

**Basic Principles of Construction
Written Assessment**

Administration time: 50 minutes

Content Area	Number of Items
Construction Industry <i>Organization, Contractor, Expeditor, Estimator, Drafter, Laborer, Engineer, Plumbers</i>	10 items
Safety <i>OSHA, Material Safety Data Sheets (MSDS), Fire Safety, Job Site Safety, Personal Protective Equipment, GFCI Safety, and Electrical Safety</i>	10 items
Construction Math <i>Basic Math</i>	10 items
Tools and Fasteners <i>Measurements, Tools and Fasteners</i>	10 items
Print Reading <i>Drawings</i>	10 items
TOTAL NUMBER OF QUESTIONS	50 items

**No performance assessment available for Basic Principles of Construction*

HBI/NAHB assessments are based on national skill standards set by NAHB industry professionals and educators as are the materials contained in the Residential Construction Academy Series.

Carpentry – Basic Written Assessment <i>Administration time: 50 minutes</i>	
Content Area	Number of Items
Safety <i>OSHA, Fire Safety, Job Site Safety, Tool Safety, Material Safety Data Sheets (MSDS), Safety-Related Injuries, and First Aid</i>	10 items
Measurement <i>Fractions, Feet/Inches, Addition, Perimeter, Linear Feet, and Rulers</i>	10 items
Tools and Equipment <i>Block Planes, Snips, Saws, Screwdrivers, Circular Saws, Electric Drills, Belt Sanders, and Power Drills</i>	10 items
Products and Materials <i>Sill Plates, Studs, Codes, Lumber, and Fasteners</i>	10 items
Rough Carpentry and Framing <i>Blueprints, Concrete Forms, Floors, Walls, Steel Framing, Trusses, Roofs, and Work Platforms</i>	10 items
Interior and Exterior Finishing <i>Drywall, Cornices, Siding, Windows, Suspended Ceilings, Flooring, Cabinets, and Insulation</i>	10 items
TOTAL NUMBER OF QUESTIONS	60 items

Carpentry – Advanced Written Assessment <i>Administration time: 2 hours (120 minutes)</i>	
Content Area	Number of Items
Safety <i>OSHA, Fire Safety, Job Site Safety, Tool Safety, Material Safety Data Sheets (MSDS), Safety-Related Injuries, and First Aid</i>	10 items
Measurement- <i>Feet/Inches, Addition and Subtraction, Area, Perimeter, Linear Feet, Triangles, and Rulers</i>	10 items
Tools and Equipment <i>Saws, Levels, Screwdrivers, Power Tools, Table Saws, Circular Saws, and Power Drills</i>	10 items
Products and Materials <i>Lumber and Fasteners</i>	10 items
Rough Carpentry and Framing <i>Blueprints, Concrete Forms, Wood Floors, Wall Frames, Steel Framing, Trusses, Roofs, and Work Platforms</i>	30 items
Exterior Finishing <i>Roofing, Cornices, Decks, Siding, Insulation, Windows and Doors</i>	20 items
Interior Finishing <i>Drywall, Ventilation, Ceilings, Trim, Flooring, Cabinets, and Stairs</i>	30 items
TOTAL NUMBER OF QUESTIONS	120 items

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Carpentry – Basic and Advanced Performance Assessment

Administration time: 2 hours and 40 minutes (160 minutes)

Content Area	Percentage of Items
Tool and Material Identification <i>Accuracy of identification of saws, bits, saw blades, wrenches, nails, fasteners, lumber, finishing tools, layout tools, marking tools, and timeliness.</i>	17%
Square Layout <i>Handling of equipment, project layout techniques used, accuracy of side length and diagonals, and timeliness.</i>	9%
Builder's Level <i>Set up and handling of instrument, techniques used to determine top of foundation, accuracy of level marks, and timeliness.</i>	8%
Blueprint Reading/Sole Plate Layout <i>Layout of plate, interpretation of plans, length of plate, door centerline, door rough opening, bi-fold door centerline, bi-fold door rough opening, closet partition intersection, stud spacing, used standard markings, hall closet depth, and timeliness.</i>	21%
Rafter Layout <i>Layout of rafter, use of tools, interpretation of plans, placement of rafter crown, ridge plumb cut, rafter line length, plate line plumb cut, overhang length, tail plumb cut mark, fascia plumb cut deduction mark, ridge plumb cut deduction mark, bird's mouth location and layout, and timeliness.</i>	18%
Stairway Stringer <i>Layout of 3-tread stringer, use of tools, interpretation of plans, riser height, tread run, stringer marking at floor level, tread thickness, and timeliness.</i>	10%
Interior Frame <i>Procedures for installing, shimming, and nailing frame, procedures for installing trim, operation of miter saw, use of hand tools, safety, window plumb and level, window shims, quality of trim cuts, tightness of joints, quality of nailing, reveal allowance, and timeliness.</i>	17%
TOTAL NUMBER OF JOBS	7

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Facilities Maintenance – Basic Written Assessment <i>Administration time: 50 minutes</i>	
Content Area	Number of Items
Safety and Tools <i>Tools, OSHA, , Material Safety Data Sheets (MSDS), Fall Protection Equipment and Measurements</i>	10 items
Electrical <i>Concepts, Wiring, Safety and Maintenance</i>	8 items
Plumbing <i>Maintenance, Tools and Supplies</i>	8 items
Carpentry <i>Measurements, Maintenance, Fasteners, External Carpentry, Internal Carpentry and Insulation</i>	8 items
Painting <i>Work Plat, Ladders, Brushes, Finishing, Drywall and Paints</i>	8 items
Mechanical Systems and Maintenance <i>Elevators, HVAC, Furnaces, Gas Burners, Ovens, Dishwashers and Dryers</i>	8 items
TOTAL NUMBER OF QUESTIONS	50 items

Facilities Maintenance – Advanced Written Assessment <i>Administration time: 1.5 hours (90 minutes)</i>	
Content Area	Number of Items
Safety and Tools <i>OSHA, Electrical Cords Safety, Fire Safety, Fall Protection Equipment , Safety, Personal Protective Equipment, HAZMAT, Measurements, Hand Tools and Power Tools</i>	20 items
Electrical <i>Theory, Meters, Concepts, Resistance, Switch, Circuits, Smoke Detectors, Electrical Box</i>	15 items
Plumbing <i>Fittings, Tools, Supplies, Maintenance, Safety, Solder and Heaters</i>	15 items
Carpentry <i>Fasteners, Measurements, Maintenance, Roof, Siding, Locks, Molding and Frames</i>	15 items
Painting <i>Paint, Brushes, Rollers, Application, Finishing, Spray, Ladders and Fall Protection</i>	10 items
Mechanical Systems and Maintenance <i>Heater, HVAC, Furnaces, Boilers, Elevators, Appliance Repair, Grounds, Pests and Trash Compactors</i>	15 items
TOTAL NUMBER OF QUESTIONS	90 items

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Facilities Maintenance – Basic and Advanced Performance Assessment

Administration time: 3 hours (180 minutes)

Content Area	Percentage of Items
Carpentry – Construct Frame <i>Selection and use of tools, cutting, techniques for assembly, accuracy of measurements, and appearance of frame.</i>	28%
Plumbing – Sweat Piping <i>Use of tools, joining and soldering techniques, accuracy of measurements, piping support, and leak testing.</i>	19%
Electricity – Rough Wiring <i>Mount electrical boxes, install nonmetallic cable, and preparation of wires in box.</i>	15%
Dry Wall <i>Accuracy of measurements and cuts, installation of drywall, and finishing techniques</i>	15%
Electricity – Finish Wiring <i>Installation of switching device, installation of light fixture, and testing of installation.</i>	13%
Carpentry – Mortise Hinge <i>Selection and use of tools and fit and appearance of installed hinge.</i>	10%
TOTAL NUMBER OF JOBS	6

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HVAC Installer – Basic Written Assessment <i>Administration time: 50 minutes</i>	
Content Area	Number of Items
HVAC Theory <i>Heat Theory and Refrigeration Theory</i>	10 items
HVAC Safety and Tools <i>Safety and Tools</i>	20 items
HVAC Installation <i>Electric, Gas, Oil, Hydronic, Heat Pump, and Geothermal Installation</i>	10 items
HVAC Electrical <i>Controls, Motors, and Troubleshooting</i>	10 items
HVAC Air Distribution <i>Air Treatment and Installation</i>	10 items
TOTAL NUMBER OF QUESTIONS	60 items

HVAC Service Technician – Advanced Written Assessment <i>Administration time: 1.5 hours (90 minutes)</i>	
Content Area	Number of Items
HVAC Theory <i>Heat Theory and Refrigeration Theory</i>	20 items
HVAC Safety and Tools <i>Safety and Tools</i>	20 items
HVAC Service <i>Electric, Gas, Oil, Hydronic, Heat Pump, and Geothermal Service</i>	30 items
HVAC Electrical <i>Controls, Motors, and Troubleshooting</i>	20 items
HVAC Air Distribution <i>Air Treatment and Installation</i>	10 items
TOTAL NUMBER OF QUESTIONS	100 items

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HVAC – Basic and Advanced Performance Assessment	
<i>Administration time: 3 hours 30 minutes (210 minutes)</i>	
Content Area	Percentage of Items
Gas Furnace Start-up and Check <i>Evaluation of assigned order, leak test gas connections, test supply gas pressure, test electric connection for voltage and polarity, start equipment, adjust thermostat heat anticipator setting, test manifold gas pressure, test temperature rise through unit, check fan motor amperage draw, perform steady state efficiency test, complete system operation sheet, time to complete job.</i>	40%
Air Conditioning <i>Evaluation of assigned order, remove unit panels and service caps, wire low voltage control circuit, verify no voltage on all wires, test capacitors, perform compressor checks, check line voltage upstream of disconnect fuses, close disconnect, check line voltage downstream of disconnect fuses, verify and record line voltage at the condensing unit, perform transformer terminals check, measure fan motor common leg amperage, calculate CFM, connect refrigeration gauges and purge air, record/correct/convert pressures, check suction line temperature at evaporator outlet, check/diagnose liquid line drier, evacuate line set and indoor coil, charge refrigerant into system, perform system check, check voltage at air handling unit/heat strips, check heat strips current draw, check dry bulb temperature rise, verify heating/cooling to specifications/enthalpy chart, reinstall unit panels and service caps, time to complete job.</i>	60%
TOTAL NUMBER OF JOBS	2

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House Wiring – Basic Written Assessment	
<i>Administration time: 50 minutes</i>	
Content Area	Number of Items
Electrical Safety, Tools and Equipment <i>Electrical Safety, Tools, Power Supplies, Switches, and Meters</i>	20 items
Electrical Codes and Blueprints <i>National Electric Code, Blueprints, Measurements, Symbols and Math</i>	8 items
Basic Concepts of Electricity <i>AC/DC, Circuits, Capacitors, Transformers, Motors, Fixtures and Ohms Law</i>	10 items
Electrical Service Entrances <i>Service Entrances, Calculations and Installation</i>	6 items
Electrical Rough-In <i>Raceways, Wires, Cables, Boxes, Branch Circuits, Switch Circuits and Special Circuits</i>	10 items
Electrical Trim-Out and Troubleshooting <i>Troubleshooting and Installation Fixtures</i>	6 items
TOTAL NUMBER OF QUESTIONS	60 items

House Wiring – Advanced Written Assessment	
<i>Administration time: 1.5 hours (90 minutes)</i>	
Content Area	Number of Items
Electrical Safety, Tools and Equipment <i>Electrical Safety, Tools, Power Supplies, Ladders, Switches, and Meters</i>	20 items
Electrical Codes and Blueprints <i>National Electric Code, Blueprints, Measurements, Symbols and Math</i>	8 items
Basic Concepts of Electricity <i>AC/DC, Circuits, Capacitors, Transformers, Motors, Generators, Fixtures and Ohms Law</i>	20 items
Electrical Service Entrances <i>Service Entrances, Calculations and Installation</i>	10 items
Electrical Rough-In <i>Raceways, Conductors, Cables, Boxes, Branch Circuits, Switch Circuits and Special Circuits</i>	30 items
Electrical Trim-Out and Troubleshooting <i>Troubleshooting and Installation of Fixtures and Devices</i>	12 items
TOTAL NUMBER OF QUESTIONS	100 items

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**House Wiring – Basic and Advanced
Performance Assessment**

Administration time: 3 hours (180 minutes)

Content Area	Percentage of Items
Switch Controls, Conduit Bending, and GFCI Receptacles <i>Draw product wiring diagram, select appropriate material, installation of boxes, wiring installation methods, installation of device, functionality, accuracy of measurement, proper bending and cutting techniques, installation of conductors, installation of GFCI, and safety/workmanship.</i>	75%
Doorbell Circuit <i>Identify and select components, installation of components, functionality, and safety/workmanship.</i>	25%
TOTAL NUMBER OF JOBS	2

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