



ESF program "Development of the system of qualifications"

OCCUPATIONAL QUALIFICATION STANDARDS

Automatician, Level 4

The Occupational Qualification Standards are documents that describe the work, a set of skills, knowledge and attitudes or competency requirements for successful performance of the work.

The occupational qualification standard forms a basis for the compilation of vocational secondary education and continuing education and for assessment of the competence on awarding the occupational qualification.

| Occupational Title | | Estonian Qualifications Framework (EQF) level |
|---------------------------|--|--|
| Automatician | | 4 |
| Specialization | Title on the occupational qualification certificate | |
| Production Automation | Production Automatician, Level 4 | |
| Building Automation | Building Automatician, Level 4 | |



Euroopa Liit
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Eesti tuleviku heaks



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Part A DESCRIPTION OF WORK

A.1 Description of work

Automation Technicians are skilled employees whose main activity is the installation and operation of automation systems, components, and equipment. In the companies of production automation, they use electromagnetic, pneumatic and/or hydro automation tools, the companies of building automation use specific equipment.

Automatician, Level 4 performs installation and maintenance work independently according to the guidelines, rules, project documentation (pre-prepared projects, working drawings), or according to the manufacturer's installation instructions. He or she is based on their work on the principles of energy efficiency, sustainability, and environmental preservation. Work may involve supervision of co-workers, mentoring, and advising clients in the use and maintenance of the equipment. The work involves communication with electricians, technologists, IT and communications specialists and other professionals in related fields.

The Automatician specializes in production or building automation.

An Automatician specializing in production automation works in the enterprises dealing with automation of processes, production equipment, and production systems. He or she governs, directs and controls the automation systems of the industry of production of electricity, district heating, wood, chemical, food, machinery, water supply and agriculture, etc. He or she also performs tasks related to installation, maintenance and operation of production equipment and robots.

An Automatician specializing in building automation works in the enterprises dealing with automation of the utility systems of buildings. He or she performs the tasks related to installation, maintenance, and deployment of the automation and the local management network of heat and cold supply, heating and cooling systems, ventilation automation and local control networks, weak current systems of buildings and facilities.

Related occupational qualifications:

Automaton-technician, Level 5

A.2 Work Units

A.2.1 Installation of automation equipment and systems

2.1.1 Preparatory work

2.1.2 The construction of the systems.

2.1.3 Operation of the systems

2.1.4 Documentation

A.2.2 Operation of automation equipment and systems

2.2.1 Preparatory work

2.2.2 Maintenance, servicing and repair of the equipment.

2.2.3 Monitoring and control of automated technological processes.

WORK UNITS RELATED TO SPECIALISATION

A.2.3 Installation and operation of production automation

2.3.1 Installation and operation of equipment and systems.

2.3.2 Process management.

A.2.4 Installation and operation of building automation

2.4.1 Installation of equipment and systems.

2.4.2 Operation of equipment and systems.

THE OPTIONAL WORK UNITS

A.2.5 Installation and operation of automation equipment and systems in potentially explosive environments.

A.2.6 Installation and operation of automation equipment and systems in chemically aggressive environments.

A.2.7 Installation and operation of automation equipment and systems in the environments related to increased sterility.

A.3 Working environment and the specificity of the work

The work may involve physical and mental exertion, and fast-paced work. Depending on the specialization, work can take place outdoors, in heights, or in hazardous or specific working environments (explosion and fire hazard, exposure to chemicals, heightened hygienic and sterility requirements etc.).

A.4 Work equipment

The basic tools of an Automatician are the tools of information technology (computer technology hardware and software), means of telecommunications, hand, and special tools, measuring instruments and tools.

A.5 Personal characteristics necessary for the work: aptitude and personality traits

Coping with the work requires logical thinking, communication and expression skills, good concentration, perseverance, coordination ability, a developed sense of responsibility and readiness to learn.

A.6 Professional training

The occupational qualification of Automatician -technician level 4 can be obtained studying in an educational institution or working on the specialty and completing professional training courses.

A.7 The most common job titles

Automatician, Automatician-installer, Automatician-mechanic, service Automatician, setter of the automatics of machine tools, programmer, Automatician-operator, machine tools Automatician, etc.

A.8 Regulations for operating in the occupational qualification

It is mandatory to pass the electrical safety, first aid and safety training.

Part B COMPETENCY REQUIREMENTS

B.1. Structure of the occupational qualification

On application for the occupational qualification of the Automatician is required the certification of the competencies B.2.1 - B.2.2 and B.2.8 (transversal competencies) and of one competence related to specialization from the selection (B.2.3 - B.2.4).

For certification of the occupational qualification of the Automatician specializing in production automation equipment and systems is required, in addition, to certify the competence B.2.3.

For certification of the occupational qualification of the Automatician specializing in building automation equipment and systems is required, in addition, to certify the competence B.2.4.

Certification of the optional competencies B.2.5-B.2.7 is voluntary.

B.2 Competencies

MANDATORY COMPETENCIES

| B.2.1 Installation of automation equipment and systems | ECT Level 4 |
|--|--------------------|
| <u>Performance indicators</u> | |
| <ol style="list-style-type: none"> 1) reads and interprets automation layouts and other drawings related to automation systems; 2) assesses the feasibility of automation systems, if necessary, makes changes in the automaton layouts; 3) selects the appropriate tools and methods and uses them as intended; 4) installs the actuator and sensor equipment and measurement instruments, in accordance with the project; 5) prepares and/or installs automation panels and cabling systems, including data communication systems; 6) installs wiring, cables, and equipment in a manner that protects them from the mechanical loads and electromagnetic interference of the environment; 7) make adjustment works: tests the compliance of the systems (including communications systems) with project solutions; 8) tunes and adjusts the settings of the apparatus, changes the programs of the controllers, checks the result of the work; 9) verifies the reliability of the installed system: performs automation and electrical measurements with the appropriate instrumentation to make sure the system is in compliance with the automation system, and the system does not have errors that would cause failures; 10) eliminates errors and faults, based on the nature of the error and the needs of the repair process; 11) corrects the automated process by way of changing the parameters in accordance with the requirements of the technology; 12) documents the installation and operation works and the changes made. | |
| <u>Knowledge:</u> | |
| <ol style="list-style-type: none"> 1) Installation methods. | |
| <u>Assessment Method(s):</u> | |
| Theory questions, sample work or an interview, or monitoring at the workplace. | |

B.2.2 Operation of automation equipment and systems

ECT Level 4

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| <p><u>Performance indicators</u></p> <ol style="list-style-type: none"> 1) reads and interprets drawings (also as-built drawings), equipment manuals, technical passports and other source documents; 2) selects the appropriate tools and equipment (including measuring instruments) and uses them as intended; 3) uses appropriate methods for troubleshooting and system maintenance programs; 4) monitors the information on the progress of technology processes, if necessary, adjusts the set points of the parameters of the process in the automation means; 5) maintains, repairs, tunes and checks automation devices (e.g., actuator and sensor equipment, measuring equipment), and automation panels and cabling systems according to the implementation project; 6) inspects and maintains the work of the communications devices between the automation equipment; 7) keeps records of his or her labor costs and uses resources efficiently; 8) use of the possibilities of information and communication technology (information retrieval, work with documents, etc.). |
| <p><u>Knowledge:</u></p> <ol style="list-style-type: none"> 1) Automatic control, command and control equipment and instruments (including measuring instruments in the area of their use). |
| <p><u>Assessment method(s):</u></p> <p>Theory questions, a sample work or an interview, or monitoring at the workplace.</p> |

COMPETENCIES RELATED TO SPECIALISATION

| | |
|--|--------------------|
| Production Automation | |
| B.2.3 Installation and operation of production automation equipment. | ECT Level 4 |
| <p><u>Performance indicators</u></p> <ol style="list-style-type: none"> 1) reads and interprets the functional and management schemes of production automation; 2) installs, adjusts, manages and checks the production equipment and robots related to the production process (e.g., power generation, chemical industry) understanding the nature of the manufacturing process; 3) installs automation cables, makes the necessary connections of automation cables; 4) performs the tasks related to maintenance, care and repair of the equipment and systems; | |
| <p><u>Knowledge:</u></p> <ol style="list-style-type: none"> 1) equipment and systems related to the technological processes of the production of electricity, district heating, wood, chemical, food, and machine industry; 2) operating principles and application of the equipment / instrumentation and electrical actuators used in the process; 3) basic knowledge of pneumatic, hydraulic, power electronic equipment; 4) classification and use production automation systems, components and equipment; 5) performs tasks related to introducing of the equipment, including testing. | |
| <p><u>Assessment Method(s):</u></p> <p>On the basis of documents or theory questions.</p> | |
| Building Automation | |
| B.2.4 Installation and operation of building automation equipment and systems. | ECT Level 4 |
| <p><u>Performance indicators</u></p> | |

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| <ol style="list-style-type: none"> 1) reads and interprets the functional and management schemes of building automation; 2) installs automation cables, makes the necessary connections of automation cables, installs the central equipment and components; 3) installs and connects the sensors, actuators and cables used in automation, taking into account the intended use and installation requirements of the automation device or instrument; 4) maintains and repairs safely the automation equipment, automatic control systems and data connection systems as well as the electrical equipment of buildings and facilities related to automation, understanding the nature of the holistic production process; 5) performs tasks related to introducing of the equipment, including testing. |
| <p><u>Knowledge:</u></p> <ol style="list-style-type: none"> 1) operating principles, uses and conditions of operations of the automation of the heat and cold supply systems, heating and cooling systems and ventilation and water supply and sewerage systems of buildings (structures, etc.); 2) possibilities of implementation of local management networks in operation of HVAC facilities; 3) general principles of operation of electrical and communications networks in order to ensure the functioning of the communication between local networks. |
| <p><u>Assessment Method(s):</u> On the basis of documents or theory questions.</p> |

OPTIONAL COMPETENCIES

| | |
|---|--------------------|
| B.2.5 Installation and operation of automation equipment and systems in potentially explosive environments. | ECT Level 4 |
| <u>Performance indicators</u> | |
| <ol style="list-style-type: none"> 1) Installs connect and maintains the explosion-proof (Ex-Certification) automation tools and cable systems, taking into account the specificities of a potentially explosive environment. | |
| <u>Knowledge:</u> | |
| <ol style="list-style-type: none"> 1) building requirements of space with a heightened the danger of explosion; 2) the equipment and cables installed in an explosive environment and their marking; 3) the specific nature of the structures of the equipment corresponding with the markings, their use and installation conditions. | |
| B.2.6 Installation and operation of automation equipment and systems in chemically aggressive environments. | ECT Level 4 |
| <u>Performance indicators</u> | |
| <ol style="list-style-type: none"> 1) Installs connects and maintains equipment and cable systems, taking into account the specificities of a chemically aggressive environment. | |
| <u>Knowledge:</u> | |
| <ol style="list-style-type: none"> 1) requirements of use of chemically aggressive space; 2) the equipment and cables installed in an explosive environment and their marking; 3) the specific nature of the structures of the equipment corresponding with the markings, their use and installation conditions. | |
| B.2.7 Installation and operation of automation equipment and systems in the environments related to increased sterility. | ECT Level 4 |
| <u>Performance indicators</u> | |

- 1) Installs connects and maintains equipment and cable systems, taking into account the specificities of environment with an increased sterility (such as pharmaceutical and food industries, medical institutions).

Knowledge:

- 1) requirements of use of the space with increased requirements for sterility;
- 2) the equipment and cables installed in the space with increased requirements for sterility;
- 3) the specific nature of the structures of the equipment corresponding with the markings, their use and installation conditions.

TRASNVERSAL COMPETENCIES

| B.2.12 Automatician, level 4, transversal competency | ECT Level 4 |
|---|--------------------|
| <u>Performance indicators</u> | |
| <ol style="list-style-type: none"> 1) reads and understands the technical documentation; 2) arranges for a safe and handy workplace; 3) handles purposefully the basic tools and resources of the profession; 4) works in a customer-oriented, cost-effective manner, achieving results meeting the quality requirements; 5) measures and records parameters by means of measurement instruments; 6) in the assigned site in all the work adheres to the statutory occupational health (including first aid), environment preservation, and occupational safety requirements; 7) masters the most common word-processing and spreadsheet programs, and the documentation programs based thereon, and CAD software; 8) must be willing to develop themselves continually in order to cope with the developing technology, software, new equipment, and working techniques; 9) during the manufacturing process minimizes the power outages or impairment caused by the maintenance operations performed by him or her; 10) supervision and work quality control. | |
| <u>Knowledge:</u> | |
| <ol style="list-style-type: none"> 1) occupational and electrical safety; 2) professional terminology and symbols; 3) principles of customer service; 4) automation equipment and installations, their classification, function and building requirements (e.g., the standard); 5) automation system parameters and principles of operation; 6) basic knowledge of automation installation works, the materials used and their properties; 7) basic knowledge of measurement techniques (electrical and non-electrical measurements) 8) tools used in installation; 9) handling of environmentally hazardous materials that need utilization; 10) occupational health and safety requirements in force in general construction works; 11) basic knowledge of automatics, mechanics and electrical engineering (including terminology); 12) materials and tools used in the work, their use; 13) principles of operation of the components related to the hydraulics and pneumatics. | |
| <u>Assessment Method(s):</u> | |
| <p>Transversal competencies are assessed in integration with the assessment of all other competencies provided in the occupational qualification standard.</p> | |

Part C

GENERAL INFORMATION AND ANNEXES

| C.1 Information for the preparation and approval of the occupational standard, the awarding body, and a reference to the location of the occupational standard in the classifications | |
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| 1. The marking of the occupational standard in the occupational qualification register | 07-26032014-1.1/6s |
| 2. Occupational qualification standard prepared by: | Leho Kuusk, ABB Ellen Mihklepp, Tallinna Vesi Natalya Tšurkina, Tallinn Polytechnic School Arvo Ulla, EETEL Alexander Grünstam, Estonian Society of System Engineers |
| 3. Occupational qualification standard approved by | Professional Council of Energy, Mining and Chemical Industry |
| 4. Date of Professional Council Decision. | 26.03.2014 |
| 5. Occupational Standard valid until | 25.03.2019 |
| 6. Occupational standard version number | 6 |
| 7. Reference to the Classification of Occupations (ISCO 08) | 74 Employees of electrical and electronics industry |
| 8. Reference to the European Qualifications Framework (EQF) | 4 |
| C.2 Occupational title in a foreign language | |
| In English <i>Automatician</i> | |