



CARPENTRY 46.0201.00

TECHNICAL STANDARDS

Arizona CTE's Carpentry Program Technical Standards are updated and adopted from the National Center for Construction Education Research (NCCER), the leading provider of construction education for industry and career and technical education programs. The Arizona Career and Technical Education Quality Commission, the validating authority for the Arizona Skills Standards Assessment System, reviewed these standards on July 13, 2025.

Note: Arizona's Professional Skills are taught as an integral part of the Carpentry program.

The Technical Skills Assessment for Carpentry is available SY2026-2027.

Note: In this document i.e. explains or clarifies the content and e.g. provides examples of the content that must be taught.

STANDARD 1.0 PRACTICE WORKPLACE SAFETY

- 1.1 Comply with Occupation Safety and Health Administration (OSHA), safety and health standards [e.g., safe work attire and personal protective equipment (PPE); fall protection requirements; lifting procedures; stuck-by, caught-in, and caught between hazards; lockout tagout (LOTO) procedure; fire protection plan; emergency plan, and Safety Data Sheets (SDS)]
- 1.2 Describe methods to establish work zone safety according to the Construction Standard, U.S. Code of Federal Regulations 1926 (i.e., danger signs, caution signs, information signs, safety instruction signs, barricades and barriers, etc.)
- 1.3 Use hand tools, power tools, and equipment according to job specifications and safety guidelines
- 1.4 Inspect, maintain, and store tools and equipment according to manufacturer guidelines
- 1.5 Follow good housekeeping procedures (e.g., keeping the work area clean, storing materials properly, eliminating hazards, performing safety checks, and reporting injuries, incidents, and near misses)

STANDARD 2.0 APPLY COMMUNICATION SKILLS

- 2.1 Write and speak clearly and concisely, using industry terminology when appropriate
- 2.2 Describe the elements of customer service and their impact on a business (e.g., availability, courtesy, consistency, accuracy, responsiveness, and efficiency)
- 2.3 Use verbal, nonverbal, and listening skills with people of diverse cultures and generations
- 2.4 Describe how electronic communication is used in the workplace (e.g., cell phone, text messaging, and social networking)
- 2.5 Read manuals and follow instructions

STANDARD 3.0 USE MATHEMATICS AND MEASUREMENTS

- 3.1 Calculate linear feet, square feet, board feet, and area
- 3.2 Measure and convert measurements to standard and/or metric measurement systems
- 3.3 Add subtract, multiply, and divide fractions and decimals
- 3.4 Convert decimals, fractions, and percentages
- 3.5 Use mathematical formulas to solve problems (e.g., 3.4.5 Rule, Pythagorean Theorem, and the Diagonal Method for Solving Square)
- 3.6 Explain the use of measuring scales (e.g., architect's scale, metric's scale, and engineer's scale)
- 3.7 Measure horizontal, vertical, and traverse angles
- 3.8 Calculate supplies, materials, labor, and overhead costs (i.e., job estimates, inventory, labor estimates, etc.)

STANDARD 4.0 INTERPRET CARPENTRY CONSTRUCTION DOCUMENTS

- 4.1 Describe guidelines and details provided by carpentry construction documents (i.e., construction plan or blueprint, diagrams, drawings, specification sheets, site layout plans, cut list, schedule, etc.)
- 4.2 Identify and explain types of construction blueprints (i.e., architectural, mechanical, electrical, structural, plumbing, etc.)
- 4.3 Interpret blueprint structures and sections (i.e., lines, terms, symbols, scales, drawing dimensions, etc.)
- 4.4 Explain the importance of building code compliance [i.e., MasterFormat 2020, International Residential Code (IRC), International Building Code (IBC), and National Fire Protection Association (NFPA 72 and NFPA 70)]

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STANDARD 5.0 OPERATE HAND TOOLS, POWER TOOLS, AND EQUIPMENT

- 5.1 Identify and describe the use of common hand tools (i.e., hammers, chisels and punches, screw drivers, wrenches, saws, utility knives, shovels and picks, etc.)
- 5.2 Identify and describe the use of common measurement and layout tools (i.e., steel rule, tape measure, wooden folding rule, laser measuring tool, spirit levels, digital levels, laser levels, squares, plumb bob, chalk lines, etc.)
- 5.3 Identify and describe the use of common power tools and accessories [i.e., saws (circular, jigsaws and reciprocating saws, portable band saws, miter and cutoff saws, table saws), power nailers, pneumatic tools, drill bits, saw blades, extension cords, cartridges, hoses, etc.]

STANDARD 6.0 LAY OUT BUILDING LINES

- 6.1 Explain "laying out building lines" for carpentry work (e.g., carpenter uses the architectural plan to mark precise locations of walls, studs, and other framing elements of the building)
- 6.2 Identify different building lines and explain their uses (i.e., object lines, dimension and extension lines, center line, cutting plane line, etc.)
- 6.3 Demonstrate the accurate use of a tape measure (i.e., accuracy and tolerances, calibrated tape, know where zero is on the tape, maintain good alignment, apply correct tape tension, measure horizontally, repeat measurements, etc.)
- 6.4 Determine elevations using levels (i.e., builders/transit, laser, etc.)

STANDARD 7.0 DEMONSTRATE BASIC FLOOR FRAMING

- 7.1 Explain the key components of basic floor framing (e.g., sill plate, rim joist, floor joists, girders or beams, joist hangers, and subfloor)
- 7.2 Explain key considerations about floor framing (e.g., spacing, calculating joist size, crown direction, and support for openings such as doorways)
- 7.3 Differentiate lumber types and materials- for flooring (e.g., OSB, plywood, and pressure-treated lumber)
- 7.4 Explain the purpose of fasteners used in floor framing according to national, state, and local building codes
- 7.5 Explain different floor systems (e.g., cantilever, TGI truss, and conventional)
- 7.6 Lay out and snap sill lines
- 7.7 Install sill plates, floor joists, and subfloors (e.g., tongue and groove, and OSB panels)

STANDARD 8.0 DEMONSTRATE FRAMING AND FINISHING WALLS AND CEILINGS

- 8.1 Identify different types of wall systems (i.e., load bearing, live and dead walls, stem walls, pony walls, etc.)
- 8.2 Explain key components of wall systems (i.e., studs, top plate, bottom plate, sill, cripple, header, ceiling joists, etc.)
- 8.3 Identify the tools and materials necessary to frame walls and ceilings (i.e., saw, hammer, nails or screws, tape measure, level, chalk line, power drill, etc.)
- 8.4 Measure and mark walls and ceilings (i.e., snap wall lines, including plates, corner posts, door and window openings, partition Ts, and bracing, and plan for installation of fire stops, etc.)
- 8.5 Erect and brace walls and ceiling (e.g., wood and metal)
- 8.6 Explain measures to ensure thermal and moisture barriers in walls, flooring, and ceilings (e.g., waterproofing, insulation, air and vapor barriers, and sealants and caulks)
- 8.7 Explain and install interior wall and ceiling finishes to specifications (i.e., drywall, texture, tongue and groove, trim, etc.)
- 8.8 Identify the tools and materials needed to install drywall for wall and ceiling finishes

STANDARD 9.0 DEMONSTRATE FRAMING AND FINISHING A ROOF

- 9.1 Identify different types of roof styles and materials (i.e., A-Frame, gabled, hipped, shingles, metal roofing, tiles, etc.)
- 9.2 Identify different truss and rafter systems (i.e., scissored, Warren, Pratt, Howe, K Truss, etc.)
- 9.3 Calculate the run, rise, pitch, spacing and length of each truss or rafter
- 9.4 Install roof ventilation systems (i.e., soffits, ridge vent, gable vent, other roofing penetrations, etc.)
- 9.5 Set a truss or rafter system
- 9.6 Install roof sheathing

STANDARD 10.0 DEMONSTRATE DOOR AND WINDOW INSTALLATION

- 10.1 Identify door and window types and uses (i.e., solid core, hollow core, steel, architectural glass, dual pane, double hung, sliding window, etc.)
- 10.2 Identify parts of windows and doors (i.e., header, sill, jamb, apron, etc.)

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- 10.3 Identify the steps and the techniques for door and window installation (i.e., measuring, leveling, plumb, threshold, casing, jamb, shims, etc.)
- 10.4 Install doors and windows
- 10.5 Install door hardware (i.e., hinges, doorknobs, door locks, etc.)

STANDARD 11.0 DEMONSTRATE EXTERIOR FINISHES

- 11.1 Identify different types and purposes of frieze boards and soffits
- 11.2 Install frieze boards or soffit
- 11.3 Identify different exterior finishes (i.e., vinyl siding, wood, stucco, brick, etc.)
- 11.4 Install exterior finish (i.e., vinyl siding, stucco, wood, etc.)
- 11.5 Identify different types of external moldings and trims
- 11.6 Install exterior moldings and trim