

## **Farm Mechanics Competencies**

### CORE CURRICULUM (Part 1)

#### 1. ARC WELDING

- a. Understands safety and use of equipment and accessories
- b. Understands essential skills for welding
- c. Demonstrates knowledge in selecting electrodes
- d. Demonstrates running a continuous bead in flat, horizontal, vertical, and/or overhead positions
- e. Understands welding metallurgy
- f. Understands non-ferrous metal
- g. Demonstrates metal inert gas (MIG) welding
- h. Understands pipe sections
- i. Understands testing procedures
- j. Demonstrates ARC cutting

#### 2. OXY-ACETYLENE WELDING/CUTTING

- a. Understands safety and use of equipment and accessories
- b. Demonstrates setup and operation of equipment and materials
- c. Demonstrates flat and other position welds
- d. Understands brazing
- e. Understands silver soldering
- f. Demonstrates flame cutting
- g. Demonstrates cutting Oxy-Ace

#### 3. SMALL GASOLINE ENGINE

- a. Understands purpose of small engines
- b. Understands efficiency small engine cycles
- c. Understands engine maintenance construction, design and materials (valve operation, carburetion, fuel supply, lubrication, and cylinder resizing)
- d. Understands electrical components (ignition/magneto system, starter system, and generator/alternators)
- e. Understands cooling system
- f. Understands filters (coil/fuel/air)
- g. Understands tune-process

#### 4. SHOP MATHEMATICS

- a. Understands use of mathematics concepts in whole numbers, fractions, powers/roots, math systems and basic equations
- b. Understands methods of measurement, area, weight and volume

#### 5. ENGINE TECHNOLOGY

- a. Understands purpose of farm applications
- b. Understands nomenclature

- c. Understands safety and use of auto tools, auto equipment and measurement instruments
- d. Understands engine fundamentals
- e. Understands engine construction
- f. Understands electrical components
- g. Understands fuel
- h. Demonstrates reconditioning the engine (cylinder/piston/ring, crank/cam shafts, block, rods, heads/valves, lubrication and cooling)
- i. Understands basic tune-up

## FARM MECHANICS (Part 2)

### 6. INTRODUCTION TO ENGINE REPAIR

- a. Understands operating principles (fuel injection, combustion chambers and governors)
- b. Understands construction of a diesel engine
- c. Understands fuel systems
- d. Understands air intake exhaust systems
- e. Understands lubrication systems
- f. Understands cooling systems
- g. Understands reconditioning the engine (cylinder/piston/ring, crank/cam shafts, block, rods, heads/valves, lubrication and cooling)
- h. Understands engine diagnosis
- i. Understands engine tune-up
- j. Understands engines as irrigation pumps

### 7. POWER TRANSMISSION SYSTEM

- a. Understands purpose of power transmission system
- b. Understands general principles of force, friction, efficiency, levers/gears, shafts, universal joints, chains and belts
- c. Understands standard transmissions
- d. Understands hydraulics
- e. Understands cleaning and assembly
- f. Understands servicing
- g. Understands preventative maintenance
- h. Understands crawlers and graders
- i. Understands peripheral equipment (irrigation pumps, conveyors, wind rowers, combines, balers, fork lifts, etc.)

### 8. FLUID POWER

- a. Understands physical laws of fluid power, hydraulics and pressure
- b. Understands fluid power cylinder
- c. Understands cylinder angle, speed, ratio and mounting
- d. Understands fluid valves
- e. Understands directional control
- f. Understands fluid motor valve

- g. Understands two-way solenoid valve
- h. Understands spool types
- i. Understands four- and five-way controls
- j. Understands solenoid valve circuits
- k. Understands manual and power pumps
- l. Understands super charging
- m. Understands pump cavitations
- n. Understands oil reservoirs
- o. Understands filtering
- p. Understands air dryers
- q. Understands heat exchangers
- r. Understands accumulators

## OPTIONAL UNITS

### 9. ELECTRICAL

- a. Understands safety and use of electrical testing equipment
- b. Understands Ohm's law
- c. Understands series and parallel circuitry
- d. Understands wiring diagrams
- e. Understands troubleshooting techniques

### 10. AIR CONDITIONING

- a. Understands theory of operation
- b. Understands system operation and controls
- c. Understands automatic systems
- d. Understands diagnosis and service of system

11. Demonstrated skills in advanced Arc welding

12. Demonstrated skills in advanced oxy-acetylene welding

13. Demonstrated skills in advanced small engines

### 14. AUTOMOTIVE TRANSMISSION

- a. Understands clutch (flywheel, friction, disk, pressure plate, throw out bearing, clutch fork, and clutch housing)
- b. Understands manual transmission (disassemble and assemble transmissions; three-speed, four-speed, and five-speed transmissions; gear selection; shifting linkage; lube; and diagnosis of problems)
- c. Understands automatic transmission (Ford-C4-C6; Chevrolet 350-400; disassemble and assemble; servicing band adjustment; and diagnosis)

15. Demonstrated skills in work-based learning activity (Community/Cooperative Classroom)

## 16. ESSENTIAL EMPLOYABILITY SKILLS/CAREER PREPARATION STANDARDS

- a. Demonstrates personal skill development (positive attitude, honesty, self-confidence and time management)
- b. Demonstrates effective interpersonal skills (group dynamics, conflict resolution and negotiations)
- c. Demonstrates academic skills, critical thinking and problem-solving in the workplace
- d. Demonstrates effective communication
- e. Demonstrates occupational safety issues and observe all safety rules
- f. Demonstrates career awareness and knowledge of pathways
- g. Demonstrates ability to adapt to changing technology
- h. Demonstrates ability to prepare for employment (resume, job application, job interview and portfolio development)