



**AGRICULTURAL POWER &
TECHNOLOGY
SMALL GAS ENGINE TECHNICIAN
SKILLS STANDARDS
OD46902**

Competency-Based Education: OKLAHOMA'S RECIPE FOR SUCCESS

BY THE INDUSTRY FOR THE INDUSTRY

Oklahoma's *CareerTech* system of competency-based education uses industry professionals and certification standards to identify the knowledge and abilities needed to master an occupation. This industry input provides the foundation for development of instructional materials that help prepare the comprehensively trained, highly skilled employees demanded by our workplace partners.

TOOLS FOR SUCCESS

CareerTech relies on three basic instructional components to deliver competency-based instruction: skills standards, curriculum materials, and competency assessments.

Skills standards provide the foundation for competency-based instruction in Oklahoma's *CareerTech* system. The skills standards outline the knowledge, skills, and abilities needed to perform related jobs within an industry. Skills standards are aligned with national skills standards; therefore, a student trained to the skills standards possesses technical skills that make him/her employable in both state and national job markets.

Curriculum materials contain information and activities that teach students the knowledge and skills outlined in the skills standards. In addition to complementing classroom instruction, curriculum resources provide supplemental activities to enhance learning and provide hands-on training experiences.

Competency Assessments test the student over material outlined in the skills standards and taught using the curriculum materials. When used with classroom performance evaluations, written competency assessments provide a means of measuring occupational readiness.

Although each of these components satisfy a unique purpose in competency-based education, they work together to reinforce the skills and abilities students need to gain employment and succeed on the job.

MEASURING SUCCESS

Written competency assessments are used to evaluate student performance. Results reports communicate competency assessment scores to students and provide a breakdown of assessment results by duty area. The results breakdown shows how well the student has mastered skills needed to perform major job functions and identifies areas of job responsibility that may require additional instruction and/or training.

Group analysis of student results also provides feedback to instructors seeking to improve the effectiveness of career and technology training. Performance patterns in individual duties indicate opportunities to evaluate training methods and customize instruction.

TRUE TO OUR PURPOSE

"Helping Oklahomans succeed in the workplace" defines the mission of Oklahoma *CareerTech* and its competency-based system of instruction. Skills standards, curriculum, and assessments that identify and reinforce industry expectations provide accountability for programs and assure *CareerTech*'s continued role in preparing skilled workers for a global job market

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Oklahoma Department of Career and Technology Education
Stillwater, Oklahoma

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**AGRICULTURAL POWER AND TECHNOLOGY
SMALL GAS ENGINE TECHNICIAN
SKILLS STANDARDS
Frequency and Criticality Ratings**

Duty A: Maintain a Safe Work Environment

Duty B: Service Small Engines

Duty C: Overhaul Small Gas Engines

Duty D: Use the Fundamental Principles of Hydraulics

Duty E: Use the Fundamental Principles of Electric Motors

Frequency: represents how often the task is performed on the job. Frequency rating scales vary for different occupations. The rating scale used in this publication is presented below:

- 1 = less than once a week
- 2 = at least once a week
- 3 = once or more a day

Criticality: denotes the level of consequence associated with performing a task incorrectly. The rating scale used in this publication is presented below:

- 1 = slight
- 2 = moderate
- 3 = extreme

DUTY A: Maintain a Safe Work Environment

CODE	TASK	F/C
A.01	Interpret general safety information <ul style="list-style-type: none"> • Hand signals • Safety colors • Fire extinguisher • Emergency exits • First aid • Lifting • Clothing • Eye protection 	1/3
A.02	Organize/maintain a clean and safe work area	3/3
A.03	Comply with shop and equipment safety rules	3/3
A.04	Ventilate work area	2/3
A.05	Identify safety hazards	3/3
A.06	Report safety hazards in accordance with established procedure	1/3
A.07	Correct safety hazards	3/3
A.08	Maintain safety devices	3/3
A.09	Complete accident reports	1/3

A.10	Demonstrate knowledge and use of MSDS <ul style="list-style-type: none"> Transporting, use, and storage of oil and gasoline 	1/3
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DUTY B: Service Small Engines

CODE	TASK	F/C
B.01	Exhibit ability to visually inspect crankcase and accessories for cleanliness and leakage	3/3
B.02	Service and inspect air cleaner	3/3
B.03	Drain sediment and/or water from fuel tank, fuel bowl, and/or water separator	3/3
B.04	Service crankcase breather if so equipped	1/1
B.05	Change crankcase oil and oil filter if so equipped	3/3
B.06	Clean and inspect spark plugs for proper operation	3/3
B.07	Replace electronic ignition system components	2/2
B.08	Replace ignition contact points and condenser on internal magneto	2/2
B.09	Service carburetor <ul style="list-style-type: none"> Identify types of carburetors 	3/3
B.10	Demonstrate knowledge of terms associated with servicing small engines	3/3
B.11	Identify the solutions used in cleaning an engine	3/3
B.12	Identify basic parts of 4-cycle gasoline engines	3/3
B.13	Identify basic parts of 2-cycle gasoline engines	3/3
B.14	Identify basic parts of diesel engines	3/3
B.15	Demonstrate knowledge of the operation of 4-cycle gasoline engines	3/3
B.16	Demonstrate knowledge of the operation of 2-cycle gasoline engines	3/3
B.17	Demonstrate knowledge of the operation of diesel engines	3/3
B.18	Identify the basic operating positions of the small gasoline engine	2/3
B.19	Identify tools needed in the servicing of small gas engines <ul style="list-style-type: none"> Metric Standard 	3/3

DUTY C: Overhaul Small Gas Engines

CODE	TASK	F/C
C.01	Disassemble, inspect, and reassemble a 4-stroke cycle engine	3/3
C.02	Disassemble, inspect, and reassemble a 2-stroke cycle engine	3/3
C.03	Reface valves and valve seats <ul style="list-style-type: none"> Identify parts of a valve 	3/3
C.04	Replace rings <ul style="list-style-type: none"> Identify kinds of rings Know specific purpose of each kind of ring 	3/3
C.05	Demonstrate knowledge of terms associated with overhauling small gasoline engines	3/3
C.06	Identify systems found in a small gasoline engine	3/3
C.07	Identify parts of a small gasoline engine	3/3
C.08	Identify tools needed in overhauling small gasoline engines	3/3
C.09	Demonstrate knowledge of terms found on an engine nameplate	2/2

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	<ul style="list-style-type: none"> • Serial number • Model number • Importance of reading an engine nameplate 	
C.10	Identify parts of a micrometer	2/3
C.11	Complete engine service report	3/3
C.12	Demonstrate the ability to use and maintain the outside, inside, and depth micrometer	3/3

DUTY D: Use the Fundamental Principles of Hydraulics

CODE	TASK	F/C
D.01	Follow general safety precautions when maintaining or operating hydraulic systems <ul style="list-style-type: none"> • Hydraulic oil contamination 	3/3
D.02	Identify system types <ul style="list-style-type: none"> • Closed loop • Open loop 	3/3
D.03	Check oil level and quality <ul style="list-style-type: none"> • Visual from site glass 	3/3
D.04	Select oil	3/3
D.05	Interpret gauge readings	3/3
D.06	Bleed air	1/2
D.07	Drain hydraulic system	3/3
D.08	Exhibit knowledge of maintaining a clean hydraulic system	3/3
D.09	Fill hydraulic system <ul style="list-style-type: none"> • Cleanliness • Proper fluid 	2/3
D.10	Replace hydraulic oil filter	2/3
D.11	Inspect oil cooler <ul style="list-style-type: none"> • "Air to cool" 	2/3
D.12	Replace defective oil cooler	1/3
D.13	Inspect system for oil leaks <ul style="list-style-type: none"> • Oil leakage indicates dirt entry 	3/3
D.14	Draw a diagram of a simple hydraulic system in each of the three positions <ul style="list-style-type: none"> • Static • Extend • Retract 	1/3
D.15	Disassemble, clean, and reassemble a hydraulic jack	1/2
D.16	Demonstrate knowledge of hydraulics <ul style="list-style-type: none"> • Functions of hydraulic fluids 	1/2
D.17	Demonstrate knowledge of advantages and disadvantages of hydraulics	3/3
D.18	Demonstrate knowledge of hazards to safety when working with hydraulic systems	3/3
D.19	Know terms and definitions related to hydraulics	3/3
D.20	Perform calculation of pressure	3/3
D.21	Demonstrate knowledge of Pascal's Law	3/3
D.22	Demonstrate knowledge of operating principles of a hydraulic press	1/2
D.23	Demonstrate knowledge of Bernoulli's Theorem	2/2

D.24	Demonstrate knowledge of components of a basic hydraulic circuit	3/3
D.25	Demonstrate knowledge of power transfer in a hydraulic system	3/3
D.26	Demonstrate knowledge of the components of a hydraulic jack	1/2
D.27	Demonstrate knowledge of the operation of a hydraulic jack	1/2

DUTY E: Use the Fundamental Principles of Electric Motors

CODE	TASK	F/C
E.01	Demonstrate knowledge of terms associated with electric motors	1/2
E.02	Identify types of A.C. single-phase, induction-run motors	1/2
E.03	Demonstrate knowledge of the factors to consider in selecting electric motors <ul style="list-style-type: none"> • Types of motor enclosures • Reasons for having protective devices on motors 	1/3
E.04	Demonstrate knowledge of the thumb rules to follow in estimating the size of an electric motor	1/2
E.05	Identify factors to consider when replacing electric motors <ul style="list-style-type: none"> • Causes of motor damage (burn out) • Common motor problems 	2/3
E.06	Identify information found on the nameplate of a motor	2/3