

OCCUPATIONAL QUALIFICATION STANDARD

Sheet Metal, CNC Machine Operator, EstQF Level 5

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)
Sheet Metal, CNC Machine Operator, EstQF Level 5	5

Possible specialisation and titles on occupational certificate	
Specialisation	Title on occupational qualification certificate
Making products from sheet metal using flame- and plasma-cutting technology	Sheet Metal, CNC Machine Operator, EstQF Level 5 Making products from sheet metal using flame- and plasma-cutting technology
Making products from sheet metal using water-cutting technology	Sheet Metal, CNC Machine Operator, EstQF Level 5 Making products from sheet metal using water-cutting technology
Making products from sheet metal using laser-cutting technology	Sheet Metal, CNC Machine Operator, EstQF Level 5 Making products from sheet metal using laser-cutting technology
Making products from sheet metal using CNC sheet-processing machines	Sheet Metal, CNC Machine Operator, EstQF Level 5 Making products from sheet metal using CNC sheet-processing machines
Making products from sheet metal using CNC press brakes	Sheet Metal, CNC Machine Operator, EstQF Level 5 Making products from sheet metal using CNC press brakes

Part A DESCRIPTION OF WORK

A.1 Description of work <p>A Sheet Metal, CNC (Computer Numerical Control) Machine Operator is a skilled worker with work experience who has obtained specialised education and completed in-service training and who works in an enterprise that processes sheet metal. Their main duty is making parts from sheet metal using CNC machines.</p> <p>A Sheet Metal, CNC Machine Operator performs their duties according to technical and normative documents and general quality requirements.</p> <p>Sheet Metal, CNC Machine Operator, EstQF Level 5 specialises in one or several technologies, depending on their work experience.</p> <p>A worker at Level 5 writes control programmes. They set up machines and ensure the quality of the part that is processed using checking and measuring equipment.</p> <p>Sheet Metal, CNC Machine Operator, Level 5 can lead a small team and is responsible for performing their duties to a high level of quality and in a timely manner.</p>
A.2 Tasks
A.2.1 Preparing the work process

A.2.2 Checking, monitoring, adjusting and configuring machine operations
A.2.3 Carrying out machine maintenance and repairs
A.2.4 Storage and utilisation

Specialised areas of work

A.2.5 Making products from sheet metal using flame- and plasma-cutting technology

1. Workplace preparation.
2. Configuring the machine and making the sample part.
3. Making parts from sheet metal on flame-cutting machines.
4. Making parts from sheet metal on plasma-cutting machines.
5. Clearing parts of off-cuts.

A.2.6 Making products from sheet metal using water-cutting technology

1. Workplace preparation.
2. Configuring the machine and making the sample part.
3. Making parts from sheet material on water-cutting machines.
4. Post-processing of finished parts.

A.2.7 Making products from sheet metal using laser-cutting technology

1. Workplace preparation.
2. Configuring the machine and making the sample part.
3. Making parts from sheet metal on laser-cutting machines.
4. Clearing parts of off-cuts.

A.2.8 Making products from sheet metal using CNC sheet-processing machines

1. Workplace preparation.
2. Configuring the machine and making the sample part.
3. Making parts from sheet metal on CNC sheet-processing machines.
4. Clearing parts of off-cuts.

A.2.9 Making products from sheet metal using CNC press brakes

1. Workplace preparation.
2. Configuring the machine and making the sample part.
3. Making parts from sheet metal using CNC press brakes.

A.3 Work environment and specific nature of work

The working hours of a Sheet Metal, CNC Machine Operator may be in shifts or on the basis of a working schedule and include night-time, weekends and public holidays, depending on the employer. The pace of work may periodically be fast and stressful. The work environment is indoors and can be noisy. There is metal dust in the work environment which can cause allergic reactions. Failure to comply with work environment safety requirements may result in an occupational accident.

A.4 Tools

Unmanned cranes, forklifts, measuring instruments (calliper, measuring tape, instruments for measuring angles, etc.) and electrical and pneumatic hand tools (angle grinder, chisels, etc.).

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

The work of a Sheet Metal, CNC Machine Operator requires mathematical and logical thinking, analytical skills, spatial abilities, visual memory and the ability to concentrate. Their work demands precision in movement, coordination and physical capabilities. Other useful qualities are correctness, accuracy, the ability to learn and a sense of responsibility.

A.6 Professional preparation

Sheet Metal, CNC Machine Operator, Level 5 has long-term professional experience and has obtained specialised vocational education or that of a closely related area. Those who do not obtain professional education acquire their professional skills in the course of practical training. They usually have secondary education and have completed in-service training.

A.7 Most common occupational titles

CNC sheet-processing machine operator

Part B COMPETENCY REQUIREMENTS

B.1 Structure of occupation

Competences B.2.1-B.2.4 and B.2.10 and at least one competence related to a specialisation (B.2.5-B.2.9) must be certified when applying for the qualification of Sheet Metal, CNC Machine Operator, EstQF Level 5.

B.2 Competences

MANDATORY COMPETENCES

B.2.1 Preparing the work process	EstQF Level 5
<p>Performance indicators</p> <ol style="list-style-type: none"> 1. Familiarises themselves with the technical drawings and ensures that the primary data necessary for making the part are on the drawings. 2. Ensures that the immediate vicinity of the workstation is safe and in order. Checks that the necessary personal protective equipment (glasses, gloves, etc.) is available and in good order. 3. Visually checks the machine and ensures that it is in good order, clean and configured before commencing work. 4. Checks that they have all the necessary documents (work order, waybills, error and problem reports, etc.) and fills them in on an ongoing basis. 5. Selects the necessary tools and materials based on data, compiles the operation technology and programme and configures the machine. 	
B.2.2 Checking, monitoring, adjusting and configuring machine operations	EstQF Level 5
<p>Performance indicators</p> <ol style="list-style-type: none"> 1. Starts the machine and monitors for deviations in its work. If a deviation occurs, reacts quickly and appropriately according to their authorisation. If necessary, notifies their line manager and/or a specialist of the problem. 2. Makes a sample of the product to ensure that the configured parameters of the machine and the work order are compatible. 	
B.2.3 Carrying out machine maintenance and repairs	EstQF Level 5
<p>Performance indicators</p> <ol style="list-style-type: none"> 1. Checks the physical and electronic indicators of the machine throughout the work period. If problems arise, implements measures to eliminate the malfunction based on their authorisation. If necessary, notifies their line manager and/or a specialist of the malfunction. 2. Registers all problems and their repair data in the manner prescribed. 3. Conducts small repairs on and technical maintenance of the machine within the limits of their authorisation. Calls a technician and informs other appropriate people, if necessary. 	
B.2.4 Storage and utilisation	EstQF Level 5
<p>Performance indicators</p> <ol style="list-style-type: none"> 1. Marks finished parts and packages them or prepares them for packaging according to the work order. 2. Stores and marks the waste material left from filling in the work order. 3. Sorts and stores the material to be utilised. 	

COMPETENCES RELATED TO SPECIALISATION

At least one competence related to a specialisation (B.2.5-B.2.9) must be certified when applying for the qualification of Sheet Metal, CNC Machine Operator, EstQF Level 5.

Making products from sheet metal using flame- and plasma-cutting technology	
B.2.5 Making products from sheet metal using flame- and plasma-cutting technology	EstQF Level 5
<p>Performance indicators</p> <ol style="list-style-type: none"> 1. Ensures that the machine is in good technical order and that there are no objects in the work area which restrict the work of the machine. Prepares the machine for work (opens the required gas valves, checks the pressure levels, indexes the machine, etc.). 2. Familiarises themselves with the work order/drawings and configures the machine accordingly: selects the appropriate parameters; assembles and installs the necessary wear parts and accessories; downloads or opens the work programme, writing the programme if necessary. Makes a sample part. 3. Makes parts from sheet metal on the flame-cutting machine according to the given work order/drawing. 4. Makes parts from sheet metal on the plasma-cutting machine according to the given work order/drawing. 5. Clears finished parts of off-cuts, if necessary. 6. Checks the quality of the product based on the determined frequency of checks. Checks whether the number of parts made complies with the work order. <p>Knowledge:</p> <ol style="list-style-type: none"> 1) operating principles of plasma- and flame-cutting technologies; 2) accessories and wear parts of plasma- and flame-cutting equipment, their specific nature and uses; 3) cutting gases (plasma gas) and auxiliary gases (nitrogen, argon, oxygen, H₂O, H₃₅ and compressed air) used in plasma-cutting technology; 4) cutting gases used in flame-cutting technology (propane or acetylene and oxygen as an auxiliary gas), their suitability to the base materials and their principles of use; 5) choosing cutting parameters according to the EVS-EN ISO 9013 standard; 6) the EVS-EN ISO 9013 standard; 7) safety technology (machine and gas safety). 	

Making products from sheet metal using water-cutting technology	
B.2.6 Making products from sheet metal using water-cutting technology	EstQF Level 5
<p>Performance indicators</p> <ol style="list-style-type: none"> 1. Ensures that the machine is in good technical order and that there are no objects in the work area which restrict the work of the machine. Prepares the machine for work (indexes the machine). 2. Familiarises themselves with the work order/drawings and configures the machine accordingly: selects the appropriate parameters; selects the appropriate abrasive; assembles and installs the necessary wear parts and accessories; downloads or opens the work programme, writing the programme if necessary. Makes a sample part. 3. Makes parts from sheet material on the water-cutting machine according to the given work order/drawing. 4. If necessary, clears finished parts of off-cuts, dries the part and applies corrosion protection. 5. Checks the quality of the product based on the determined frequency of checks. Checks whether the number of parts made complies with the work order. <p>Knowledge:</p> <ol style="list-style-type: none"> 1) operating principles of water-cutting technology; 2) accessories and wear parts of water-cutting machines, their specific nature and uses; 3) extensive knowledge of the materials used based on water-cutting technology; 4) cutting abrasives, their differences and uses; 5) choosing cutting parameters according to the EVS-EN ISO 9013 standard; 6) the EVS-EN ISO 9013 standard; 7) safety technology (machine safety). 	

Making products from sheet metal using laser-cutting technology	
B.2.7 Making products from sheet metal using laser-cutting technology	EstQF Level 5
Performance indicators	

1. Ensures that the machine is in good technical order and that there are no objects in the work area which restrict the work of the machine. Prepares the machine for work (opens the required gas valves, checks the pressure levels, indexes the machine, etc.).
2. Familiarises themselves with the work order/drawings and configures the machine accordingly: selects the appropriate parameters; selects the appropriate cutting gas; assembles and installs the necessary wear parts and accessories; downloads or opens the work programme, writing the programme if necessary. Makes a sample part.
3. Makes parts from sheet metal on the laser-cutting machine according to the given work order/drawing.
4. Clears finished parts of off-cuts, if necessary.
5. Checks the quality of the product based on the determined frequency of checks. Checks whether the number of parts made complies with the work order.

Knowledge:

- 1) operating principles of laser-cutting technology;
- 2) accessories and wear parts of laser-cutting machines, their specific nature and uses;
- 3) extensive knowledge of the materials used based on laser-cutting technology;
- 4) cutting gases used (oxygen, nitrogen, compressed air, etc.), their suitability to the base materials and their principles of use;
- 5) resonator gases, their function and compatibility with equipment;
- 6) choosing cutting parameters according to the EVS-EN ISO 9013 standard;
- 7) the EVS-EN ISO 9013 standard;
- 8) safety technology (machine and gas safety).

Making products from sheet metal using CNC sheet-processing machines

B.2.8 Making products from sheet metal using CNC sheet-processing machines

EstQF Level 5

Performance indicators

1. Ensures that the machine is in good technical order and that there are no objects in the work area which restrict the work of the machine. Prepares the machine for work (indexes the machine etc.).
2. Familiarises themselves with the work order/drawings and configures the machine accordingly: assembles and installs the necessary tools; downloads or opens the work programme and selects the appropriate parameters; writes the programme, if necessary. Places the sheet on the machine and makes a sample part.
3. Makes parts from sheet metal on CNC sheet-processing machines (eccentric, hydraulic, servo-electric press, etc.) based on the given technical drawings. Separates finished details from the processed sheet.
4. Clears finished parts of off-cuts, if necessary.
5. Checks the quality of the product based on the determined frequency of checks. Checks whether the number of parts made complies with the work order.

Knowledge:

- 1) stamps, matrices and wear parts used in stamping, their specific nature and uses;
- 2) types of stamping (embossing, beading, etc.) and their operating principles;
- 3) stamping parameters and determining them;
- 4) the principles of selecting the appropriate play between the stamp and matrix based on the specific nature of the material being processed;
- 5) the machine codes required to write the programme;
- 6) safety technology (machine safety).

Making products from sheet metal using CNC press brakes

B.2.9 Making products from sheet metal using CNC press brakes

EstQF Level 5

Performance indicators

1. Ensures that the machine is in good technical order and that there are no objects in the work area which restrict the work of the machine. Prepares the machine for work (indexes the machine etc.).
2. Familiarises themselves with the work order/drawings and configures the machine accordingly: assembles and installs the necessary tools; downloads or opens the work programme and selects the appropriate parameters; writes the programme, if necessary. Makes a sample part.
3. Makes parts from sheet metal on the CNC press brake based on the given technical drawings.

4. Checks the quality of the product based on the determined frequency of checks. Checks whether the number of parts made complies with the work order.

Knowledge:

- 1) stamps and matrices used in bending, their specific nature and uses;
- 2) types of bending (air bending, bottoming and coining) and their operating principles;
- 3) the principles of selecting a matrix with appropriate dimensions based on the specific nature of the material to be bent;
- 4) the basics of calculating the force necessary for bending;
- 5) safety technology (machine safety and configuring security curtains);
- 6) the basics of calculating the necessary dimensions of the blank;
- 7) the basics of calculating the suitable bending order for the product.

RECURRING COMPETENCES

B.2.10 Recurring competences of Sheet Metal, CNC Machine Operator, EstQF Level 5	EstQF Level 5
<p>Performance indicators</p> <ol style="list-style-type: none"> 1. A Sheet Metal, CNC Machine Operator places importance on both client and team satisfaction and makes high-quality products that comply with the agreed standards. Adhering to deadlines and stages and maintaining quality and productivity are important to them. 2. They plan their own time and that of their team efficiently, work in a systematic and organised way and follow all instructions, procedures and safety requirements. 3. A Sheet Metal, CNC Machine Operator uses all acquired field-specific knowledge and the possibilities offered by technology to achieve their professional goals. They share their knowledge and the nature of the field with colleagues and further their professional knowledge through constant professional development. 4. They grasp new information quickly. Performing new duties and acquiring new methods and techniques is not difficult for them. They look for opportunities for self-development and to improve their skills by orienting themselves towards results and achieving personal work-related objectives. 5. They analyse their own work and that of their team and present ideas and suggestions for improvements. 6. A Sheet Metal, CNC Machine Operator is a team player. They have a clear understanding of the work and functions of the departments in the organisation and communicate with people at all levels, stating their opinion clearly and not hiding information. They can handle conflict situations. 7. They respond to criticism reasonably and can draw conclusions and learn from it. They are capable of giving constructive criticism, drawing attention to shortcomings in work processes and making suggestions for improving the situation (improving the work environment or technology, developing and implementing more efficient working methods, motivating the team, etc.). 8. Ethical beliefs and values are important to a person who works as a Sheet Metal, CNC Machine Operator. 9. They speak Estonian at the B2 level and one foreign language of their choice (preferably English) at the A2 level. 10. They use a computer daily at the Independent user level for information processing and communication and have general knowledge of CAD/CAM programmes. 	
<p>Knowledge:</p> <ol style="list-style-type: none"> 1) professional terminology, definitions, symbols and markings used in technical documentation; 2) operating principles of machines, programmes and operating modes and their technical capabilities; 3) most common control systems of CNC machines; 4) the methodology and methods of monitoring machine operations, display symbols indicating malfunction; 5) instructions on what to do in the event of a malfunction (knowledge of how to stop the machine or operation in a way that minimises damage, e.g. technical condition of the machine and consumption of raw materials); 6) general technical safety rules, security measures arising from the use of the machine and personal protective equipment; 7) most common malfunctions and ways of preventing and eliminating them; 8) the need to archive technical repairs for future work, requirements of formatting documents; 9) other documents required for work (work orders, reports, etc.) and the requirements for filling in and formatting them; 10) basic knowledge of metal-processing (locksmith work, mechanical processing of materials, etc.); 	

- 11) measuring instruments needed to process sheet metal (calliper, instrument for measuring angles, measuring tape, etc.) and their operating principles;
 12) sheet metal materials and identifiers for differentiating them visually and by product marking;
 13) most common EN and ISO material standards for sheet metal.

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	24-08052019-2.4.2/3k
2. Occupational qualification standard compiled by:	Ivar Peedu, FinEst Steel AS Peeter Kalmet, Favor AS Henri Tabri, Aider OÜ Aleksi Saareväli, Tallinna Tööstushariduskeskus Veiko Põldmaa, Tallinna Tööstushariduskeskus Katrín Tammjärv, SA Innove
3. Occupational qualification standard approved by:	Engineering, Manufacturing and Processing
4. No. of decision of Sectoral Council	12
5. Date of decision of Sectoral Council	08.05.2019
6. Occupational qualification standard valid until	07.05.2021
7. Occupational qualification standard version no.	3
8. Reference to International Standard Classification of Occupations (ISCO 08)	7223 Metal Working Machine Tool Setters and Operators
9. Reference to European Qualifications Framework (EQF)	5

C.2 Occupational title in foreign language

English:	Sheet Metal, CNC Machine Operator, EstQF Level 5
Russian:	Оператор станков с ЧПУ

C.3 Annexes

Lisa 1 [Language skills level descriptions](#)

Lisa 2 [Scale of self-assessment in digital competence](#)