Curriculum for Power-supply Fitter VG3 / in-service training at a training establishment

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 10 March 2008 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

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Purpose

In a highly advanced technological society, one expects safe and well-functioning distribution systems for electrical power. A well-functioning power grid for distributing electrical power will be important in satisfying technological demands and requirements to safe and quality supply of power in important areas like the oil sector, industrial production, railway transport, health care, business activities and residential areas. These requirements are necessary to meet society's need for qualified power-supply fitters to install, operate and maintain such systems.

Technological developments in electrical power require a full understanding of systems and equipment. Learning in electrical power subjects shall help develop the individual's ability to think holistically and promote an understanding of systems and safety. Awareness of the consequences daily work has on the environmental concerning electrical power can contribute to ensuring better use of resources and sustainable development. Learning in the subject shall lead to interaction across professional borders, which is important for workplace safety and for safe, stable power plants.

Training power-supply fitters shall emphasise testing, reflection, insight and conscious choices of one's own work related to electrical power systems and appurtenant equipment. Precision, creativity and problem solving are thought processes involved in performing work and are central elements in the subject. Documentation, current rules, regulations, routines, procedures, personal safety and respect for the great forces involved shall be emphasised throughout learning. Knowledge of business studies and the company's internal control system shall be a natural part of learning.

Learning in the subject shall promote independence and encourage cooperation with others in the same trade, and with other professional fields. Furthermore, service-mindedness and the ability to communicate with users and colleagues shall be an important focus. Developing the ability to understand systems and general understanding and holistic planning of one's own work are essential for lifelong learning.

Training completed and passed in the subject will lead to a Trade Certificate. The professional title is Power-supply Fitter.

Structure

Power-supply fitter consists of two 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	Transmission of electrical power	Operations, maintenance and control systems

Main subject areas

Transmission of electrical power

The main subject area covers transmission of electrical power for low and high voltage systems for wires, cables, distributions and transformer substations, components for new installations like device guidance and computer systems, and the use of appurtenant equipment and tools. Installing, mounting and rebuilds are covered by the main subject area.

Operations, maintenance and control systems

The main subject area *Operations, maintenance and control system* covers planning, execution and documentation of maintenance, troubleshooting, monitoring, stand-by and measurements to run a distribution grid and improve first-line support of line networks, distribution plants and transformer substations. Integrated in this are EHS, personal and electrical safety, functions testing, measuring technology, electrotechnical calculations, electrotechnical concepts and the use of digital and hand tools.

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 Power-supply fitter, basic skills are understood as follows:

Being able to express oneself orally and in writing in Power-supply fitter involves formulating oneself precisely in professional discussions with customers, colleagues, specialist and people from other disciplines.

Being able to read in Power-supply fitter involves understanding different kinds of written material for the trade, which ensures that work is always performed in line with current rules, regulations, recommendations and client needs.

Numeracy in Power-supply fitter involves performing calculations for planning, executing and evaluating the dimensioning of systems and evaluating results from measurements and tests, and understanding how electrical circuits and systems work.

Being able to use digital tools in Power-supply fitter involves searching for information, doing calculations and producing technical documents for

systems and units. Digital tools are also used for programming, configuration and troubleshooting.

Competence aims

After Vg3

Transmission of electrical power

The aims of the training are to enable the apprentice to

- put the company's maintenance and work order systems into use, and document finished work
- perform work according to current internal control regulations and be able to describe the system
- carry out safe job analyses
- do risk assessments for systems and equipment before work begins, do final control tests, and document and evaluate the quality of one's own work
- give necessary first aid in case of electrical injury
- plan, install, start and maintain measuring equipment for voltage and power
- plan, carry out and document own work when constructing an electrical energy distribution system
- plan, carry out and document own work when constructing an electrical distribution system for both mechanical and electrical systems
- plan, carry out and document the hanging and start-up of cable and overhead systems, as well as distribution plants
- describe the work of installing and start-up of production systems, systems for distribution and transfer of electric power, and control systems
- plan, install, start-up and document basic control systems for circuit breakers and disconnectors in production and distribution of electric power
- plan, install, start and document transformers that are connected to different types of loads
- plan, install, start and document distribution plants for simple industrial sites based on different voltage systems, cabling methods and appurtenant grounding systems
- plan, install, start and document a backup power generator to feed an electrical energy system
- plan, carry out and document the construction of protective system for a three-phase distribution plant with grounding
- plan, carry out and document work on systems and equipment in a professional and precise manner in accordance with electrical safety, quality assurance, internal control (HMS), social aspects and the manufacturer's technical documentation

- document own learning and training in the transfer of electrical power

Operations, maintenance and control systems

The aims of the training are to enable the apprentice to

- plan, carry out and document control checks and maintenance of equipment for working on live wires based on current regulations
- plan, carry out and document modernisation and replacement of measuring transformers for current and voltage
- plan, carry out and document the installation, maintenance, repair and troubleshooting of basic control systems for transferring electrical power
- plan, carry out and document the installation, maintenance and repair of emergency and backup power, emergency lighting and lighting systems
- plan, carry out and document the installation, maintenance and repair of cable inlets, protective classifications and flash points within areas with the risk of explosion
- plan, carry out and document the installation, maintenance and repair of electrical power systems
- plan, carry out and document the installation, maintenance and repair of cabling and wiring systems for computers and telecommunication systems
- test and measure electrical sizes on power systems and equipment, and evaluate the results
- troubleshoot electrical energy systems and equipment with a thought to connections and operational errors, and keep a log of your troubleshooting work
- plan, carry out and document the maintenance and repair of batteries and accumulator systems
- plan, carry out and document control checks and maintenance of alarm systems for monitoring electrical energy transmission
- plan, carry out and document the installation and start-up of programmable control systems for remote and sequential control
- plan, carry out and document the maintenance and repair of cable systems and overhead wires on masts and poles
- install bus bar systems for low and high voltage
- install and start the operation of distribution transformers
- install and document switchgear and controlgear
- perform and document maintenance on circuit breakers
- document own learning and training in operations, maintenance and control systems

Assessment

Vg3 Power-supply fitter

Provisions for final assessment:

Main subject areas	Provision
Transmission of electrical power Operations, maintenance and control systems	The apprentices shall sit for a written examination in the subject. The examination must be passed before a Trade Examination can be taken. The examination is prepared centrally and censured locally. All apprentices shall sit for a Trade Examination, which is normally carried out over a period of at least six working days.

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