

Facilities Maintenance Technician Standards

Volume I

Home Builders Institute

An Overview of HBI Framework for Skill Standards

We are pleased to present the fifth in a series of National Skill standards for the residential/light commercial construction industry. The goal of this project is to establish national standards for the residential construction industry that reflect industry skill requirements. The standards provide a basis for the certification and training of workers as well as objective benchmarks for employee selection and evaluating training needs. In addition, educators will find the standards useful for designing curriculum and evaluating individual training outcomes.

These standards in and by themselves do not represent a model training program. These standards are designed to be a source in developing training programs and curricula and evaluating the outcomes of residential facilities management training programs.

Residential and light commercial standards are designed for entry- and skilled-level facility maintenance technicians. Standards are developed and validated for the following fourteen critical work functions: *Safety and OSHA Regulations, Tools and Equipment, Pest Prevention, HVAC, Trash Compactors, Electrical Maintenance, Elevators, Painting, Practical electrical Theory, Plumbing, Appliance Repair and Replacement, Carpentry, Groundskeeping, and Organization of Work Tasks.*

Critical work functions describe the major tasks and content areas of work within a specialty.

Key activities, or major tasks and knowledge involved in completing critical work functions, are also provided.

Performance Indicators, or skill standards, which help determine when critical work functions and key activities are being performed competently, are referenced to critical work functions.

In addition, applied academic skills required to perform key activities are provided. These include mathematics, communications, and practical electrical theory.

Safety requirements involved in completing key activities have also been identified.

How the Standards Were Developed

Committees of subject matter experts (SMEs) representing facilities maintenance technicians, small, medium and large facilities maintenance companies, instructors, trainers and other experts in the field from across the nation established and validated the standards. The final list of fourteen critical work

functions reflects and accommodates regional differences.

The project called for the formation of a committee of National Association of Home Builders (NAHB) leaders in facilities maintenance. In addition, the author of Delmar's new facilities maintenance text (Thompson Learning Company) was included in this committee.

These leaders represented the Northeast, Midwest, and Southeast regions. They had experience in managing the following type of facilities: *garden apartments, high- and medium-rise apartments, multi-family and senior units, and condominiums.*

- A preliminary list of critical work functions and activities organized into duty areas performed by facilities maintenance technicians was developed from industry texts, curricula, association reference materials and other sources of information about the organization and array of tasks performed and knowledge

required in residential and light commercial facilities maintenance.

- An initial committee of six SMEs developed, reviewed and rated critical work functions and key activities and applied academic skills. The committee also reviewed and referenced applied academic skills, safety needs and tools required for each of these functions and activities.
- A second group of six SMEs, including three from the initial committee, validated the original list and developed performance standards for critical work functions and key activities.

Time on Task

Subject Matter Experts (SME) rated the percent of time that the fourteen critical work functions were factors in the work of *all facilities maintenance technicians*.

Table 1. Percent of Time that All Facilities Maintenance Technicians Perform the Described Critical Work Functions

Safety & OSHA Regulations	100%
Tools and Equipment	91%
Pest Prevention	90%
HVAC	76%
Trash Compactors	75%
Electrical Maintenance	75%
Elevators	75%
Painting	69%
Electrical Theory	65%
Plumbing	65%
Appliance Repair	63%
Carpentry	47%
Groundskeeping	37%
Organization of Work Tasks	37%

Table 1 shows a *core of eight work functions that account for almost two-thirds of the time* in the work of facilities maintenance technicians.

How Standards are organized

Facilities Maintenance standards are organized into the follow broad categories: *Applied Academic Skills; Basic Occupational Skills; and Occupational Specific Skills.* Performance indicators or skill standards have been developed for key activities and knowledge required for completing critical work functions.

Applied Academic Skills include Mathematics, Communications and Practical Electrical Theory that are fundamental to Facilities Maintenance Technicians.

Basic Occupational Skills include Safety and OSHA Regulations, Tools and Equipment, and Organization of Work Tasks.

Facilities Maintenance Occupational Skills are organized into the following: Pest Prevention, HVAC, Trash Compactors, Electrical Maintenance, Painting, Plumbing, Appliance Repair and Replacement, Carpentry, Elevators, and Groundskeeping.

The *percent of all HVAC installers and service technicians who perform tasks and key activities, and importance of tasks* are shown in Appendix A.

Applied Academic Skills

Facilities maintenance technicians must master a broad array of applied academic skills to work and communicate effectively on the job site.

Mathematics

- Measure using tape or rule within +/- 1/8" of specifications.
- Use tape measure and other measurement tools to verify accurately that dimensions of features

conform to plan specification or manufacturer's tolerances.

- Determine approximate distance by pacing.
- Convert measures from feet/inches to decimals and vice versa.
- Convert oral information into math equations and vice versa.
- Perform simple arithmetic functions including addition, subtraction, multiplication, and division of whole numbers, decimals, fractions and mixed numbers both with and without calculators.
- Solve problems using conventional carpentry, plumbing, electrical and HVAC symbols.
- Calculate necessary dimensions from blueprints.
- Estimate the results of basic arithmetic functions and accurately round estimates using appropriate rules.
- Apply simple equations for area and volume (in square foot, cubic foot, etc.).

- Solve problems involving proportions of ingredients.
- Understand and interpret job and manufacturer tables, graphs and charts.
- Take accurate readings from and interpret different types of scales including volume, temperature and pressure gauges, air flow measurements, and electrical meters.
- Solve multi-step problems using basic formulas.

Communication Skills

- Read and apply material safety data sheets (MSDS) and other safety information
- Listen and follow verbal directions for work activity.
- Give accurate verbal directions for work activity.
- Read and apply manufacturer specifications for equipment and materials.
- Follow standard safety procedures for job site safety.

- Locate electrical and plumbing fixtures using symbols from blueprints.
- Follow written directions including technical manuals, schematics, tables, graphs, and charts.

Practical Electrical Theory

- Calculate electrical load using Ohm's law.
- Describe the difference between AC and DC currents.
- Understand properties of common electrical wires used by facilities maintenance technicians and understand and correctly measure wire size and load carrying capacity.
- Understand operation and functions of emergency circuits.
- Describe different types of emergency back-up electrical power systems.

Basic Occupational Skills

Facilities maintenance technicians are also required to be proficient in a variety of basic occupational skills, many of which cut across a number of critical work functions.

Applied Safety Rules

- Understand and apply Occupational Safety and Health Administration (OSHA) regulations that cover facilities maintenance work activities.
- Apply basic fall protection safety procedures.
- Apply all OSHA, Environmental Protection Agency (EPA), and Department of Transportation (DOT) hazardous materials safety procedures.
- Apply electrical safety procedures in the National Electric Code (NEC) and local codes and regulations.

- Apply safety and maintenance procedures for power tools and cords.
- Apply OSHA ladders safety and maintenance procedures.
- Use appropriate personal protective equipment (PPE) including safety glasses, electrical protection, shoes, gloves, ear protection, hardhat and other equipment.
- Use safe methods and tools for lifting and moving materials and equipment to prevent personal injury and property damage.
- Use proper procedures to prevent and respond to fires and other hazards.
- Apply proper procedures for reporting fire and safety incidents.
- Apply proper safety procedures to prevent uncontrolled chemical reactions.
- Understand and apply proper general safety procedures when working with pressurized systems, electrical energy, heat, cold, and

chemicals, rotating machinery, and heavy objects.

Tools and Equipment

Basic Safety of Tools and Equipment

- Describe the safe use of tools, including power tools used by facilities maintenance technicians.
- Describe the safe use of specialized service and installation equipment used to maintain and repair HVAC systems.

Anchors, Fasteners and Adhesives

- Describe, select and install the proper fasteners, adhesives and solvents used with wood, sheet metal, fiberglass, plastics and insulation.
- Describe, select and install the proper machine screws and masonry anchors and fasteners.

- Describe, select and install the proper hanging devices and supports.
- Describe, select and install the proper solderless terminals and screw-on wire connectors.

Hand Tools

- Select and properly use measuring, marking, leveling and layout tools including plumb bobs, spirit levels and tape measures.
- Select and properly use boring and cutting tools including drill bits, saws and cold chisels.
- Select and properly use fastening and dismantling tools including hammers and wedges.

Portable Power Tools

- Select and properly use power saws, drills and drivers including reciprocating saws, portable drills and skill saws.

- Select and properly use planes, routers and sanders.
- Select and properly use fastening tools including powder-actuated fastening tools.

Stationary Tools

- Select and properly use miter, chop, band and table saws and drill presses.

Blueprints and Building Codes

- Correctly identify, describe and locate major elements of building floor plans and elevations
- Correctly locate site features using plot plans.
- Understand the importance of following national, state and local building codes.

Organization of Work Tasks

- Establish priorities for carrying out work-related tasks.

- Assign tasks based on priorities and resources available.
- Carry out assignments using work order system.

Skill Levels and Training

Entry-level skill standards can typically be met in training programs of six months to one year, depending on the student's prior job training and educational background. Previous education in applied mathematics, work experience, interests and mechanical aptitude, as well as breadth, scope and sequence of the training program all influence the length of training necessary for competence. Entry-level technicians usually perform work under the direction of a skilled facilities maintenance technician.

Entry-level skills are typically learned in high school vocational programs, informal or formal facilities maintenance-based training programs, on-the-job training or some combination of these.

Skilled technicians usually work independently and may supervise one or more entry-level technicians. Skilled technicians typically require two or more years of work experience mastering skills learned in training or on the job. Incumbent workers with extensive experience in carpentry, plumbing, electrical, and painting may be able to demonstrate competence on standards with little or no additional structured or informal training.

Facilities Maintenance Occupational Skills

The following is a breakdown of critical work functions, activities and standards for the following: *Pest Prevention, Heating, Ventilation and Air Conditioning, Trash Compactors, Electrical Maintenance, Elevator Maintenance, Painting, Plumbing, Appliance Repair and Replacement, Carpentry and Groundskeeping.*

Pest Prevention

- Recognize the sources of damage caused by pests.
- Select and apply proper techniques, chemicals and/or materials to eradicate and/or prevent pest infiltration consistent with manufacturer specifications.
- Follow applicable safety procedures consistent with manufacturer specifications.

Heating, Ventilation and Air Conditioning Systems

Safety, Tools and Equipment

- Understand and apply OSHA regulations related to HVAC practices.
- Apply all OSHA, EPA and DOT hazardous materials safety requirements.
- Apply all safety and maintenance procedures for power and hand tools, gauges and

measurement devices and equipment used to maintain HVAC systems.

HVAC Maintenance

- Perform general maintenance procedures including tightening belts, adjusting pulleys and replacing filters on HVAC units according to manufacturer specifications.
- Perform general maintenance of boiler, burner and chilling systems according to manufacturer specifications.
- Clean coils and lubricate motors.
- Calibrate and adjust thermostats and humidistats according to manufacturer specifications.
- Follow systematic diagnostic and troubleshooting practices consistent with manufacturer specifications.

- Record electrical measurements and temperatures not meeting specified operating parameters.
- Repair and replace electrical devices, zone valves and circulator pumps according to manufacturer specifications.
- Maintain and service condensate systems.
- Replace through-wall air conditioners according to manufacturer specifications.

Trash Compactors

- Perform general maintenance procedures including checking and adjusting trash chute doors.
- Wash down and deodorize trash chutes.
- Perform general maintenance of hydraulic devices including checking for leaks, bleeding hydraulic lines, tightening fittings according to manufacturer specifications.

- Perform test of interlock safety device and report and malfunction immediately to supervisor.
- Check general condition of dumpster.

Electrical Maintenance

Safety, Tools and Electrical Plans

- Understand and apply OSHA regulations that cover electrical practices.
- Apply electrical safety procedures in NEC and local codes and regulation.
- Apply all safety and maintenance procedures for power and hand tools, gauges and measurement devices and equipment used to maintain electrical systems.

Electrical Materials and Supplies

- Correctly identify and select electrical fixtures, boxes and switches and different size and type of wire.
- Correctly identify and select Ohm meters, VOHM meters and other electrical measuring devices.

Electrical Maintenance Procedures

- Follow systematic diagnostic and troubleshooting practices for electrical circuits using appropriate electrical measurement devices.
- Repair and/or replace 120-volt outlets, switches, fuses, breakers, cover plates and fixtures.
- Correctly identify single and three-phase power supplies.
- Perform tests of fire alarm and smoke detector systems and emergency and exit sign lighting

according to manufacturer specifications and report any malfunctions to supervisor.

- Repair and/or replace any defective alarm and smoke detector systems and emergency and exit sign lighting according to manufacturer specifications.
- Perform tests of medical alert systems manufacturer specifications and report any malfunctions to supervisor.
- Perform tests of GFCI receptacles and replace defective receptacles according to manufacturer specifications.
- Repair and replace interior and exterior lighting fixtures.
- Replace light bulbs, ballasts and photo cells with proper bulb, ballast or cell.
- Locate and troubleshoot underground shorts and repair/splice connection according to manufacturer specifications.

Elevators

- Check and inspect floor leveling and report out of level condition to supervisor.
- Check operation of elevators and report any unusual noises to supervisor.
- Perform test of length of time for door closing and report results to supervisor.

Painting

Surface Preparation

- Identify and select proper surface finishes
- Identify and select proper finishing tools for different type of finishes.
- Prepare surface and site properly for finishing including sanding, caulking and covering exposed surfaces.
- Apply paint using roller and brush according to manufacturer and job specifications.

- Apply paint using paint sprayer according to manufacturer and job specifications.
- Clean and store paint materials including brushes, thinners, spray guns according to manufacturer's specifications and OSHA regulations.

Temporary Work Platforms

- Safely erect, use and dismantle single stage scaffolds according to manufacturer specifications and OSHA regulations.
- Safely erect, use and take down ladders according to manufacturer specification and OSHA regulations.
- Safely use sawhorses according to OSHA regulations.
- Safely use hydraulic/electric scissor lifts according to manufacturer specifications and OSHA regulations.

Plumbing

Plumbing Materials and Supplies

- Correctly identify, select and install and/or apply the following materials and supplies: pipes, vales and fittings, fasteners, hangers and supports, compounds, caulking, putty and seals, adhesives and primers, faucet seats, washers, spouts and handles, and low-flow fixtures.
- Understand and apply plumbing system fitting specifications and allowances.

Plumbing Maintenance

- Fabricate plastic pipe with correct fittings to correct dimensions as required for job without any leaks.
- Assemble compression fittings without any leaks.

- Repair, replace and/or rebuild plumbing fixtures and connections to job specifying without and leaks.
- Clean and replace traps, drains and vents including use of snake or rod to clean drain lines.
- Clean and service grease traps.
- Caulk and seal fixtures according to manufacturer specifications.
- Fabricate and solder copper pipe with correct fittings as required for job without any leaks.
- Locate and repair leaks in pipes and fixtures.
- Service, install and repair water heaters according to manufacturer specifications.
- Test and set hot water temperature according to manufacturer specifications.
- Follow and apply all national and local building codes.

Appliance Repair and Replacement

- Follow systematic and comprehensive appliance troubleshooting and diagnostic practices consistent with manufacturer specifications.
- Correctly identify appliance parts using manufacturer schematics and specifications.
- Repair and/or replace the following: gas and electric stoves, refrigerators and ice makers, dishwashers, gas disposals, hood range vents, exhaust fans, microwaves, and clothes washers and dryers according to manufacturer specifications.

Carpentry

Wood Products

- Describe the general properties of hardwood and softwoods commonly used by facilities maintenance technicians.
- Describe the effects of moisture content on different wood products.
- Perform estimating and take-off quantities for simple one-step carpentry projects.

Engineer Products, Panels and Sheet Goods

- Correctly identify and select the following products: plywood, OSB, siding, particleboard, drywall, wallboard and cement board, fiberboard including hardboard, MDF and others) insulation board, waterproofing membranes, plastic laminates and metal framing products.

Framing

- Correctly identify wall, door and window framing components.

Interior Carpentry Maintenance

- Repair and replace interior trim.
- Repair and replace interior doors.
- Repair and replace door hardware and re-key locks.
- Repair and replace cabinets and shelving.
- Repair and replace suspended ceiling systems.
- Repair and replace windows and screens.
- Repair and replace floor and wall tile and fixtures.
- Repair and replace carpet.
- Repair and replace wall and ceiling insulation.
- Repair and install drywall and plaster walls.
- Repair and install wall sheet paneling.
- Repair and install kitchen and bath countertops.

- Prepare interior surfaces for painting.
- Perform tests to determine that all seams and joints do not leak.

Exterior Carpentry Maintenance

- Clean, repair and install downspouts, gutters and roof drains.
- Repair and replace weatherproofing and weatherization.
- Repair exterior siding, trim, flashing, drip caps and roofing.

Groundskeeping

- Maintain and police grounds including mowing, edging, planting, mulching, leaf removal and other tasks as assigned.
- Perform basic small engine repair and preventive maintenance according to manufacturer's specifications.

- Perform basic swimming pool maintenance not requiring certification.
- Remove refuse and snow as required.
- Maintain public areas including hallways, kitchens and lobbies.
- Repair asphalt using cold-patch material.

Critical Work Functions and Key Activity Ratings

Importance ratings and percent of all facilities maintenance technicians who perform critical work functions and key activities are found in Appendix A.

Importance

The importance of key activities, tasks and topical content areas reported in Appendix A is the product of

the proficiency or skill required to perform each task and the impact or risk to the employer, job incumbent, and/or tenant or home owner if the task is preformed improperly. Impact or risk includes possible injury to the job incumbent, financial exposure or litigation to the employer, health risk to the tenant or home owner, to name but a few.

Proficiency was rated by the SMEs using a four point scale with a 1 indicating Minimally Skilled and a 4 Highly Skilled.

Risk was rated was rated using a four point scale with a 1 indicating Minimal Risk and 4 Catastrophic Risk.

Appendix B tools and equipment required for HAC installers and service technicians.

Appendix A
HBI/NAHB Facilities Maintenance Standards Importance Matrix

Rating Scale

- Extremely Important Content/13-16 Tasks
- Moderate Important Content/9-12 Tasks
- Somewhat Important Content/5-8 Tasks
- Low Importance Content/0-4 Tasks

Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Safety & OSHA Regulations			
OSHA, MSDS and Local Regulations	16	16	100
Personal protective equipment	16	16	100
First aid & medical emergencies	16	16	100
Burn protection	16	16	100
Blood borne pathogens	16	16	100
Electrical safety	16	16	100
Ladders & fall protection	16	16	100
Vehicle loading, operation & maintenance	16	16	100
Hazardous materials: asbestos, CFC, mold & lead paint	16	16	100
Lock-out/tag-out	12	16	100
Material handling and lifting	16	16	100
Average	16	16	100

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Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Tools and Equipment			
Anchors & Fasteners			
Nails, screws, bolts, staples	6	12	90
Anchors	6	12	90
Adhesives	6	12	90
Framing hardware	6	12	90
Average	6	12	90
Hand Tools			
Measuring and marking tools	4	16	100
Leveling & layout tools	4	16	100
Boring and cutting tools	4	16	100
Fastening and dismantling tools	4	16	100
Average	4	16	100

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Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Portable Power Tools			
Saws, drills and drivers	4	16	100
Planes, routers, and sanders	4	16	100
Fastening tools (powder-actuated, etc)	2	16	100
Average	3	16	100
Stationary Tools			
Miter & chop saws	4	16	90
Table saws	4	16	90
Band saw	4	8	50
Drill press	4	8	65
Average	4	12	74

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Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Blueprints and Building Codes			
Building plans (floor plans, elevations)	1	9	25
Site plans (plot plans, etc.)	1	9	25
Building codes and zoning regulations	1	12	25
Average	1	10	25
Pest Prevention			
Recognition of source and cause of damage	6	4	90
Techniques to prevent pests	2	9	90
Average	6	9	90

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Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Heating, Ventilation and Air Conditioning Systems			
Safety, Tools & Equipment			
General Safety Practices	12	16	100
Safety Rules (OSHA, EPA, DOT)	12	16	100
Tools, equipment and fasteners	6	16	75
Average	10	16	92
HVAC Maintenance			
General maintenance including tightening belts pulleys & replacing filters	4	12	60
Clean coils, adjust belts and lubricate motors	4	12	75
Calibrate and adjust thermostats	4	12	50
Repair and replace electrical devices, zone valves and circulator pumps	6	12	50
Trouble-shoot HVAC systems	4	12	50
Maintain condensate drains/systems	4	12	50
Replace furnace or cooling filters	9	12	75
Replace through-wall air conditioners	4	12	59
Perform basic maintenance of boiler, burner and chiller systems	1	12	60
Average	4	12	59

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Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Trash Compactors			
Check and adjust trash chute doors	4	9	75
Wash down and deodorize trash chutes	9	9	75
Service hydraulics	4	16	75
Test interlock safety device	4	16	75
Check condition of dumpsters	2	2	75
Average			
Electrical Maintenance			
Safety Practices & Interpret Plans			
Interpret electrical plans and specifications	2	9	35
Apply proper safety practices	16	16	100
Average	9	13	68

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Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Electrical Materials and Supplies			
Identify electrical wires, fixtures, boxes and switches	4	9	50
Identify electrical measuring meters	4	9	50
Average	4	9	50

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Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Electrical Maintenance			
Trouble-shoot electrical circuits using appropriate meters	6	9	50
Identify single and three-phase power supplies	3	9	50
Wire low-voltage circuits	3	9	50
Repair and replace 120-volt outlets, switches, fuses, breakers, cover plates and fixtures	6	9	75
Test fire alarm and smoke detector systems	6	9	75
Test, repair and replace emergency and exit sign lighting	6	9	75
Test and replace GFCI receptacle	8	12	100
Repair and replace interior and exterior lighting fixtures	6	9	60
Follow and apply National Electrical Code and local building codes	4	16	50
Test medical alert systems	9	16	65
Identify and replace light bulbs, ballast and photo cells	9	16	65
Locate and troubleshoot underground shorts and repair/splice	2	16	65
Average	6	11	65

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Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Elevators			
Check and inspect floor leveling	1	16	75
Check emergency phones	4	9	75
Time length of door closing	4	9	75
Check for unusual noises	4	9	75
Average	3	11	75
Painting			
Surface Finishing			
Identify and select proper surface finish	6	9	50
Identify and select proper finishing tools	6	9	50
Prepare surface and site for finish including caulking	6	8	50
Operate paint sprayer	1	8	50
Apply paint using roller and brush, including cutting-in, caulking	4	9	50
Clean and store materials as required by OSHA & manufacturer	9	9	50
Average	5	9	50

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Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Temporary Work Platforms			
Safely set-up and dismantle single stage scaffolds (regional)	8	16	75.0
Safely erect and use ladders	16	16	100
Safely setup and use saw horses (not for standing)	12	16	100
Safely use hydraulic/electric scissor lifts	12	16	
Average	12	16	92
Practical Electrical Theory			
Calculate load using Ohm's law	1	16	65
Understand difference between AC and DC current	1	16	65
Understand wire size and load carrying capacity and properties	1	16	65
Understand operation of emergency circuits	1	16	65
Describe different types of back-up power generating systems	1	16	65
Average	1	16	65

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Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Plumbing			
Plumbing Materials and Supplies			
Pipe, valves & fittings specifications & identification	6	9	35
Fasteners, hangers & supports	6	9	35
Fixture identification & allowances	6	9	35
Compounds, caulking, putty & seals	4	9	65
Adhesives & primers	6	9	75
Flux & solder	8	9	75
Faucet seats, washers, spouts, handles	4	9	50
Identify low flow fixtures	4	9	50
Average	6	9	53

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Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Plumbing Maintenance			
Fabricate plastic pipe	9	9	75
Assemble compression fittings	6	9	65
Replace and repair/rebuild plumbing fixtures and connections	6	9	75
Clean and replace traps, drains and vents and snake/rod drain lines	9	9	75
Clean and service grease traps	9	9	75
Caulk and seal fixtures	9	9	100
Fabricate and solder copper pipe	6	9	75
Locate and repair leaks in pipes and fixtures	6	9	75
Service, install and repair water heaters	6	9	75
Test and set hot water temperature	8	16	75
Follow and apply national and local building codes	12	16	75
Average	8	10	76

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Appliance Repair and Replacement			
Stoves (gas and electric)	3	9	50
Refrigerators and ice makers	3	9	50
Dishwasher	3	9	50
Garbage disposal	2	9	75
Hood range vents	2	9	75
Exhaust fans	2	9	75
Microwaves	2	9	65
Washers and dryers	2	9	65
Interpret appliance schematics & specifications (symbols, plans, etc.)	2	9	65
Average	3	9	63

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Rating Scale

- Extremely Important Content/13-16 Tasks
- Moderate Important Content/9-12 Tasks
- Somewhat Important Content/5-8 Tasks
- Low Importance Content/0-4 Tasks

Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Carpentry			
Wood and Lumber			
Hardwood and softwood properties	4	6	25
Moisture content	1	4	25
Estimating/takeoff quantities	1	4	25
Average	2	5	25

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Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Identify Engineered Products, Panels & Sheet Goods			
Plywood	1	12	50
OSB	1	9	50
Siding	1	9	75
Particleboard	1	9	75
Drywall, wallboard, cement board	6	16	75
Fiberboard (hardboard, MDF & others)	1	9	35
Softboard (e.g., ceiling tiles)	1	12	35
Insulation board	1	9	40
Waterproofing membranes (plastic, etc.)	1	16	40
Plastic laminates	1	9	35
Metal framing products	4	12	40
Average	2	11	50

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Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Framing Components			
Identify wall, door and window framing components	4	9	50
Average	4	9	90
Interior Carpentry Maintenance			
Repair and replace interior trim	4	9	75
Repair and replace interior doors	4	16	50
Repair and replace door hardware and re-key	4	9	75
Repair and replace cabinets and shelving	6	12	50
Repair and replace suspended ceiling systems	6	9	25
Repair and replace windows and screens	4	9	50
Repair and replace floor & wall tile, fixtures, including grouting	4	9	50
Repair and replace carpet	4	9	50
Repair and install drywall/plaster walls	6	9	75

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Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Interior Carpentry Maintenance (cont.)			
Repair and install wall sheet paneling	4	9	75
Repair and replace wall and ceiling insulation	4	9	75
Repair and install kitchen & bath counter tops	4	9	25
Preparation of interior surfaces for painting	4	9	75
Average	4	10	58
Inspection and Repair of Exterior Carpentry			
Repair siding	4	6	10
Repair trim	4	12	30
Repair flashing and drip caps	6	12	25
Repair roofing	6	12	50
Repair, install & clean downspouts, gutters & roof drains	6	9	75
Repair and replace weatherproofing and weatherization	4	10	65
Average	5	10	43

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Critical Work Functions/Duty Areas	Importance		% of All Technicians Who Perform Task
	Entry-Level	Skilled-Level	
Groundskeeping			
Maintain & police grounds (mowing, edging, planting, mulching, leaf removal, etc.)	8	12	100
Small engine repair & preventive maintenance	8	16	35
Perform basic non-certified pool maintenance	8	12	25
Refuse handling	8	12	25
Snow removal	12	12	25
Maintain public areas (hallways, kitchens, lobbies)	8	12	25
Asphalt cold-patch	8	12	25
Average	9	13	37
Organization of Work Tasks			
Establish priority of work tasks	1	16	50
Assign tasks	1	16	35
Carry-out work order system	1	16	25
Average	1	16	37

Appendix B

HBI/NAHB Facilities Maintenance Standards

Matrix

Hand Tools

Safety glasses

Ear protection

Steel toe safety shoes

Safety or dust filter mask

Gloves

Hammers

Tape measure 25' or more

Pencils

Meat thermometer

Thermometer &
humidistat

Chalk box and chalk

Tri-square

Spirit/torpedo levels

Utility knife

Slotted screwdrivers

Phillips screwdrivers

Insulated screw drivers

Adjustable
wrench

Flat bar

Insulated lineman's/side pliers

Appendix B

HBI/NAHB Facilities Maintenance Standards Matrix

Tin/metal snips
Nail pouch
w/belt
Set of wood chisels
Nail sets
Sheet rock keyhole saw
Scriber
Hand planes
Nut drivers
Pipe wrench
Slip-joint pliers
Vise grip
Wire stripper
Voltage/continuity tester and polarity tester
Flashlight
Cordless drill & bits
Electrical tape
Teflon tape
Needle nose and diagonal pliers
Scratch awl
All purpose putty knife
Spackling knives
Hacksaw

Appendix B

HBI/NAHB Facilities Maintenance Standards Matrix

Basin wrench

Allen wrench set

Standard Power Tools (All Heavy Duty)

Miter saws

Circular saw

Variable speed reversible drill

Variable speed reversible hammer drill (1/2")

Reciprocating

saw

Electric screw

gun

Air compressor

Electric cords

Sanders

Portable door planer

Powder-actuated tools

Router & bits

Table saws

Band saws

Jig saw

Drill press

Appendix B

HBI/NAHB Facilities Maintenance Standards Matrix

Shop Tools

Generator

Sump pump

Shop vacuum

Drying fan

Portable lights

Water pressure gauge

Snake

Power snake

Closet auger

Plunger

Water hoses

Pressure washer

Bench grinder

Funnel

Drywall tools

Respirator

Concrete finishing

trowels

Heat gun

Painting

equipment

Appendix B

HBI/NAHB Facilities Maintenance Standards Matrix

Ladders: step & extension

Extension cords

Socket set

Open end wrench set

Hex-key wrench set

Pop-rivet

Propane torch

Pipe cutters

Tubing cutters and reamers

Shovel

Bolt cutter

Files

Vise

4' level

Oven thermometer

Stud finder

Caulking gun

Strap wrench

Bulb syringe

Sawhorses

Appendix B

HBI/NAHB Facilities Maintenance Standards Matrix

Hard hat
Individual fall arrest
Framing square w/rafter tables
Combination square
T-square
Plumb bob
Personal protective gear
Back support belts
HEPA Vacuum
Cat's paw nail puller
Wrecking bar
Notch trowel
6" Spackling knife
Key cutting machine
Re-key kit
Screen spline tools
Snow blower
Shovels
Rakes
Brooms, mop and bucket
Oxy-acetylene torch
Hand truck/dolly
Staplers