

NM FFA CDE Competencies

Changes effective 2025

1. GMAW, SMAW (MIG & Stick welding) & Oxy-fuel Cutting Competencies:

- a. Read and interpret welding charts and instructions for welder settings.
- b. Read and interpret electrode and MIG wire classification numbers.
- c. Understand and interpret base metal welding positions 1, 2, 3, 4, and include welding positions 5 and 6 for pipe welding.
- d. Read and interpret a basic welding diagram.
- e. Read and interpret a basic WPS (Welding Procedure Specification sheet)
- f. Read and interpret American Welding Society (AWS) Welding symbols for:
 1. Fillet and square groove weld, arrow side
 2. Fillet and square groove weld, other side
 3. Fillet and square groove weld, both sides
 4. Weld all around
 5. Chain Intermittent Fillet Weld (Length & Pitch of segments)
- g. Layout and prepare metal for welding up to 1/4" thick.
- h. Perform butt, lap, tee, corner, and edge joint welds.
- i. Perform surface, fillet, groove, or plug and slot welds.
- j. Perform welds in all positions with appropriate electrodes using AC or DC equipment.
- k. Able to select and use 1/8", 6010 or 6011 or 7018 electrodes.
- l. Able to select and use 0.030" and 0.035" MIG wire.
- m. Able to use 100% CO₂ or 75% Argon/25% CO₂ mixed gas for wire welding.
- n. Cut mild steel up to 1/4" thick.
- o. Layout and weld or cut pipe from 1 1/2" up to 2 7/8" diameter.
- p. Read and interpret oxy-fuel data charts and instructions for torch settings.
- q. Perform pipe to pipe, or pipe to plate welding.
- r. Safely set up, light, use, and shut down an oxy-fuel cutting torch system.
- s. Read and interpret a tape measure.
- t. Use measurement and marking tools.
- u. Select and install proper torch cutting tips.
- v. Read, interpret, and set correctly or make proper adjustments to welding and acetylene and oxygen regulator working pressures.
- w. Correctly select, connect, or install all components of the oxy-fuel system.
- x. Cuts performed may include straight line or multi-directional cuts for cutting out a shape. (examples – a livestock chain gate latch or a round or square shape)

- y. Cut mild steel with straight 90-degree or 45 degree-beveled cuts and/or pierce holes.

2. Math Competencies

- a. Perform basic mathematical calculations related to current skills areas.
- b. Calculate materials needed and costs associated with construction, fabrication, or repairs related to current skills areas.
- c. Know and correctly use formulas for:
 - 1. Area of a circle, square, triangle, cylinder, polygons (5, 6, 8 sides, gazebo floor, etc.) and trapezoid
 - 2. Volume of a cone, cylinder, cube, triangular prism, polygons,
 - 3. Pythagorean's theorem
 - 4. Metric and Imperial system conversions.
- d. Evaluate and make financial computations and decisions to real world scenarios related to current skill rotations

e. Carpentry Competencies

- a. Use, read and interpret measurement tools
- b. Use hand, electric, or pneumatic tools appropriate for floor, wall, ceiling, stairs, and roof layout for framing of sheds or homes
- c. Identify parts of, and use of the carpenter's framing square
- d. Identify parts of, and use of the Swanson Speed Square
- e. Identify and select appropriate construction fasteners
- f. Identify, layout and cut structural components of a shed or home
- g. Layout and cut rafters for a shed or Gable roof. No Hip or Jack rafters.
- h. Layout and cut stair risers and treads
- i. Apply ½" rough opening all around for windows
- j. Apply 1" rough opening on both sides and top for doors
- k. Calculate materials needed for floor, wall, ceiling, and roof framing and sheathing
- l. Select and install 3-tab or architectural asphalt shingles
- m. Select and install R-panel metal sheathing for rooves or with appropriate fasteners
- n. Here's one I found we did a few years ago. Do you still want it? It was reading and interpreting lumber and plywood stamped markings. Like the ink stamps on 2 x 4's and on plywood sheathing for indicating if its indoor or outdoor rated, and what the support spacing should be.

f. Concrete & Masonry Competencies

- a. Correctly perform a slump test on concrete and interpret the results.
- b. Calculate materials for a concrete pad with footings and/or masonry units.
- c. Correctly place and/or finish concrete masonry units, with or without mortar.
- d. Select and place concrete or masonry reinforcement.
- e. Fabricate forms for pouring and finishing concrete.
- f. Mixing, placing, and finishing concrete.
- g. Set batter boards with a transit and surveyor's rod.