Equipment & Engine Training Council

Principles of Small Engine Technology Certification

Study Guide

CERTIFICATION OVERVIEW

The Equipment & Engine Training Council (EETC) Principles of Small Engine Technology Certification validates students possess an in-depth knowledge of small engine technology and equips students with the fundamental skills necessary to pursue a career within this industry.

EXAM OVERVIEW

The EETC Principles of Small Engine Technology Certification is hosted on the iCEV testing platform. The certification exam is a 100-question, randomized assessment. Exam questions are in the format of multiple choice, sort order, diagramming, matching, labeling and other question types meant to fully evaluate an individual's competency of the industry standards. The certification exam should be proctored within a controlled environment. The proctor of the exam must review and verify all exam procedures and provide electronic documentation through the exam platform.

More information about the certification exam and testing platform, including optional preparation materials offered by iCEV, can be found at https://www.icevonline.com/smallengi ne

ABOUT THE EQUIPMENT & ENGINE TRAINING COUNCIL

The EETC is a non-profit association addressing the critical shortage of service technicians through its school accreditation and EETC technician certification programs. Membership is made up of industry professionals from manufacturers, distributors, dealers, educational institutions and associations. Learn more at https://www.eetc.org/page/PrinciplesofSmallEngineTechnology

INDUSTRY STANDARDS

The certification exam assesses knowledge and skills from the following weighted industry standards set by EETC:

ENGINE COMPONENTS & OPERATIONS OVERVIEW- 60%

- Engine Component Identification
- Engine Cooling Systems
- Engine Oil & Lubrication Systems
- Fuel System
- Emission System
- Electrical System
- Governor Systems

TOOLS, PARTS & EQUIPMENT IDENTIFICATION & MANAGEMENT- 10%

- Precision Measuring Tools
- Testing Instruments
- Servicing Tools & Equipment
- Hand Tools
- Testing Tools & Equipment
- Storage & Maintenance

DISASSEMBLY PROCEDURES- 10%

- Preparation of Disassembly
- Removal of Muffler Assembly
- Removal of Levers & Linkage
- Removal of Valve Cover Breather Assembly
- Removal of Closure Plate

ASSEMBLY PROCEDURES- 10%

- Installation of Oil Sentry
- Installation of Flywheel
- Installation of Ignition Module
- Installation of Fuel Tank

BASIC TROUBLESHOOTING, REPAIR, SERVICE & MAINTENANCE PROCEDURES- 10%

- Inspection of Parts
- Evaluation of Parts for Wear Tolerance
- Repairing Parts
- Testing Procedures

Industry Standard Overview

To pass the EETC Principles of Small Engine Technology Certification exam, certification candidates must have adequate knowledge of the industry standards. The following outlines an in-depth overview of the industry standards and sub-standards:

Engine Components & Operations Overview- 60%

- Four-Stroke Engine
    - Ignition
    - Cycle of Operation
- Intake Stroke
- Compression Stroke
- Power Stroke
- Exhaust Stroke
- Normal Combustion
- Abnormal Combustion
- Parts of Four Stroke Engine
- Fuel System
- Octane
- Volatility
- Fuel Issues
- Alcohol-Based Fuels/Ethanol Blends
- Alcohol Types
- Alcohol Problems
- Shaker Test
- Carburetors & Parts
- Float Carburetor
- Venturi Effect
- Carburetor Operation
- Choking Systems
- Fuel Delivery Methods & Components
- Engine Control Unit
- Sensors
    - Crankshaft position Sensor
    - Inlet Air Temperature Senor
    - Manifold Absolute Pressure Sensor
    - Temperature/manifold Absolute Pressure Sensor
    - Throttle Position Sensor
    - Engine Temperature Sensor
    - Oxygen Sensor
- Emission Systems
- Emissions Legislation
- Phase 1 Standards

- Non-Handheld Equipment
- Handheld Equipment
- Tampering
- Ignition Systems
- Ignition Coil
- Breaker Points Ignition System
- Condenser
- Capacitor Discharge Ignition System
- Magneto Ignition System
- Spark Plugs & Heat Range
- Charging Systems
- Starting Systems
- Inertia Drive Starting System
- Solenoid Shift Starting System
- Governor System
    - Mechanical Governor System
    - Electric Governor System

Tools, Parts & Equipment Identification & Management- 10%

- Precision Measuring Tools
- Engine Testing Instruments
- Engine Servicing Tools & Equipment
- Engine Testing Tools & Equipment
- Parts of Micrometers
- Reading a Micrometer

Disassembly Procedures- 10%

- Engine Parts Identification; included but not limited to,
    - Air Cleaner Shroud
    - Blower House
    - Fuel Tank Drain Plug
    - Crankcase
    - Recoil Stater Drive Cup

Assembly Procedures- 10%

- Oil Sentry Installation
- Ignition Module Installation
- Fuel Tank Installation

Basic Troubleshooting, Repair, Service & Maintenance Procedures- 10%

- Engine Maintenance & Cleaning
- Use Correct Spark Plug
- Service Carburetors
- Carburetor Limited Caps
- Servicing Carburetors
- Other Engine Maintenance
- Ignition System Inspection
- Compression Tests
- Wet Compression Tests
- Cylinder Leakage Test
- Fuel System Inspection
- Exhaust Inspection
- Engine Performance Issue
- Inspection of Engine Parts
- Evaluation of Engine Parts for Wear Tolerance
    - Spark Plug
    - Head Gasket Surface of the Crankcase
    - Cylinder Head Machine Surface
    - Valves
    - Valve Guide Stem Clearance
    - Cam Lobe and Camshaft Journals
    - Compression Ring
    - Connecting Rod and Crankshaft Journal
    - Cylinder Bore
- Piston-to-Bore Clearance
- Crankshaft Main Bearing Journals
- Carburetor Disassembly and Cleaning
- Recoil Starter Assembly Repair
- Pulley Components
- Recondition Valve Seat Inserts
- Piston Installation
- Oil Sentry System Test
- Crankcase Vacuum Test
- Cylinder Leakdown Test

Optional Preparation Materials Overview

The preparation materials offered by iCEV for the EETC Principles of Small Engine Technology Certification was specifically created to prepare candidates for the certification exam. While it is not required to complete the preparatory materials before accessing the certification exam, EETC recommends certification candidates complete some form of training. The following outlines the lessons scope and objectives:

Lesson 1: Four-Stroke Engine: Overview

1. To understand four-stroke engine operation.
2. To define normal combustion.

Lesson 2: Four-Stroke Engine: Components & Operation

1. To understand the purpose of various four-stroke engine components.
2. To determine the purpose and types of cooling systems in four-stroke engines.
3. To understand the uses and importance of engine oil.
4. To analyze lubrication systems in four-stroke engines.

Lesson 3: Four-Stroke Engine: Fuel System

1. To understand proper use of fuel and analyze various types of fuel.
2. To examine carburetors and carburetor functions.
3. To assess fuel delivery methods.
4. To discuss engine management.

Lesson 4: Four-Stroke Engine: Emissions System

1. To understand various emission standards in small engines.
2. To learn about engine servicing and warranty pertaining to emissions standards.

Lesson 5: Four-Stroke Engine: Electrical System

1. To understand various types of electrical ignition.
2. To analyze components and component functions of ignition systems.
3. To examine spark plugs and spark plug function.
4. To discuss engine charging and starting systems.

Lesson 6: Four-Stroke Engine: Governor Systems

1. To understand mechanical governor function.
2. To understand electronic governor function.

Lesson 7: Four-Stroke Engine: Servicing & Troubleshooting

1. To understand the importance of servicing engine systems.
2. To acquire knowledge on various maintenance procedures.
3. To learn about troubleshooting procedures.

Lesson 8: Small Engine Tools, Parts & Equipment: Identification & Operation

1. To understand the selection and identification of standard tools and equipment common to engine technology.
2. To know the procedures for following operating instructions and safety procedures of specialized tools and equipment.
3. To obtain knowledge on setting up and adjusting tools and equipment.
4. To learn how to properly maintain and store tools and equipment.
5. To understand inventory methods.

Lesson 9: Small Gas Engine: Disassembly Procedures

1. To learn how to properly disassemble a small gas engine.
2. To learn and understand all parts of a small gas engine.
3. To understand real world uses of a small gas engine
4. To efficiently work as a team to complete the assignments in the classroom.

Lesson 10: Small Gas Engine: Assembly Procedures

1. To learn how to properly assemble a small gas engine.
2. To learn and understand all parts of a small gas engine.
3. To learn the importance of torque sequence and gap setting on key components during the assembly process.
4. To efficiently work as a team to complete the assignments in the classroom.

Lesson 11: Small Engine Technology: Troubleshooting, Repair, Service & Maintenance

1. To learn how to properly assemble a small gas engine.
2. To learn and understand all parts of a small gas engine.
3. To learn the importance of torque sequence and gap setting on key components during the assembly process.
4. To efficiently work as a team to complete the assignments in the classroom.