

OCCUPATIONAL QUALIFICATION STANDARD

Sheet Metal, CNC Machine Operator, EstQF Level 4

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 4	4

Possible partial professional qualifications and titles on occupational qualification certificate	
Title of partial professional qualification	Level of Estonian Qualifications Framework (EstQF)
Lehtmetalli APJ vesilõikepinkide operaator, tase 4	4
Lehtmetalli APJ gaasi- ja plasmalõikepinkide operaator, tase 4	4
Lehtmetalli APJ laserlõikepinkide operaator, tase 4	4
Lehtmetalli APJ lehetöötlemiskeskuste operaator, tase 4	4
Lehtmetalli APJ painutuspinkide operaator, tase 4	4
Lehtmetalli APJ plastse deformeermise seadmete operaator, tase 4	4

Part A DESCRIPTION OF WORK

A.1 Description of work
<p>A Sheet Metal, CNC (Computer Numerical Control) Machine Operator is a skilled worker 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 the work order, technical and normative documents and general quality requirements.</p> <p>Sheet Metal, CNC Machine Operator, Level 4 writes control programmes for simpler parts or uses the pre-written control programmes that have been entered in the control system of the machine. They set up the machine according to the work order and ensure the quality of the part that is processed using checking and measuring equipment.</p> <p>Sheet Metal, CNC Machine Operator, Level 4 can successfully perform their duties under normal circumstances and is responsible for performing them to a good level of quality.</p> <p>The qualification of Sheet Metal, CNC Machine Operator includes the following partial professional qualifications:</p> <ol style="list-style-type: none"> 1) Sheet Metal, CNC Water-cutting Machine Operator 2) Sheet Metal, CNC Flame- and Plasma-cutting Machine Operator 3) Sheet Metal, CNC Laser-cutting Machine Operator 4) Sheet Metal, CNC Sheet-processing Machine Operator 5) Sheet Metal, CNC Bending Press Operator 6) Sheet Metal, CNC Plastic Deformation Machine Operator
A.2 Tasks
<p>A.2.1 Preparing the work process</p> <p>A.2.2 Checking, monitoring, adjusting and configuring machine operations</p> <p>A.2.3 Carrying out machine maintenance and repairs</p>

Elective areas of work

A.2.4 Cutting sheet metal on water-cutting machines

1. Configuring the water-cutting machine to make parts.
2. Manufacturing sample parts.
3. Making parts from sheet metal on a water-cutting machine.

A.2.5 Cutting sheet metal on flame-cutting machines

1. Configuring the flame-cutting machine to make parts.
2. Manufacturing sample parts.
3. Making parts from sheet metal on a flame-cutting machine.

A.2.6 Cutting sheet metal on plasma-cutting machines

1. Configuring the plasma-cutting machine to make parts.
2. Manufacturing sample parts.
3. Making parts from sheet metal on a plasma-cutting machine.

A.2.7 Cutting sheet metal on laser-cutting machines

1. Configuring the laser-cutting machine to make parts.
2. Manufacturing sample parts.
3. Making parts from sheet metal on a laser-cutting machine.

A.2.8 Cutting sheet metal on mechanical cutting machines

1. Configuring the machine to make parts.
2. Manufacturing sample parts.
3. Making parts from sheet metal on a mechanical cutting machine.

A.2.9 Punching sheet metal on CNC sheet-processing machines

1. Configuring the CNC sheet-processing machine to make parts.
2. Manufacturing sample parts.
3. Punching parts from sheet metal on a CNC sheet-processing machine.

A.2.10 Punching sheet metal on other punching machines

1. Configuring the punching machine to make parts.
2. Manufacturing sample parts.
3. Punching parts from sheet metal on other punching machines.

A.2.11 Plastic deformation of sheet metal on CNC bending presses

1. Plastic deformation of parts on CNC bending presses.
2. Manufacturing sample parts on CNC bending presses.
3. Configuring the machine to bend simpler parts on CNC bending presses.

A.2.12 Plastic deformation of sheet metal on roll-bending and roll-profiling machines

1. Plastic deformation of parts on CNC rolling machines.
2. Manufacturing sample parts on CNC rolling machines.
3. Configuring the machine to roll simpler parts on CNC rolling machines.

A.2.13 Plastic deformation of sheet metal on other forming machines

1. Plastic deformation of parts on other machines used to form sheet metal.
2. Making sample parts on other machines used to form sheet metal.
3. Configuring the machine to make simpler parts on other forming machines.

The qualification of Sheet Metal, CNC Machine Operator includes the following partial professional qualifications:

Sheet Metal, CNC Water-cutting Machine Operator

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 Cutting sheet metal on water-cutting machines

A.2.8 Cutting sheet metal on mechanical cutting machines

Sheet Metal, CNC Flame- and Plasma-cutting Machine Operator

- 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.2.5 Cutting sheet metal on flame-cutting machines
- A.2.6 Cutting sheet metal on plasma-cutting machines
- A.2.8 Cutting sheet metal on mechanical cutting machines

Sheet Metal, CNC Laser-cutting Machine Operator

- 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.2.7 Cutting sheet metal on laser-cutting machines
- A.2.8 Cutting sheet metal on mechanical cutting machines

Sheet Metal, CNC Sheet-processing Machine Operator

- 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.2.9 Punching sheet metal on CNC sheet-processing machines
- A.2.10 Punching sheet metal on other punching machines

Sheet metal, CNC bending press operator

- 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.2.8 Cutting sheet metal on mechanical cutting machines
- A.2.11 Plastic deformation of sheet metal on CNC bending presses

Sheet Metal, CNC Plastic Deformation Machine Operator

- 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.2.8 Cutting sheet metal on mechanical cutting machines
- A.2.12 Plastic deformation of sheet metal on roll-bending and roll-profiling machines
- A.2.13 Plastic deformation of sheet metal on other forming machines

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

Various 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 a capacity for physical effort. 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 4 has usually completed specialty-related vocational or secondary education. Those who do not obtain professional education acquire the skills required for their work in the course of in-service training or at the workplace.

A.7 Most common occupational titles

CNC sheet processing machine operator.

Part B COMPETENCY REQUIREMENTS

B.1 Structure of occupation

To obtain the qualification of Sheet Metal, CNC Machine Operator, Level 4, all mandatory (B.2.1-B.2.3) and recurring competences (B.2.14) must be certified, as well as

- a) one optional competence in implementing sheet metal cutting technology (B.2.4-B.2.8),
- b) one optional competence in implementing sheet metal punching technology (B.2.9-B.2.10) and
- c) one optional competence in implementing plastic deformation of sheet metal (B.2.11-B.2.13).

To obtain a partial professional qualification, the following competences must be certified:

- a) partial professional qualification of Sheet Metal, CNC Water-cutting Machine Operator: competences B.2.1-2.3, B.2.14, B.2.4 and B.2.8;
- b) partial professional qualification of Sheet Metal, CNC Flame- and Plasma-cutting Machine Operator: competences B.2.1-2.3, B.2.14, B.2.5, B.2.6 and B.2.8;
- c) partial professional qualification of Sheet Metal, CNC Laser-cutting Machine Operator: competences B.2.1-2.3, B.2.14, B.2.7 and B.2.8;
- d) partial professional qualification of Sheet Metal, CNC Sheet-processing Machine Operator: competences B.2.1-2.3, B.2.14, B.2.9 and B.2.10;
- e) partial professional qualification of Sheet Metal, CNC Bending Press Operator: competences B.2.1-2.3, B.2.14, B.2.8 and B.2.11;
- f) partial professional qualification of Sheet Metal, CNC Plastic Deformation Machine Operator: competences B.2.1-2.3, B.2.14, B.2.8, B.2.12 and B.2.13.

B.2 Competences

MANDATORY COMPETENCES

B.2.1 Preparing the work process	EstQF Level 4
<p>Performance indicators</p> <ol style="list-style-type: none"> 1. Familiarises themselves with the technical drawings and ensures that they have the instructions for the planned operation and that the instructions are clear and comprehensible (with the necessary parameters being defined and achieved). Asks for additional information, if necessary. 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 to ensure 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. 	
B.2.2 Checking, monitoring, adjusting and configuring machine operations	EstQF Level 4
<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 and notifies a specialist or their line manager of the problem, if necessary. 	

2. If necessary, makes a sample of the product to ensure that the configured parameters of the machine and the work order are compatible. Adjusts the parameters, if required.

B.2.3 Machine maintenance and repairs

EstQF Level 4

Performance indicators

1. Regularly maintains and cleans the machine pursuant to the prescribed order and using the prescribed tools. Cleans the immediate vicinity of their workstation and the machine after finishing work. Checks that the machine is in working order throughout the work period. If problems arise, implements measures to eliminate the malfunction based on their authorisation or notifies their line manager or specialist.
2. Registers all problems and 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.

OPTIONAL COMPETENCES

To obtain the qualification of Sheet Metal, CNC Machine Operator, Level 4 as well as

- a) one optional competence in implementing sheet metal cutting technology (B.2.4-B.2.8),
- b) one optional competence in implementing sheet metal punching technology (B.2.9-B.2.10) and
- c) one optional competence in implementing plastic deformation of sheet metal (B.2.11-B.2.13).

B.2.4 Cutting sheet metal on water-cutting machines

EstQF Level 4

Performance indicators

1. Makes parts from sheet metal on water-cutting machines based on the given technical drawings.
2. Makes a sample part and checks its compliance with the technical drawings.
3. Configures the machine to produce simpler parts, if necessary.

Knowledge:

- 1) tools and wear parts used on water-cutting machines;
- 2) specific nature of water-cutting technology and its operating principles;
- 3) areas of application of water-cutting technology.

B.2.5 Cutting sheet metal on flame-cutting machines

EstQF Level 4

Performance indicators

1. Makes parts from sheet metal on flame-cutting machines based on the given technical drawings.
2. Makes a sample part and checks its compliance with the technical drawings.
3. Configures the machine to produce simpler parts, if necessary.

Knowledge:

- 1) tools and wear parts used on flame-cutting machines;
- 2) specific nature of flame-cutting technology and its operating principles;
- 3) areas of application of flame-cutting technology.

B.2.6 Cutting sheet metal on plasma-cutting machines

EstQF Level 4

Performance indicators

1. Makes parts from sheet metal on plasma-cutting machines based on the given technical drawings.
2. Makes a sample part and checks its compliance with the technical drawings.
3. Configures the machine to produce simpler parts, if necessary.

Knowledge:

- 1) tools and wear parts used on plasma-cutting machines;
- 2) specific nature of plasma-cutting technology and its operating principles;
- 3) areas of application of plasma-cutting technology.

B.2.7 Cutting sheet metal on laser-cutting machines

EstQF Level 4

Performance indicators

1. Makes parts from sheet metal on laser-cutting machines based on the given technical drawings.
2. Makes a sample part and checks its compliance with the technical drawings.

3. Configures the machine to produce simpler parts, if necessary.	
Knowledge: 1) tools and wear parts used on laser-cutting machines; 2) specific nature of laser-cutting technology and its operating principles; 3) areas of application of laser-cutting technology.	
B.2.8 Cutting sheet metal on mechanical cutting machines	EstQF Level 4
Performance indicators 1. Makes parts from sheet metal on mechanical cutting machines based on the given technical drawings. 2. Makes a sample part and checks its compliance with the technical drawings. 3. Configures the machine to produce simpler parts, if necessary.	
Knowledge: 1) tools and wear parts used on metal cutting machines; 2) specific nature of metal cutting technologies and their operating principles; 3) areas of application of metal cutting technologies.	
B.2.9 Punching sheet metal on CNC sheet-processing machines	EstQF Level 4
Performance indicators 1. Makes parts from various materials on CNC sheet-processing machines based on the given technical drawings. 2. Makes a sample part and checks its compliance with the technical drawings. 3. Configures the machine to produce simpler parts, if necessary.	
Knowledge: 1) stamps, matrices and wear parts used in stamping; 2) types of stamping and their operating principles; 3) stamping parameters and determining them.	
B.2.10 Punching sheet metal on punch press machines	EstQF Level 4
Performance indicators 1. Makes parts from sheet metal on various punch press machines (eccentric, hydraulic, servo-electric press, etc.) based on the given technical drawings. 2. Makes a sample part and checks its compliance with the technical drawings. 3. Configures the machine to produce simpler parts, if necessary.	
Knowledge: 1) stamps, matrices and wear parts used in stamping; 2) types of stamping and their operating principles; 3) stamping parameters and determining them.	
B.2.11 Plastic deformation of sheet metals on CNC bending presses	EstQF Level 4
Performance indicators 1. Makes parts from various materials on CNC bending machines (bending presses and rotary bending equipment) based on the given technical drawings. 2. Makes a sample part and checks its compliance with the technical drawings. 3. Configures the machine to bend simpler parts, if necessary.	
Knowledge: 1) tools (stamps, matrices, rolls, etc.) and wear parts used for plastic deformation.	
B.2.12 Plastic deformation of sheet metal on roll-bending and roll-profiling machines	EstQF Level 4
Performance indicators 1. Makes parts from various materials on roll-bending and roll-profiling machines based on the given technical drawings. 2. Makes a sample part and checks its compliance with the technical drawings. 3. Configures the machine to roll simpler parts, if necessary.	
Knowledge: 1) tools (stamps, matrices, rolls, etc.) and wear parts used for plastic deformation.	

B.2.13 Plastic deformation of sheet metal on other forming machines	EstQF Level 4
<p>Performance indicators</p> <ol style="list-style-type: none"> 1. Makes parts on other sheet metal forming machines (metal spinning machines, etc.) based on the given technical drawings. 2. Makes a sample part and checks its compliance with the technical drawings. 3. Configures the machine to produce simpler parts, if necessary. 	
<p>Knowledge:</p> <ol style="list-style-type: none"> 1) tools (stamps, matrices, rolls, etc.) and wear parts used for plastic deformation. 	

RECURRING COMPETENCES

B.2.14 Recurring competences of Sheet Metal, CNC Machine Operator, EstQF Level 4	EstQF Level 4
<p>Performance indicators</p> <ol style="list-style-type: none"> 1. A Sheet Metal, CNC Machine Operator places importance on client satisfaction and makes high-quality products that comply with the agreed standards. They pay heed to deadlines and stages. 2. They use their time 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 think fast and quickly grasp new information. Performing new duties and acquiring new methods and techniques is not difficult for them. They are oriented towards results and achieving personal work-related objectives. 5. They analyse their activity in the course of their work and present ideas and suggestions to improve their work, if necessary. 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, if required. 7. They respond to criticism reasonably and can draw conclusions and learn from it. 8. They speak Estonian at the B2 level and one foreign language of their choice (preferably English) at the A2 level. 9. They use a computer at the required level in accordance with the basic modules: basic aspects of a computer; basic aspects of the Internet; word processing; and table processing. Has basic 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. 	
<p>Assessment method(s):</p>	

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	24-08052019-2.4.1/4k
2. Occupational qualification standard compiled by:	Ivar Peedu, FinEst Steel AS Peeter Kalmet, Favor AS Henri Tabri, Aider OÜ Aleksei Saareväli, Tallinna Tööstushariduskeskus Veiko Põldmaa, Tallinna Tööstushariduskeskus Katrin 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	26.04.2021
7. Occupational qualification standard version no.	4
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)	4
C.2 Occupational title in foreign language	
English:	Sheet Metal, CNC Machine Operator, EstQF Level 4
Russian:	Оператор станков с ЧПУ
C.3 Annexes	
Lisa 1 Language skills level descriptions	
Lisa 2 Scale of self-assessment in digital competence	