



ARCHITECTURAL DRAFTING 15.1300.20

TECHNICAL STANDARDS

An Industry Technical Standards Validation Committee developed and validated these standards on November 10 and 19, 2020. The Arizona Career and Technical Education Quality Commission, the validating authority for the Arizona Skills Standards Assessment System, endorsed these standards on January 27, 2021.

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

The Technical Skills Assessment for Architectural Drafting is available SY2021-2022.

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 APPLY MEASUREMENT AND SCALE CONCEPTS IN DESIGN DRAFTING

- 1.1 Compare types of measurement instruments used by architects and engineers (e.g., architectural scale and engineering scale)
- 1.2 Perform field measurements with handheld instruments (i.e., tape measure, lasers, digital applications, electronic measuring tools, etc.)
- 1.3 Select and apply the appropriate scale for viewing information and drawings (i.e., readability, etc.)
- 1.4 Transcribe illustrations and/or field measurements accurately to a scale
- 1.5 Verify interior dimensions for spatial awareness
- 1.6 Assess measurements for accuracy by documenting existing conditions (i.e., photographs, portable drones, etc.)

STANDARD 2.0 INTERPRET TECHNICAL DOCUMENTS AND BUILDING SPECIFICATIONS USED BY ARCHITECTS AND ENGINEERS

- 2.1 Interpret dimensions, symbols, legends, scales, and directions/orientations
- 2.2 Read and interpret content and information communicated in schematics (preliminary concept) and technical drawings
- 2.3 Locate and interpret information on specific documents (i.e., schedules, existing drawings, reference callouts, plan notes, cut sheets, etc.)
- 2.4 Analyze schematics (preliminary concept) and technical drawings for clarity, completeness, and accuracy
- 2.5 Recognize cross-referencing on technical drawings (e.g., sections, elevations, and details related to a floor plans and roof plan)
- 2.6 Identify and describe basic types of drawings by trade (e.g., architecture, mechanical, structural, electrical, plumbing, HVAC, and civil engineering systems)
- 2.7 Verify and justify documents for dimensional accuracy, completeness, and details (i.e., plans, elevations, doors, windows, etc.)
- 2.8 Compare schematics to technical drawings (i.e., isometric schematic related to electrical plans, plumbing plans, etc.)
- 2.9 Interpret legal land descriptions (i.e., ALTA, GIS, plat maps, etc.) needed for a site plan
- 2.10 Verify state, county, local, and national building standards, codes, and regulations used in architectural drafting (i.e., ADA, ANSI, etc.)
- 2.11 Apply appropriate specifications for project-specific jobs (i.e., CSI format, outline, drawing, etc.)

STANDARD 3.0 UTILIZE HARDWARE AND SOFTWARE TOOLS INCLUDING BASIC COMPUTER CONCEPTS, OPERATIONS, AND TECHNOLOGY APPLICATIONS

- 3.1 Use computer hardware/software for design drafting solutions
- 3.2 Apply electronic file management techniques (e.g., consistency, folders/subfolders, reference files, PDFs, simple/intuitive naming, and follow through)
- 3.3 Maintain electronic file management techniques (e.g., archiving, file cleanup, and void folders)
- 3.4 Use various formats (e.g., dxf, dxb, Tiff, gif, pcx, eps, spd, and pdf) to import and export data files
- 3.5 Prepare files for electronic transfer and/or storage
- 3.6 Use the Internet, Intranet, and/or third-party file transfer/storage programs (i.e., FTP, Cloud, etc.)

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STANDARD 4.o UTILIZE COMPUTER-AIDED SOFTWARE SYSTEMS FOR PROJECT MANAGEMENT

- 4.1 Compare and contrast services and processes provided by CADD, VDCM, and BIM systems
- 4.2 Determine the program to analyze drawings (e.g., CADD, VDCM, or BIM)
- 4.3 Use CADD, VDCM, and BIM software functions and commands to set up drawing scale, format, dimensioning, etc.
- 4.4 Apply item properties, colors, line types, editing commands, text styles, and grouping techniques
- 4.5 Incorporate standard parts, symbol libraries, and/or templates
- 4.6 Control viewing commands (i.e., setting scale, title block, view reference, sheet layout, cartoon set, sheet organization, etc.)
- 4.7 Characterize the difference between model space and paper space to determine scale using computer-aided software

STANDARD 5.o DETERMINE THE TYPES AND COMPONENTS OF BUILDING SYSTEMS

- 5.1 Identify the components of a site plan (i.e., property lines, utility access, setbacks, easements, landscaping, contour and topography lines, etc.)
- 5.2 Identify different types/parts of foundations/footings (i.e., concrete slabs, stem walls, masonry, rebar, crushed rock, etc.)
- 5.3 Identify different types/parts of plans (i.e., first level, upper level, basement, finish, dimension, equipment, demolition, electrical, HVAC, reflected ceiling, etc.)
- 5.4 Identify different types of floor structures/systems (i.e., framing, wood or steel trusses/joists, sheathing, wood or steel beams, i-joists, concrete, girders, etc.)
- 5.5 Examine types of walls [i.e., architectural and structural stud walls (steel or wood), masonry, concrete, fire, etc.]
- 5.6 Distinguish components of a wall (i.e., sheathing, sheathing, insulation, air space, vapor barrier, stud spacing, bracing, tie-/hold-downs, etc.)
- 5.7 Identify parts of a staircase systems (i.e., treads, risers, stringers, handrails, landing, railing, structural support, steel/wood, cast in place, precast, etc.)
- 5.8 Identify parts of ramp systems (i.e., support walls, handrails, landing, railing, steel/wood, concrete, etc.)
- 5.9 Identify types of roofs (i.e., pitched, inverted pitch, flat, shed, gable, barrel, etc.)
- 5.10 Identify components of roofs (i.e., tile, membrane, shingles, framing, wood or steel trusses/joists, wood or steel beams, i-joists, concrete, girders, rigid insulation, rafters, steel decking, wood/gypsum sheathing, etc.)

STANDARD 6.o PRODUCE TECHNICAL DRAWINGS

- 6.1 Use fundamental drafting techniques for drawings
- 6.2 Demonstrate freehand lettering technique (i.e., all uppercase without slant)
- 6.3 Determine correct line types and line weights (i.e., when to use heavy, solid, dotted, hidden, etc.)
- 6.4 Create title blocks
- 6.5 Format a sheet set (i.e., sequence number, deciding numbering system to be consistent within the project, etc.)
- 6.6 Apply notes/annotations and dimensions as appropriate and required
- 6.7 Plot, print, or create digital drawings (i.e., PDF, etc.)
- 6.8 Organize a sequence of drawings and supporting documents [i.e., narrative (standards used), calculation, etc.]

STANDARD 7.o APPLY DESIGN DRAFTING CONCEPTS AS RELATED TO ARCHITECTURAL DESIGN

- 7.1 Prepare a foundation or basement plan
- 7.2 Prepare a floor plan or model from a preliminary sketch
- 7.3 Prepare roof details (i.e., roof drain schedules, gutter details, roof flashing, scupper details, roof vent, pitch calculation, flat, tile, etc.)
- 7.4 Prepare an electrical plan locating receptacle, switch, and lighting fixtures
- 7.5 Prepare a plumbing plan showing fixture locations and floor drains
- 7.6 Prepare a basic HVAC plan locating air handlers, condensers, duct returns, return plenum, transfer ducts, and diffusers (vents)
- 7.7 Prepare drawings of four exterior elevations (e.g., north, east, south, and west) including keynote elements (i.e., dimension any special elements, provide building height, material finishes, etc.)
- 7.8 Identify and prepare the components of door and window schedules
- 7.9 Assemble a set of working drawings for a residential or small commercial structure

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- 7.10 Prepare site plan [i.e., drain and drainage, site walls (block, fencing), utility lines, easement, setbacks, stairs, sidewalks, etc.]
- 7.11 Prepare a landscape plan including vegetation, irrigation, and retention basins [i.e., NAOS (natural area open space), sidewalks, etc.]

STANDARD 8.o PREPARE DRAWINGS OF SECTIONS AND DETAILS

- 8.1 Create and place one North/South and one East/West cross section on a plan
- 8.2 Create a larger scale detail of one area of a cross section/detail (i.e., end of full height wall section, etc.)
- 8.3 Create plan details (i.e., enlarged floor plans of restrooms, column details, any unique detail to show architectural intent for the contractor, reflected ceiling details of soffits or coves, etc.)
- 8.4 Identify parts and pieces for detailed drawings (i.e., leaders, keynotes, texts, descriptive terms, sequencing, major components, etc.)

STANDARD 9.o CREATE PICTORIAL DRAWINGS, MODELS, AND RENDERINGS

- 9.1 Create isometric or perspective drawings using manual and/or electronic techniques
- 9.2 Select appropriate materials and properties to apply to the entities (i.e., textures, concrete vs. stucco, glass, metals, etc.)
- 9.3 Render a model to create a presentation drawing (i.e., shadowing, coloring, lighting, shading, camera perspective, vanishing points, etc.)
- 9.4 Create video of rendered model (i.e., fly-thru, exterior aerial views, animation, etc.)

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