

Dette er en oversettelse av den fastsatte læreplanteksten. Læreplanen er fastsatt på Bokmål

Laid down as a regulation by the Norwegian Directorate for Education and Training on 14 December 2007 as delegated in a letter of 26 September 2005 from the Ministry of Education and Research pursuant to the Act of 17 July 1998 no. 61 relating to primary and secondary education (Education Act) Section 3-4 first paragraph.

Valid from 01.08.2008

## Purpose

Engine installation, repair and maintenance shall lay the foundation for competence in installing, maintaining and repairing engines, drive gears, propeller systems and generators. Fleets of leisure boats and small working boats are growing. This subject plays an important role in safety and environmental issues along the coast. The subject shall promote the competence of future engine mechanics in areas of operational safety for boats and for mobile and stationary internal combustion engines. Furthermore, the subject shall contribute by keeping a high standard where Environment, Health and Safety (EHS) is concerned.

Learning in the subject shall help the apprentice develop competence in troubleshooting, installation, repairing and carrying out maintenance. Learning in the subject shall also contribute to developing the apprentice's ability to cooperate with others and gain professional insight and communication skills. Furthermore, learning in the subject shall promote knowledge about laws, regulations and procedures.

Learning in the subject shall arrange for practical and varied work with mechanics, electricity and electronics. The use of digital aids and tools related to planning, execution and documentation of work are a part of the learning. Learning shall also promote respect for fellow human beings, materials and the natural environment. Learning in the subject shall arrange for professional development and prepare the apprentice for a working life that sets demands on efficiency and profitability.

Training completed and passed in the subject will lead to a Trade Certificate. The professional title is Engine mechanic.

## Structure

Engine installation, repair and maintenance consists of four main subject areas. The main subject areas complement each other, and should be viewed in relation to one another.

### Overview of the main subject areas:

Year level	Main subject areas			
Vg3 / In-service training at a training establishment	Troubleshooting and diagnosing	Maintenance	Repairs and rebuilds	Communication and service

## Main subject areas

The main subject area covers troubleshooting and diagnosing mechanical, hydraulic, pneumatic, electrical and electronic components.

The main subject area covers service and maintenance on mechanical, hydraulic, pneumatic and electrical systems. This also includes the selection and use of tools, equipment and measuring instruments.

The main subject area covers work on mechanical, hydraulic, pneumatic, electrical and electronic systems. This also includes the selection and use of tools, equipment and measuring instruments.

The main subject area covers communicating with customers, colleagues and collaborators. The main subject area also covers planning and documentation of completed work. Environment, health and safety are a part of the main subject area.

## Basic skills

Basic skills are integrated into the competence aims for this course in areas where they contribute to the development of and are a part of the basic subject competence. In Engine installation, repair and maintenance, basic skills are understood as follows:

*Being able to express oneself orally and in writing* in Engine installation, repair and maintenance involves describing, explaining and documenting work tasks. It also involves formulating risk assessments and preparing non-conformance reports. It also deals with communicating with colleagues, other collaborators and customers regarding questions related to the profession.

*Being able to read* in Engine installation, repair and maintenance involves understanding and following work descriptions, procedures, manuals, standards and laws in various languages.

*Numeracy* in Engine installation, repair and maintenance involves calculating and converting forces, electric sizes and make-up torques. It also includes calculating concerning the selection of materials and equipment, expenses and use of time.

*Being able to use digital tools* in Engine installation, repair and maintenance involves using digital tools in connection with planning, production, operation, documentation and communication. It also involves using digital equipment for troubleshooting and adjusting machines and equipment.

## Competence aims

### Troubleshooting and diagnosing

*The aims of the training are to enable the apprentice to*

- use technical information in various languages for troubleshooting and diagnoses
- perform and interpret wear indications in engines with the help of measuring tools
- perform pressure and leak tests on lubricant and cooling systems
- perform control checks and make adjustments to timing belts/camshafts
- perform particle and CO<sub>2</sub> measurements
- perform control checks on engine rigging
- troubleshoot drive shafts, pinions, axle shafts, propellers, tillers and steering systems
- troubleshoot electronic engine control systems using circuit diagrams
- troubleshoot injection systems
- troubleshoot turbo, compressor and intercooler systems
- troubleshoot hydraulic and pneumatic systems
- troubleshoot electrical and electronic systems and components
- troubleshoot comfort and air conditioning systems

### Maintenance

*The aims of the training are to enable the apprentice to*

- locate and use professional information in various languages
- perform service and maintenance based on manufacturer instructions
- carry out quality control tasks and document completed work tasks
- perform source separation and handle special waste
- select and use oils, lubricants and liquids on engines and equipment
- use product and EHS data sheets

## Repairs and rebuilds

*The aims of the training are to enable the apprentice to*

- install, dismantle and replace components on engines, drive gears, pinions, axel shafts, propellers, tillers and steering systems
- install, dismantle and replace components in lubrication and cooling systems
- install, dismantle, replace and produce components for engine installation and carry out the installation

## Communication and service

*The aims of the training are to enable the apprentice to*

- discuss an assignment's profitability and work load with colleagues
- elaborate on the structure, organization and areas of responsibility at the company
- prepare non-conformance reports and discuss company internal control systems
- plan and document executed work tasks in line with current rules
- communicate with customers about work tasks and deal with them according to guidelines and rules for customer service
- discuss and elaborate on professional solutions with colleagues and collaborators
- find professional solutions together with customer, colleagues and collaborators
- explain what can influence cost and efficiency related to workshop operations

## Assessment

### Vg3 Engine installation, repair and maintenance

Provisions for final assessment:

Main subject areas	Provision
Troubleshooting and diagnosing	All apprentices shall take a Trade Examination, which is normally carried out over a period of three working days
Maintenance	
Repairs and rebuilds	
Communication and service	

The provisions for assessment are stipulated in the regulations of the Norwegian Education Act.