| 7. Sones | X | | | | |
| 8. Pressure differential | X | | X | | |
| 9. Temperature differential | X | | | | |
| 10. Efficiency | X | | X | | |
| 11. Watt-hour | X | | | | |
| 12. R and U Value | X | | X | | |
| 13. Ton of refrigeration | | X | | | |
| 14. Total equivalent length | | | | | X |
| 15. Dehumidification / Humidification | X | | X | | |
| 16. Inches of Water Column (iwc) | X | | | | |
| 17. Pascal (Pa) | X | | X | | |
| 18. Hydrostatic pressure | | | | | |
| 19. Natural ventilation | X | | | | |
| 20. Mechanical ventilation | X | | X | | |
| 21. Net free area | | | X | | |
| 22. Equipment efficiency descriptors | X | | | | |
| 23. Permeability and perm rating | X | | | | |
| 24. Vapor barriers/retarders | X | | X | | |
| 25. Building ventilation | X | | X | | |
| 26. IAQ (indoor air quality) | X | | X | | |
| 27. IEQ (indoor environmental quality) | X | | | | |
| 28. Psychrometrics | | | | | X |
| 29. Vented/Unvented combustion appliance | X | | X | | |
| | | | | | |
| 2. Principles of Energy, Air & Moisture | | | | | |
| 1. Thermodynamics: conduction, convection, radiation, ΔT | X | | | | |
| 2. Factors that affect insulation performance | X | | X | | |
| 3. Wind-driven house pressurization/depressurization | X | | | | |
| 4. Natural and Mechanical driving forces of infiltration/exfiltration as well as pressurization/depressurization | X | | | | |
| 5. Heat gain/loss | X | | X | | |
| 6. BTU content of fuels | X | | | | |
| 7. Moisture transport mechanisms | X | | X | | |
| 8. Principles of combustion | X | X | | | |

| 3. Combustion Science | BSP | BA-T | BA-P | SS | N/A |
|--|-----|------|------|----|-----|
| 1. Combustion analysis: oxygen, <i>flue-gas temperature*</i> , carbon monoxide | X | X | | | *X |
| 2. Carbon Monoxide (CO) testing of combustion appliances | | X | | | |
| 3. Basics of: Combustion appliance venting, draft, and combustion air | X | X | | | |
| 4. Open combustion safety issues: Combustion air, draft, depressurization, spillage, backdrafting | | X | | | |
| 5. Effect of duct leakage on depressurization of CAZ | X | X | | | |
| | | | | | |
| 1.2 Envelope Systems and their interaction with other Building Systems | | | | | |
| 1. Building Components | | | | | |
| 1. Duct configurations and components | | X | X | | |
| 2. Hydronic distribution configurations and components | | | X | | |
| 3. Structural components of residential construction | X | X | X | | |
| 4. Thermal boundaries and insulation applications | X | | X | | |
| 5. Electrical components and safety considerations | | X | X | | |
| 6. Fuel delivery systems and safety considerations | | X | | | |
| 7. Bulk water (moisture) management components: weather-resistant barrier, drainage, plumbing gutters sumps etc. | X | | X | | |
| 8. Vapor barriers, weather-resistant barriers | X | | X | | |
| 9. Radiant barrier principles and installations | X | | | | |
| 10. Understand/recognize heat and energy recovery ventilators | X | | | | |
| 11. Understand fenestration types and characteristics | X | X | X | | |
| 12. Understand issues involved with basements, crawlspaces, slabs, attics, attached | X | X | | | |
| 13. Understand issues involved with interstitial building cavities and unconditioned | X | X | | | |
| 14. Understand issues involved with ventilation equipment | X | | X | | |
| 15. Understand basic heating equipment components controls and operation | X | X | X | | |
| 16. Understand basic cooling equipment components controls and operation | X | X | X | | |
| 17. Understand basic DHW equipment components controls and operation | | X | X | | |
| 18. Identify common mechanical safety controls | | X | X | | |
| 19. Identify insulation types and R-Values | X | X | | | |
| 20. Understand various mechanical ventilation equipment and strategies | X | | X | | |
| | | | | | |
| 2. Conservation Strategies | | | | | |
| 1. Appropriate insulation applications based on existing conditions | | | X | | |
| 2. Opportunity for ENERGY STAR lighting and appliances | X | | X | | |
| 3. Identify duct sealing opportunities and applications | X | | X | | |
| 4. Understand importance of air leakage control and remediation procedures | X | | X | | |
| 5. Understand importance of air leakage control in conjunction with insulation performance/ improvements | X | | X | | |
| 6. Blower door-guided air sealing techniques | X | | X | | |
| 7. Understand proper insulation installation procedures | | | X | | |
| 8. Appropriate applications for sealed crawlspaces basements and attics | | | X | | |
| 9. Appropriate applications for fenestration upgrades including modification or replacement | | X | | | |
| | | | | | |

| 3. Comprehensive Building Assessment Process | BSP | BA-T | BA-P | SS | N/A |
|--|-----|------|------|----|-----|
| 1. Understand/recognize need for conducting appropriate diagnostic procedures | X | X | | | |
| 2. Interaction between mechanical systems envelope systems and occupant behavior | X | | | | |
| 3. Understand basic mathematics & science | | X | X | | |
| | | | | | |
| 4. Design Considerations | | | | | |
| 1. Appropriate insulation applications based on existing conditions | | | X | | |
| 2. Understand/recognize building locations where non-flammable materials must be used | | | X | | |
| 3. Understand/recognize building locations where opportunities for retrofit materials and processes are needed to correct problems and/or enhance performance | | | X | | |
| 4. Understand climate specific concerns | | | X | | |
| 5. Understand indoor environment considerations for the environmentally | X | | | | |
| 6. Understand impact of building orientation | X | | X | | |
| 7. Understand impact of landscape drainage and site grading | X | X | | | |
| 8. Understand impact of shading on loads | X | | | | |
| 9. Awareness for solar gain reduction in cooling climate | X | | | | |
| 10. Awareness for solar gain opportunities in heating climate | | | | | X |
| 11. Appropriate applications for sealed crawlspaces basements and attics | | | X | | |
| 12. Determine basement air-sealing strategy dependent on the interpretation and application of blower door test results | | X | | | |
| | | | | | |
| 1.3 Measurement and Verification of Building Performance | | | | | |
| 1. Applied Diagnostics & Troubleshooting | | | | | |
| 1. Application of measured air leakage test results | | | X | | |
| 2. Process and calculate information from blower door test results | | | X | | |
| 3. Understand building shell/envelope leakage as a function of pressure difference | | | | | X |
| 4. Apply fundamental construction mathematics and unit conversions | X | | | | |
| 5. Understand ventilation needs | | | X | | |
| 6. Ventilation calculations and strategies | | | X | | |
| 7. Proper methods for identifying / testing fuel leaks | | X | | | |
| 8. Combustion Appliance Zone (CAZ): depressurization, spillage, draft, carbon monoxide (ambient and flue) | | X | X | | |
| 9. Carbon Monoxide (CO) evaluation: ambient | | X | | | |
| 10. Blower door setup, accurate measurement, and interpretation of results | | X | X | | |
| 11. Duct leakage testing (total leakage and leakage to outside): <i>setup, accurate measurement and interpretation of results*</i> <i>(*This is not part of either the BA-T exam or BA-P exam.)</i> | | | X | | X* |
| 12. Pressure pan testing | | X | X | | |
| 13. Basic pressure diagnostic procedures including understanding "With Reference | | X | | | |
| 14. Recognize contributing factors to comfort problems | X | | X | | |
| 15. Inspect for areas containing moisture or bulk water in undesirable locations | X | | | | |
| 16. Understand and inspect for basic electrical safety | | X | | | |
| | | | | | |

| 1.4 BPI National Standards and Project Specifications | BSP | BA-T | BA-P | SS | N/A |
|--|-----|------|------|----|-----|
| 1. Installation Safety and Specification | | | | | |
| 1. Understand applicability content and intent of BPI National Standards | | X | X | | |
| 2. Recognize need for a professional local/state/national codes evaluation | | | X | | |
| 3. Understand hazards associated with knob & tube wiring and <i>be able to determine if it is live using basic electrical inspection techniques* (*Please note that we do not require our certified professionals to conduct testing of electrical wires.)</i> | | | X | | *X |
| 4. Address attic ventilation requirements | | | X | | |
| 5. Be able to specify materials and processes needed for building performance projects | | | X | | |
| | | | | | |
| 1.5 Optimizing the Installation, Operation, and Maintenance of Envelope Systems | | | | | |
| 1. Installation Safety and Specification | | | | | |
| 1. Recognize need for air sealing measures and their impact on other building systems | X | | X | | |
| 2. Recognize need for mechanical equipment improvements | | | X | | |
| 3. Understand blower door use for identifying critical air sealing areas | X | | X | | |
| 4. Apply blower door test results in development of improvement strategies | | | X | | |
| 5. Understand needs for protective shielding and baffling for the preparation of insulation installation | | | X | | |
| 6. Verify installed airflow rates of ventilation devices | | | X | | |
| 7. Apply appropriate strategies for alignment of insulation and air barrier | | | X | | |
| 8. Working knowledge of various types of insulation and air sealing techniques and materials | | | X | | |
| 9. Methods for determining if dense packing procedure has reached appropriate density blown: Air pressure to material ratio manufacturers recommended density to achieve the R-value | | | | X | |
| | | | | | |
| 1.6 Professional Ethics, Conduct & Communications | | | | | |
| 1. Conservation Strategies | | | | | |
| 1. Present options for comprehensive conservation strategies that are consistent with sound building science practices | | | X | | |
| 2. Understand the implications of building performance improvements on occupants and other building systems/components | X | | X | | |
| 3. Understand the importance of coordinating air-sealing work with insulation | | | | X | |
| 4. Understand the impact of installed actions on cost benefit analysis guidance | | | X | | |
| | | | | | |
| 2. Professional Conduct and Work Ethics | | | | | |
| 1. Elements of effective oral communication with customer | | | | X | |
| 2. Elements of a documentation system | | | | X | |
| 3. Elements of effective written communication with customer | | | | X | |
| 4. Understand the role of and basic elements of a quality management system | | | | X | |
| | | | | | |

| 3. Personal Safety & Work Practices | BSP | BA-T | BA-P | SS | N/A |
|--|-----|------|------|----|-----|
| 1. Locations in which to identify indoor air quality issues | | | | X | |
| 2. Material Safety Data Sheets | | | | X | |
| 3. Federal/State/Local Requirements (EPA OSHA) | | | | X | |
| 4. Isolation procedures for pollutants | | | | X | |
| 5. Practice building science within your limits of professional competency | | | | X | |
| 6. Precautions when working around chemical biological and other potential hazards | | | | X | |
| 7. Understand the roles and responsibilities of the envelope professional | | | | X | |