

OCCUPATIONAL QUALIFICATION STANDARD

Refrigeration Mechanic, EstQF Level 3

An occupational qualification standard is a document which describes the set of skills, knowledge and attitudes, i.e. competence requirements, needed to successfully accomplish duties.

The occupational qualification standard of Refrigeration Mechanic, Level 3 forms the basis for the preparation of training programmes and occupational training curricula that meet the requirements of the labour market, as well as the basis of competence assessment.

Occupational title	Level of Estonian Qualifications Framework (EstQF)
Refrigeration Mechanic, EstQF Level 3	3

Possible partial professional qualifications and titles on occupational qualification certificate	
Title of partial professional qualification	Level of Estonian Qualifications Framework (EstQF)
Leakage check without breaking into the refrigeration circuit	3
Refrigerant recovery	3

Part A DESCRIPTION OF WORK

A.1 Description of work Refrigeration mechanics install and maintain systems containing refrigerants in order to create an artificial climate in trade, transport, housing, industry, etc. The work of a refrigeration mechanic includes locksmith, electrical and automation work. Refrigeration Mechanic, Level 3 installs and maintains factory-fitted systems (containing up to 3 kg of refrigerant) or appropriately labelled hermetically sealed systems (containing up to 6 kg of fluorinated greenhouse gases). They visually check that a refrigeration system with an unopened cooling circuit is leak-proof and collect refrigerant, regardless of the amount. They usually work as a member of a team, but in some cases independently, e.g. doing work in which they have previously participated. They may require supervision (see Annex 1). The profession also includes the following occupational qualification standards: Refrigeration Mechanic, Level 4; and Refrigeration Site Manager, Level 5.
A.2 Tasks A.2.1 Installation of refrigeration equipment and systems 1. Installing utility lines. 2. Connecting and installing pipes. 3. Installing factory-assembled equipment. A.2.2 Maintenance and operation of refrigeration equipment and systems 1. Regulating equipment. 2. Servicing equipment on a regular basis. 3. Activating, regulating and adjusting equipment. A.2.3 Leakage testing of cooling systems without opening cooling circuit 1. Testing cooling circuit. 2. Conducting procedures after testing.

A.2.4 Refrigerant collection

1. Collecting refrigerant from cooling system.
2. Conducting procedures after collection.

The complete occupational qualification of Refrigeration Mechanic, Level 3 includes two partial professional occupations: 'Leakage testing of cooling systems without opening cooling circuit' and 'Refrigerant collection'.

A.3 Work environment and specific nature of work

Work takes place both indoors and outdoors. Work can also take place at heights. Noise, vibration, dust and temperature fluctuations may occur. Exposure to live equipment and substances that may cause allergic reactions is possible, requiring strict compliance with occupational safety requirements, the use of personal protective equipment and the wearing of special clothing, where necessary. Safety requirements in the use of devices and equipment (including tools) must be observed.

A.4 Tools

The main tools are electrical or mechanical manual and specialty tools and measuring devices (testers, ammeters, etc.).

A.5 Personal qualities required for work: abilities and characteristics

The work requires physical endurance, precise and coordinated movements and normal vision and hearing. Successful work is supported by continuous self-development, consistency, the ability to work in a team, emotional stability and the ability to concentrate, adapt, analyse and self-organise.

A.6 Professional preparation

The professional skills of Refrigeration Mechanic, Level 3 are acquired at a vocational education institution or in the course of professional work and training.

A.7 Most common occupational titles

Refrigeration and air conditioning mechanic, ship's refrigeration mechanic, etc.

A.8 Regulations governing profession

According to European Commission Regulation (EU) No 2015/2067, a Level 3 occupational certificate for refrigeration mechanics or its partial occupational qualification certificates 'Leakage testing of cooling systems without opening cooling circuit' and 'Refrigerant collection' is required for positions related to the installation, maintenance, service, leakage control and gas collection of equipment containing greenhouse gases. Conformity with category II operations of Commission Regulation (EU) 2015/2067 must be confirmed with a certificate from the register of occupational qualifications.

In addition, all persons applying for the qualification set out in the various occupational qualification standards must have completed environmental training that includes Estonian and European and legislation governing the environmental impact of substances and the handling of substances (F-gases and ODSs).

Electricity and operations work is usually done under the guidance of an expert in the field of electrical engineering. If the refrigeration mechanic has a valid A, B, B1 or C certificate of competency for electricity, they may do the relevant work in electrical installations upon the decision of their employer according to the rights and competencies afforded by the certificate.

It is mandatory to undergo and pass a medical check-up, complete occupational safety training and training on work involving an open flame and possess the corresponding certificates.

Part B COMPETENCY REQUIREMENTS

B.1 Structure of occupation

Competences B.2.1-B.2.5 must be certified when applying for the qualification of Refrigeration Mechanic, Level 3. When applying for the partial professional qualification of 'Leakage testing of cooling systems without opening cooling circuit', competences B.2.3 and B.2.5 must be certified.

When applying for the partial professional qualification of 'Refrigerant collection', competences B.2.4 and B.2.5 must be certified.

B.2 Competences

MANDATORY COMPETENCES

B.2.1 Installation of refrigeration equipment and systems	EstQF Level 3
<p>Performance indicators:</p> <ol style="list-style-type: none"> 1. installs, connects and disconnects pipes on the basis of the installation documentation provided; 2. attaches the pipes to the correct locations following the installation instructions; 3. performs cabling work in accordance with the cabling instructions; 4. installs the device in its location in accordance with the installation instructions and the terms of reference or prior instructions; 5. activates equipment with a quantity of refrigerant of up to 3 kg (6 kg in the case of a hermetic system); 6. connects the pipes by soldering or screw coupling, ensuring that the refrigerant is leak-proof; 7. attaches the pipes to the correct locations following the installation instructions; 8. reads and understands the technical documentation of the device and acts accordingly; 9. connects the device to utility lines. <p>Knowledge:</p> <ol style="list-style-type: none"> 1) material-dependent methods of pipe connection; 2) types and uses of cables; 3) fire safety requirements; 4) basic principles of the operation of refrigeration components. <p>Assessment method(s): Exam and test job</p>	
B.2.2 Maintenance and operation of refrigeration equipment and systems	EstQF Level 4
<p>Performance indicators:</p> <ol style="list-style-type: none"> 1. adjusts equipment according to the factory instructions; 2. checks the settings according to the maintenance and operating instructions; 3. inspects the equipment according to the conditions set by the factory, e.g. performs a simulation test; 4. reads the maintenance and operating instructions; 5. cleans the device according to the factory instructions; 6. checks the settings and tests the device, where necessary, according to the factory instructions; 7. where necessary, vacuums the device to remove air and moisture; 8. tests the device and, where necessary, adjusts the settings at the normal user level according to the activation instructions; 9. monitors the operation of the device during certain periods/intervals; 10. performs a pressure test to check holding and strength; 11. documents the results of the work (recording the details in the maintenance book). <p>Knowledge:</p> <ol style="list-style-type: none"> 1) operating principles of a vacuum pump; 2) types and uses of cleaning products; 3) principles of inspection and maintenance; 4) basics of automation (sensor classification); 5) properties and use of electrical materials (conductors, insulators and semiconductor materials); 6) electronic components and circuits. <p>Assessment method(s): Exam and test job</p>	
B.2.3 Leakage testing of cooling systems without opening cooling circuit	EstQF Level 3
<p>Performance indicators:</p>	

1. visually and manually inspects a refrigeration system for leaks in accordance with Commission Regulation (EC) No 1516/2007; 2. checks that the system is leak-proof using direct and indirect methods without opening the cooling circuit, in compliance with Regulation (EC) No 1516/2007 and the system manual; 3. uses an appropriate electronic leak detection device; 4. records the results of the leak inspection in the prescribed manner; 5. reports any detected faults and follows emergency instructions.	
Knowledge: 1) potential leaks in a refrigeration system; 2) leakage control methods.	
Assessment method(s): Exam and test job	
B.2.4 Refrigerant collection	EstQF Level 3
Performance indicators: 1. empties containers and fills containers with refrigerant in both liquid and gaseous states; 2. collects refrigerants from a refrigeration circuit or containers using collection equipment and ensuring minimum losses; 3. removes refrigerant oil from the system; 4. selects the weight type suitable for the amount of refrigerant and weighs the collected refrigerant; 5. marks and stores containers in the prescribed manner.	
Knowledge: 1) operating principles and use of the collection device; 2) the procedure for handling refrigerant (including contaminated refrigerants and oils); 3) specific physical and chemical properties of the most common refrigerants (toxicity, fire hazard, density, vapour pressure, etc.); 4) health and fire safety requirements related to the handling of refrigerants.	
Assessment method(s): Exam and test job	

RECURRING COMPETENCES

B.2.5 Recurring competences of Refrigeration Mechanic, Level 3	EstQF Level 3
Performance indicators: 1. reads and understands the technical documentation of the device and acts accordingly; 2. measures and fixes parameters with the help of measuring devices; 3. handles the basic tools and instruments of the profession; 4. follows all occupational health and safety, environmental protection and electrical safety requirements in every stage of their work; 5. is proficient in the use of the most common word-processing and spreadsheet programmes and the documentation programmes based thereon.	
Knowledge: 1) occupational terminology, symbols used in electrical drawings, basic and derived electrical units of the SI system and conversion and reference calculations; 2) legislation related to the profession; 3) the principles of thermodynamics; 4) basics of providing first aid; 5) safety requirements in the use of tools and resources; 6) waste management; 7) fundamentals of mathematics; 8) basics of electrical engineering (applications of the Ohm and Kirchhoff laws in direct and alternating current circuits, principles and uses of electrical machines and equipment); 9) classification and use of manual and specialist tools and mechanisms; 10) the environmental impact of refrigerants and related environmental legislation;	

11) appropriate technologies to replace or reduce the use of fluorinated greenhouse gases and their safe management.

Assessment method(s):

Recurring competences are evaluated as part of the assessment of the other competences listed in the occupational qualification standard.

Part C GENERAL INFORMATION AND ANNEXES

C.1 Information concerning compilation and certification of occupational qualification standard and reference to classification of occupations

1. ID of occupational qualification standard in register of occupational qualifications	07-17112016-3.1/7k
2. Occupational qualification standard compiled by:	Virge Raaga, Eesti Külmaliiit Riho Pilv, Cooltec OÜ Imre Soorand, Eesti Külmaliiit Roland Jung, TRV Kliima AS Viljo Kaul, Termex OÜ Kati-Liis Kensap, Keskkonnaministeerium Stanislav Štokov, Eesti Keskkonnauuringute Keskus
3. Occupational qualification standard approved by:	Energy, Mining and Chemical Industry
4. No. of decision of Sectoral Council	3
5. Date of decision of Sectoral Council	17.11.2016
6. Occupational qualification standard valid until	09.11.2021
7. Occupational qualification standard version no.	7
8. Reference to International Standard Classification of Occupations (ISCO 08)	7127 Air Conditioning and Refrigeration Mechanics
9. Reference to European Qualifications Framework (EQF)	3

C.2 Occupational title in foreign language

English:	Refrigeration Mechanic, EstQF Level 3
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C.3 Annexes

Lisa 1 [Comparison table of parts of work of refrigeration mechanic occupations](#)