OCCUPATIONAL QUALIFICATION STANDARD

Railway Signalling Area Engineer, EstQF Level 6

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. Occupational qualification standards are used for compiling curricula and awarding qualifications.

Occupational title	Level of Estonian Qualifications Framework (EstQF)
Railway Signalling Area Engineer, EstQF Level 6	6

Part A
DESCRIPTION OF WORK

A.1 Description of work

Railway Signalling Area Engineer, Level 6 plans and organises maintenance and repairs of railway safety and communications equipment in several regions or throughout an organisation.
The work may involve designing, testing and developing new traffic management systems based on standard solutions. Railway Signalling Area Engineer, Level 6 works independently in complex and unpredictable situations in construction work on new safety equipment and is responsible for the results of their own work as well as those of working groups.
They work independently and in a team, their work requiring communication with co-workers, workers in other units and clients.
Railway Signalling Area Engineer, Level 6 is responsible for the safety and quality of their work and the work they supervise, as well as hazardous situations resulting from breaches of safety during maintenance (e.g. improper tools, techniques and methods).

There are four occupations in the field of maintenance and repairs of railway safety equipment.
Railway Signalling Area Assistant, Level 2 conducts uncomplicated maintenance and repairs on railway safety and communications equipment.
Railway Signalling Area Engineer, Level 4 conducts maintenance and repairs on railway safety and communications equipment.
Railway Signalling Area Engineer, Level 5 plans and organises maintenance and repairs of railway security and communications equipment and carries out such work in their area.
Railway Signalling Area Engineer, Level 6 plans and organises maintenance and repairs of railway safety and communications equipment in several regions or throughout an organisation.

A.2 Tasks

A.2.1 Organising safety equipment maintenance
1. Organising and analysing the maintenance process of light signals
2. Organising and analysing the maintenance process of turnout safety equipment
3. Organising and analysing the maintenance process of track circuits and axle counters
4. Organising and analysing the maintenance process of automatic train signalling (ALSN) track equipment
5. Organising and analysing the maintenance process of electromechanical controls
6. Organising and analysing the maintenance process of computer-based controls
7. Organising and analysing the maintenance process of internal hardware, equipment cabinets and containers
8. Organising and analysing the maintenance process of level crossing safety equipment
9. Organising and analysing the maintenance process of the cable network
10. Organising and analysing the maintenance process of safety equipment power supply
11. Organising and analysing the maintenance process of protective devices and earthing of safety equipment

A.2.2 Managing safety equipment documentation
1. Organising the drafting of service area schedule plans
2. Checking the completion of inspection documentation for safety equipment

3. Preparing and coordinating safety equipment activation and switch-off procedures. 4. Developing temporary solutions and modifications to the structure of safety equipment and organising tests 5. Organising and supervising the implementation of temporary solutions and modifications to the structure of safety equipment 6. Organising the preparation of annual reports A.2.3 Project management 1. Coordinating the development of basic documentation for safety equipment 2. Organising the drafting of maintenance and operating instructions for safety equipment 3. Selecting, designing and building architectural solutions for basic equipment 4. Determining basic equipment functionality 5. Organising the drafting of technical and design requirements for projects 6. Organising technical administration of construction projects and construction management 7. Preparing budgets for safety equipment upgrade projects and operation 8. Organising operational work on safety equipment 9. Organising software asset management A.2.4 Management and supervision 1. Managing a structural unit 2. Organising training for less qualified employees 3. Training and instructing employees and end users in using safety equipment 4. Managing resources in a structural unit and monitoring the purposeful use of budgetary resources
Elective areas of work
A.2.5 Organising maintenance of marshalling yard safety equipment 1. Organising the operational process of marshalling yard retarders and controls 2. Analysing marshalling yard efficiency A.2.6 Organising ERTMS /ETCS equipment maintenance 1. Organising the operation, software management, updating and restarting of ERTMS/ETCS internal hardware 2. Organising the operation, software replacement and updating of ERTMS/ETCS external hardware ---------- ERTMS - European Rail Traffic Management System - Euroopa raudteeliikluse juhtimissüsteem ETCS - European Train Control System - Euroopa signalisatsioonisüsteem
A.3 Work environment and specific nature of work
A railway signalling area engineer works both indoors and outdoors. A railway signalling area engineer's working hours are fixed, but in the event of major equipment breakdowns or brief technological windows, they must work outside regular business hours, including on weekends and holidays. The workload may be unevenly distributed. The working environment is associated with an increased risk of injury and often requires working in a forced position and at heights. Exposure to chemicals and toxic agents, tick-borne infectious diseases, heat, humidity and temperature fluctuations can cause damage to health and therefore requires the use of personal protective equipment and preferably vaccination. Due to the above-average level of dangerous work, a railway signalling area engineer must strictly observe the rules of work, health and safety. Breach of safety requirements can result in illness, trauma, disability or a rail traffic accident. The occupation of railway signalling area engineer requires regular medical check-ups.
A.4 Tools
The main tools are indicator instruments, aids (e.g. shunt and stencils), precision measuring instruments (e.g. multimeter), the computer and various software, computer-based diagnostics devices and office and communication devices (e.g. telephone and radio).
A.5 Personal qualities required for work: abilities and characteristics
The work of a railway signalling area engineer requires cognitive abilities (fluency of thought, logical thinking, visual memory, spatial imagination and concentration) and mathematical abilities.

Stress tolerance, environmental tolerance, cooperative skills, analytical skills, learning ability, accountability, reliability, emotional stability, accuracy, self-discipline, communication readiness, decision-making skills, independence and management readiness are also important in the work of the railway signalling area engineer. Railway Signalling Area Engineer, Level 6 is expected to commit to their work, accept the goals of their organisation and be prepared for change.
A.6 Professional preparation
Railway signalling area engineers are usually people who have higher education, previous work experience as a Level 5 railway signalling area engineer and who have acquired professional skills during practical work under the supervision of a Level 6 railway signalling area engineer.
A.7 Most common occupational titles
Technical Service Area Manager, Communications Manager, Head of Unit (e.g. Communications and Safety)
A.8 Regulations governing profession
The work of a railway signalling area assistant is regulated by the Railways Act and the regulation of the Government of the Republic of Estonia 'List of Work Environment Hazards and Work for Which the Employment of Minors is Prohibited'.

Part B
COMPETENCY REQUIREMENTS

B.1 Structure of occupation
Competences B.2.1-B.2.4 and B.2.7 must be certified when applying for the qualification of Railway Signalling Area Engineer, Level 6. Certification of optional competences B.2.5 and B.2.6 is not mandatory.

B.2 Competences

MANDATORY COMPETENCES

B.2.1 Organising safety equipment maintenance	**EstQF Level 6**
Performance indicators: Analyses and organises 1. The maintenance process of light signals, determining the procedure and frequency of maintenance and the required manpower, monitoring the timely completion of work, compliance with standards and the use of appropriate tools in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 2. The maintenance process of turnouts, determining the procedure and frequency of maintenance and the required manpower, monitoring the timely completion of work, compliance with standards and the use of appropriate tools in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 3. The maintenance process of track circuits and axle counters, determining the procedure and frequency of maintenance and the required manpower, monitoring the timely completion of work, compliance with standards and the use of appropriate tools in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 4. The maintenance process of automatic train signalling (ALSN) track equipment, determining the procedure and frequency of maintenance and the required manpower, monitoring the timely completion of work, compliance with standards and the use of appropriate tools in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 5. The maintenance process of electromechanical controls, determining the procedure and frequency of maintenance and the required manpower, monitoring the timely completion of work, compliance with standards and the use of appropriate tools in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions.	

6. The maintenance process of computer-based controls, determining the procedure and frequency of maintenance and the required manpower, monitoring the timely completion of work, compliance with standards and the use of appropriate tools in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 7. The maintenance process of internal hardware, equipment cabinets and containers, determining the procedure and frequency of maintenance and the required manpower, monitoring the timely completion of work, compliance with standards and the use of appropriate tools in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 8. The maintenance process of level crossing safety equipment, determining the procedure and frequency of maintenance and the required manpower, monitoring the timely completion of work, compliance with standards and the use of appropriate tools in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 9. The maintenance process of the cable network, determining the procedure and frequency of maintenance and the required manpower, monitoring the timely completion of work, compliance with standards and the use of appropriate tools in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 10. The maintenance process of safety equipment power supply, determining the procedure and frequency of maintenance and the required manpower, monitoring the timely completion of work, compliance with standards and the use of appropriate tools in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 11. The maintenance process of the protective devices and earthing of safety equipment, determining the procedure and frequency of maintenance and the required manpower, monitoring the timely completion of work, compliance with standards and the use of appropriate tools in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions.
Knowledge: 1) principles of the functionality and structure of the safety systems used in infrastructure and links to existing infrastructure.
B.2.2 Managing safety equipment documentation **EstQF Level 6**
Performance indicators: 1. Organises the drafting of schedule plans, monitors adherence to schedule plans and compliance with standards and confirms service area schedules in accordance with the rules for the technical use of railways, the internal normative documents of the organisation, the manufacturer's instructions and the results of operational analysis. 2. Monitors the completion of safety equipment inspection documentation and ensures that their unit is informed of changes in requirements or regulations within the organisation in accordance with the internal normative documents of the organisation. 3. Prepares and coordinates safety equipment activation and switch-off procedures in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the equipment manufacturer's instructions. 4. Develops temporary solutions and modifications to the structure of safety equipment and organises testing in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 5. Organises the implementation of temporary solutions and modifications to the structure of safety equipment and monitors compliance with requirements during implementation in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 6. Organises the preparation of annual reports in accordance with the requirements of the Railways Act.
Knowledge: 1) principles of operation of safety equipment; 2) preparation of annual reports.
B.2.3 Project management **EstQF Level 6**
Performance indicators: 1. Develops basic documentation for safety equipment (schematic plans, interdependency tables of points, light signals and journeys, two-line station and open track plans) or coordinates this work in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the instructions of the manufacturer of selected technology.

2. Organises the compilation of operation and maintenance instructions for safety equipment in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 3. Selects the architectural solution for basic equipment and organises design and construction work in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 4. Determines the functionality of basic equipment in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 5. Prepares technical and design requirements for projects or organises this task in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 6. Organises and administers the management of construction projects and construction work in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 7. Prepares budgets for safety equipment upgrade projects and operation in accordance with the internal normative documents of the organisation. 8. Organises operational work on safety equipment in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 9. Determines the procedure for software asset management in accordance with the internal normative documents of the organisation and the manufacturer's instructions.
Knowledge: 1) types of main safety equipment devices and principles of alarm system operation; 2) principles of compiling operating instructions for safety equipment; 3) principles of compiling maintenance instructions for safety equipment; 4) principles of the technical administration of construction projects and construction work; 5) principles of organising operational work on safety equipment; 6) principles of software asset management.
B.2.4 Management and supervision **EstQF Level 6**
Performance indicators: 1. Manages a structural unit in accordance with the structure and the internal normative documents of the organisation. 2. Organises training for less qualified employees in accordance with the rules for the technical use of railways and the internal normative documents of the organisation. 3. Trains and instructs employees and end users in using safety equipment in accordance with the rules for the technical use of railways, the internal normative documents of the organisation and the manufacturer's instructions. 4. Manages unit resources (e.g. funds according to budget, warehouse resources, materials and tools) and monitors the purposeful use of budgetary resources in accordance with the internal normative documents of the organisation.
Knowledge: 1) basics of planning and organisation. 2) principles of teamwork; 3) basics of communication psychology, including assertiveness; 4) basics of motivation; 5) basics of labour law; 6) basics of document management and administration.

OPTIONAL COMPETENCES

Certification of optional competences B.2.5 and B.2.6 is not mandatory.

B.2.5 Organising maintenance of marshalling yard safety equipment **EstQF Level 6**
Performance indicators: 1. Organises the operational process of marshalling yard retarders and safety equipment in accordance with the internal normative documents of the organisation and the manufacturer's instructions.

2. Analyses marshalling yard efficiency based on end user information.
Knowledge: 1) principles of the structure and operation of marshalling yards; 2) types of marshalling yard systems.

B.2.6 Organising maintenance of ERTMS /ETCS devices	**EstQF Level 6**
Performance indicators: 1. Organises ERTMS/ETCS internal hardware maintenance, software management, updating and restarting in accordance with the rules for the technical use of railways and the manufacturer's instructions; 2. Organises ERTMS/ETCS external hardware maintenance (e.g. replacing and updating software) in accordance with the rules for the technical use of railways and the manufacturer's instructions.	
Knowledge: 1) architecture and operating principles of ERTMS/ETCS systems.	
ERTMS - European Rail Traffic Management System - Euroopa raudteeliikluse juhtimissüsteem ETCS - European Train Control System - Euroopa signalisatsioonisüsteem	

RECURRING COMPETENCES

B.2.7 Recurring competences of Railway Signalling Area Engineer, Level 6	**EstQF Level 6**
Performance indicators: 1. Knows the typical causes of safety equipment failures, instructs subordinates in eliminating faults and organises the people and tools needed to eliminate faults. 2. Knows the typical causes of safety equipment failures in assistive work, instructs subordinates in eliminating faults and organises the people and tools needed to eliminate faults. 3. Ensures traffic safety during repair, maintenance and construction work. 4. Immediately informs traffic control and other units of traffic-related malfunctions, coordinates their activities with other units and coordinates their activities with other units when planning work. 5. Organises or conducts maintenance of the traffic manager work station (telephone and radio equipment, eliminating minor faults, replacing panel lamps, etc.). 6. Organises the implementation of safety equipment activation and switch-off procedures and monitors adherence to them. 7. Organises or conducts an analysis of repeated malfunctions in safety equipment and seeks solutions or organises this task. 8. Analyses the efficiency of safety equipment maintenance processes. 9. Adjusts the working arrangements of the organisation and proposes structural changes. 10. Organises changes to the station dependency table (interdependence of light signals, journeys and turnouts). 11. Organises changes to the station and open-track schematic plan. 12. Organises changes to the two-line station and open-track plan. 13. Organises changes to the functionality of open-track route blocking systems. 14. Organises support services required to operate safety equipment (e.g. software technical support and operational supply of materials). 15. Maintains different types of safety equipment (e.g. automatic blocking and semi-automatic blocking) and safety equipment of different generations; 16. Immediately informs their line manager of any issues that fall outside the limits of their competence. 17. Pays heed to the instructions of safety equipment manufacturers. 18. Checks the proper functioning of the equipment after carrying out work independently or with the traffic manager. 19. Documents work and makes necessary record entries. 20. Pays heed to work instructions, technologies and quality requirements as well as the requirements of all relevant legislation (both national and international), including waste management regulations. 21. Works diligently and accurately without endangering human health, property or the environment; 22. Organises the workplace as required and selects appropriate tools in accordance with the nature of the work, ensuring they are in working order and safe before starting work; 23. Strictly observes occupational health and safety requirements when planning work, preparing the workplace, working and organising the workplace, and takes surrounding people and the environment into account in order to prevent occupational accidents;	

24. Uses personal protective equipment (work clothing and footwear, safety vest, etc.) and appropriate work methods and techniques that do not threaten life or health. 25. Identifies the risks (e.g. safety and deadlines) that may be associated with the achievement of goals and takes measures to mitigate them. 26. In the event of an occupational accident, performs first aid, calls for professional help and informs the emergency services and the employer of the accident; 27. In the event of a health, commercial, technical or environmental hazard, terminates the work and immediately informs the employer or the employer's representative; 28. Uses all work equipment and tools prudently and properly, according to their operation instructions; 29. Regularly organises and cleans the tools, devices and protective equipment used during work, according to their maintenance instructions; 30. Is open to cooperation, takes part in teamwork, shares all necessary and useful information with others and works towards achieving the best result for all concerned; 31. Is capable of independently adapting to changes in working conditions and can find and analyse appropriate information to perform their duties and solve work-related problems. 32. Participates in professional discussions within the limits of their competence, presenting and defending their opinions in a well-argued way. 33. Participates in continuing vocational training, applies what they have learned in professional work; 34. Estonian language skills levels: understanding B2, speaking B2 and writing B2; Russian language skills levels: understanding B2 and speaking B2; English language skills levels: understanding B2 and speaking B1. 35. Uses a computer for information processing, communication, content creation and safety at the Independent user level on the Digital Competence Self-Assessment Scale (see Annex 2).
Knowledge: 1) rules for the technical use of railways with annexes; 2) requirements of professional legislation and regulations, meanings of professional terms; 3) requirements of drafting technical documentation (e.g. technical maintenance instructions for devices and the technical management act of the station) and documents; 4) requirements of operating on railways; 5) occupational safety requirements; 6) what to do in an emergency situation; 7) principles of first aid at the site of an accident; 8) principles of waste management; 9) principles of operation and maintenance of computer equipment; 10) fire safety requirements; 11) environmental protection requirements. 12) what to do in the event of traffic and occupational accidents; 13) requirements of notification procedures in the event of railway accidents and incidents; 14) basics of economics; 15) basics of management; 16) types of traffic control devices used on railways; 17) types of communication used on railways; 18) point construction and principles of operation; 19) requirements of signal construction, installation and visibility; 20) principles of road safety for repair, maintenance and construction work; 21) principles of demarcating obstacle points and hazardous areas; 22) principles of hand signalling; 23) principles of issuing a caution order; 24) requirements of section availability detection sensors; 25) requirements of open track vacancy detection sensors; 26) requirements of automatic engine signalling equipment; 27) requirements of signalling equipment at crossings; 28) requirements of route-blocking equipment; 29) requirements of road-blocking equipment; 30) requirements of station-blocking equipment; 31) requirements of interdependence between points, signals and journeys; 32) maintenance requirements of safety and communications lines;

33) architecture and operating principles of various types of safety equipment.
Assessment methods: Recurring competences are assessed in an integrated manner 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	12-15052019-1.1.5/6k
2. Occupational qualification standard compiled by:	Aleksandr Malõsev, AS Eesti Raudtee Andres Türn, Edelaraudtee Infrastruktuuri AS Anto Looken, SA Raudteekutsed Indrek Süld, AS Eesti Raudtee Mati Lõhmus, AS Eesti Raudtee Tarvi Viisalu, AS Eesti Raudtee Tiiu Poltruk, Edelaraudtee Infrastruktuuri AS
3. Occupational qualification standard approved by:	Transport and Logistics
4. No. of decision of Sectoral Council	12
5. Date of decision of Sectoral Council	15.05.2019
6. Occupational qualification standard valid until	10.04.2024
7. Occupational qualification standard version no.	6
8. Reference to International Standard Classification of Occupations (ISCO 08)	7412 Electrical Mechanics and Fitters
9. Reference to European Qualifications Framework (EQF)	6
C.2 Occupational title in foreign language	
English:	Railway Signalling Area Engineer, EstQF Level 6
Finnish:	Rautatie mekaanikko
Russian:	Механик СЦБ железнодорожного транспорта
C.3 Annexes	
Lisa 1 Language skills level descriptions	
Lisa 2 Scale of self-assessment in digital competence	