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ESF programme “Development of the system for occupational qualifications”

OCCUPATIONAL STANDARD

Concrete worker, Level 4

The occupational standard is a document that describes the job and competence requirements, i.e. a set of skills, knowledge and attitudes required for successful job performance in a particular occupation.

The occupational standard for the concrete worker, Level 4, provides the basis for the assessment of persons’ occupational competencies and for in-service training curricula.

Occupational (qualification) title	EstQF level
<i>Concrete worker, Level 4</i>	4



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Part A JOB CONTENT

A.1 Job content

Concrete worker is a skilled worker who may work both at a construction company and at a plant producing concrete components.
The main tasks of the concrete worker are the construction and fabrication of reinforced concrete structures.

Concrete worker, Level 4, organises their workplace independently and is responsible for the high-quality performance of their tasks.

Based on the organisation of work, may supervise or advise less experienced fellow employees in regular work within their occupation.

A.2 Units

A.2.1 Construction of foundations

- 2.1.1 Preparation of substrates for the construction of foundations
- 2.1.2 Installation of waterproofing and insulation materials
- 2.1.3 Inspection and preparation of foundation formwork parts
- 2.1.4 Installation and timbering of foundation formwork
- 2.1.5 Reinforcement
- 2.1.6 Concreting and compaction of concrete
- 2.1.7 Demoulding
- 2.1.8 Continued care for concrete surfaces

A.2.2 Construction of concrete floors

- 2.2.1 Preparation of substrates for the construction of concrete floors
- 2.2.2 Installation and timbering of formwork and joint profiles
- 2.2.3 Reinforcement
- 2.2.4 Concreting of a floor
- 2.2.5 Finishing of a concrete surface
- 2.2.6 Demoulding
- 2.2.7 Cutting and filling contraction joints
- 2.2.8 Continued care for concrete floors

A.2.3 Performance of concreting works – construction of walls, floors, posts and stairs

- 2.3.1 Preparation of substrates for the performance of concreting works
- 2.3.2 Inspection and preparation of formwork parts
- 2.3.3 Installation of formwork
- 2.3.4 Installation of reinforcements
- 2.3.5 Performance of concreting works
- 2.3.6 Demoulding
- 2.3.7 Aftertreatment of and continued care for concrete surfaces

A.2.4 Energy-efficient construction

A.2.5 Advising and supervising a concrete worker with a lower qualification in the performance of tasks

- 2.5.1 Assessment of work-related environmental risks and advising the supervisee
- 2.5.2 Analysis of errors revealed during the performance of work and advising their rectification
- 2.5.3 Supervising and advising a concrete worker with a lower qualification in the performance of tasks



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OPTIONAL PARTS OF OCCUPATION

A.2.6 Production of concrete surfaces with final treatment

2.6.1 Performance of preparations of concrete surfaces with final treatment

2.6.2 Casting of concreting

2.6.3 Final treatment of a concrete surface

For a list of tasks related to units, see Annex 1, “Units and tasks”.

A.3 Working environment and specific aspects of work

The work of the concrete worker requires physical effort. Often, there is a need to lift heavy construction components, work in forced positions, or climb scaffolding, ladders or structures. Works is done at various heights and under changing environmental conditions, predominantly outdoors. The working environment of the concrete worker involves an elevated risk of sustaining injuries. Furthermore, damage to health may be caused by dust, airborne chemical compounds, noise, temperature fluctuations and draft, and, accordingly, wearing protective clothing and using protective equipment is mandatory. Concrete worker should comply with work regulations, and health and safety requirements.

A.4 Tools

Concrete mixers, concrete pumps, concrete spreaders, concrete compactors; paddle, diamond, angle and other sanders; diamond cutter; bending machine for reinforcements; pick; various electrical and mechanical hand tools; various measuring equipment (level gauges, levels etc).

A.5 Personal characteristics necessary for this job: abilities and personality traits

Good health, physical endurance and a tolerance for heights are required. Work presupposes conscientiousness and a sense of responsibility, logical thinking, spatial imagination, planning ability, precision of movements, stress tolerance, readiness to learn and teamwork ability. Technical insight and good coordination are required.

A.6 Occupational training

Persons working as concrete worker, Level 4, have a secondary vocational education in their area of specialisation and professional experience from a construction company or a secondary education, in-service training in their area of specialisation or professional experience from a construction company.

A.7 Possible job titles

Concreteer, builder of reinforcements, steel bender.

Part B

COMPETENCE REQUIREMENTS

B.1 Occupation structure

The occupational standard for concrete worker, Level 4, sets out five mandatory competencies (B.2.1 – B.2.5) and one optional competence (B.2.6) as well as transversal and qualification-specific competencies for the qualification of concrete worker (B.2.7 – B.2.8).

For the award of the qualification, proof must be provided for all the mandatory competencies (B.2.1 – B.2.5), transversal competencies of the qualification of concrete worker (B.2.7) and qualification-specific transversal competencies (B.2.8) . Proving the optional competence B 2.6 at this level is voluntary.

B.2 Competencies

MANDATORY COMPETENCIES

B.2.1 Construction of foundations	EstQF level 4
<p><u>Performance indicators:</u></p> <ol style="list-style-type: none"> 1. Using measuring equipment, checks the conformity of the substrate to the working drawing and its suitability for the performance of subsequent work. Creates a levelling course and compacts it. Installs underlays according to the design (for instance, geotextiles). 2. Installs waterproofing and insulation materials according to preassigned work drawings. 3. Makes sure that all necessary formwork components and parts are available and ready for installation. 4. Stakes out locations of formwork. Assembles and/or produces formwork. Installs, lines up and supports formwork. Marks and installs aperture forming devices on formwork based on the design. Treats formwork surfaces (formwork or mould oil etc). If needed, installs scaffolding and gangways on formwork. Checks performed work to make sure that formwork have been installed properly. 5. Prepares reinforcements (cutting, bending, assembling etc) according to preassigned drawings. For reinforcement, installs necessary retainers to ensure the location of reinforcements in the concrete structure according to the design. Depending on the type of the structure, installs, secures and mounts reinforcements or ready cage of reinforcement. If needed, performs anti-corrosion treatment of iron parts. Checks performed work to make sure that reinforcements have been installed properly. 6. Checks the availability of technical equipment necessary for concreting works, necessary fixed points and electricity. Makes sure there are no foreign objects (rubbish, water, snow, ice etc) in the formwork. Casts concrete mix into formwork and compacts it, adhering to the technology based on the structure. During work, checks conformity of concrete casting to fixed points and performs follow-up checks on formwork (verticalness, overall dimensions, sag etc). 7. Removes concrete residue and temporary aids used during concrete casting. Removes supports, connections and plates based on the preassigned task, specific nature of formwork and degree of solidification of concrete / strength of demoulding. Cleans formwork and its attachments. 8. Sands, coats or varnishes concrete surfaces as needed. 	
<p><u>Knowledge:</u></p> <ol style="list-style-type: none"> a) various types of foundations and their specific features; b) various types of formwork, principles for their installation; c) effect of weather conditions on concreting works; d) specific nature of concreting works under winter conditions; 	

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- e) various concrete mixes, their properties and uses;
- f) reinforcement principles;
- g) principles for the installation of waterproofing and insulation materials;
- h) expansion and subsidence joints, their operational principles;
- i) quality requirements for concreting works;
- j) various anti-corrosion products and their use;
- k) modes of care for concrete and means used for it;
- l) making monolithic;
- m) order of the performance of works based on the structure and technology;

Method(s) of assessment:

Practical work, oral questioning/interview (evidence used: for instance, assessment of professional activity), written examination.

B.2.2 Construction of concrete floors

EstQF level 4

Performance indicators:

1. Prepares and, if needed, compacts substrates according to fixed points preassigned in the design. If needed, installs waterproofing and insulation materials
2. Installs and provides timbering for formwork, joint profiles and deformation tape according to the preassigned task.
3. Prepares reinforcements (cutting, bending, assembling etc) according to preassigned drawings. For reinforcement, installs necessary retainers and guiding irons to ensure the location of reinforcements in the concrete structure according to the design. Depending on the type of the structure, installs, secures and mounts reinforcements or ready cage of reinforcement.
4. Checks the availability of technical equipment necessary for concreting works, necessary fixed points and electricity. Makes sure there are no foreign objects (rubbish, water, snow, ice etc) in the formwork. Casts concrete mix onto the substrate or into formwork and compacts it, adhering to the technology based on the structure. Executes gradients according to the design. During work, checks conformity of concrete casting to fixed points and performs follow-up checks on formwork (verticalness, overall dimensions, sag etc).
5. Treats (smoothes, rubs, brushes etc) concrete surfaces according to the design.
6. Removes concrete residue and temporary aids used during concrete casting. Removes supports, connections and plates based on the preassigned task, specific nature of formwork and degree of solidification of concrete / strength of demoulding.
7. Stakes out and cuts into the surface of concrete contraction joints and fills these with mastic.
8. Based on the preassigned task, wets, coats or varnishes concrete surfaces as needed.

Knowledge:

- a) various types of formwork, principles for their installation;
- b) effect of weather conditions on concreting works;
- c) specific nature of work under winter conditions;
- d) various concrete mixes, their properties and uses;
- e) reinforcement principles;
- f) principles for the installation of waterproofing and insulation materials;
- g) expansion and subsidence joints, their operational principles;
- h) quality requirements for concreting works;
- i) various anti-corrosion products and their use;
- j) modes of care for concrete and means used for it;
- k) making monolithic;
- l) order of the performance of works based on the structure and technology;

- m) jointing of concreting works, construction joints;
 n) concrete surfaces finished using various methods (terrazo, wet sanding).

Method(s) of assessment:

Practical work, oral questioning/interview (evidence used: for instance, assessment of professional activity), written examination.

B.2.3 Performance of concreting works – construction of walls, floors, posts and stairs | **EstQF level 4**

Performance indicators:

1. Using visual inspection and relevant measuring equipment, checks the conformity of the substrate to the working drawing and its suitability for the performance of subsequent work. Upon detection of deficiencies, notifies their line manager. If needed, cleans substrates and jointing irons and removes any unnecessary components. When constructing foundations, constructs a levelling course and compacts it and installs underlays according to the design (for instance, geotextiles, thermal insulation, water insulation etc).
2. Makes sure that all necessary formwork components and parts are available and ready for installation.
3. Stakes out locations of formwork. Assembles and/or produces formwork. Installs, lines up and supports formwork. Marks and installs aperture forming devices on formwork based on the design. Treats formwork surfaces (formwork or mould oil etc) If needed, installs scaffolding and gangways on formwork. Checks performed work to make sure that formwork have been installed properly.
4. Prepares reinforcements (cutting, bending, assembling etc) according to preassigned drawings. For reinforcement, installs necessary retainers to ensure the location of reinforcements in the concrete structure according to the design. Depending on the type of the structure, installs, secures and mounts reinforcements or ready cage of reinforcement. If needed, performs anti-corrosion treatment of iron parts. Checks performed work to make sure that reinforcements have been installed properly.
5. Checks the availability of technical equipment necessary for concreting works, fixed points and electricity. Makes sure there are no foreign objects (rubbish, water, snow, ice etc) in the formwork. Casts concrete mix into formwork and compacts it, adhering to the technology based on the structure. During work, checks conformity of concrete casting to fixed points and performs follow-up checks on formwork (verticalness, overall dimensions, sag etc).
6. Removes concrete residue and temporary aids used during concrete casting. Removes supports, connections and plates based on the preassigned task, specific nature of formwork and degree of solidification of concrete / strength of demoulding.
7. Based on the preassigned task, sands, coats or varnishes concrete surfaces as needed.

Knowledge:

- a) various types of formwork, principles for their installation;
- b) effect of weather conditions on concreting works;
- c) specific nature of work under winter conditions;
- d) various concrete mixes, their properties and uses;
- e) reinforcement principles;
- f) principles for the installation of waterproofing and insulation materials;
- g) expansion and subsidence joints, their operational principles;
- h) quality requirements for concreting works;
- i) various anti-corrosion products and their use;
- j) modes of care for concrete and means used for it;
- k) making monolithic;
- l) order of the performance of works based on the structure and technology;

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<p>m) technology for the industrial production of concrete components; n) technologies for the industrial finishing of concrete components.</p> <p><u>Method(s) of assessment:</u> Practical work, oral questioning/interview (evidence used: for instance, assessment of professional activity), written examination.</p>
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B.2.4 Energy-efficient construction	EstQF level 4
<p><u>Performance indicators:</u></p> <ol style="list-style-type: none"> 1. Before beginning work, prepares the workplace to be compliant, allowing for the principles of energy conservation. 2. Within their occupation, performs all units, applying necessary basic knowledge about energy efficiency. 3. In performing their tasks, allows for the energy consumption during construction activities and uses necessary energy sources for work (electricity, water, lighting, heat blowers etc) expediently and efficiently. 4. Allowing for energy efficiency requirements and the specific nature of their profession and within the authorisations provided to them, selects the correct materials (construction materials, securing devices, other work aids etc). 5. Allowing for energy efficiency requirements and the specific nature of their profession, selects the correct technology and suitable practices for performing tasks. 6. If possible, applies the appropriate system of modular sizes (sizes of materials, frame spacing etc) to ensure quality and cost effectiveness when performing construction works within their occupation 7. Performs work necessary within their occupation to improve energy efficiency. <p><u>Knowledge:</u></p> <ol style="list-style-type: none"> a) general concepts of energy efficiency and their meaning b) factors influencing energy efficiency; c) main sources of energy in Estonia (including renewable energy sources); d) quality requirements for construction works and their impact on energy efficiency; e) factors impacting on the thermal conductivity of the envelope and energy consumption of a building (such as the properties of construction materials or construction products); f) various technical systems, impact of their selection on the energy efficiency of a building; g) options for improving the energy efficiency of buildings; h) influence of work culture on energy consumption in construction activities; i) impact of various weather conditions on the building's outer envelope; j) impact of behaviour on energy consumption in the operation of buildings; <p>Competence developed as part of the Buildest project</p> <p><u>Method(s) of assessment:</u> Assessment is integrated within other competencies of this standard.</p>	

B.2.5 Advising and supervising a concrete worker with a lower qualification in the performance of tasks	EstQF level 4
<p><u>Performance indicators:</u></p> <ol style="list-style-type: none"> 1. Advises on the determination and assessment of environmental risks that may be involved in the work of a concrete worker with a lower qualification and on the selection of measures needed for their management, guided by occupational health and safety requirements. 	

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2. Advises a concrete worker with a lower qualification on the analysis of any faults detected and on selecting measure for the correction of the faults, guided by the preassigned tasks, properties of materials and surfaces, the selection of correct work equipment, practices and technology and adhering to the preassigned quality requirements.
3. Supervises the work of one concrete worker or a small working group of builders, guided by the tasks, occupational health and safety requirements, the selection of correct work equipment, practices and technology and adhering to the preassigned quality requirements.

Method(s) of assessment:

Practical work, oral questioning/interview (evidence used: for instance, assessment of professional activity), written examination.

OPTIONAL COMPETENCIES

B.2.6 Production of concrete surfaces with final treatment	EstQF level 4
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Performance indicators:

1. Based on the preassigned sketch, installs and mounts distribution strips and/or other components cast into concrete
2. Casts concrete based on the preassigned pattern design and allowing for any other previously installed components.
3. Sands concrete surfaces or treats them in any other preassigned manner.

Method(s) of assessment:

Practical work, oral questioning/interview (evidence used: for instance, assessment of professional activity), written examination.

TRANSVERSAL COMPETENCIES

B.2.7 Concrete worker, Level 4 transversal competence of the occupation	EstQF level 4
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Performance indicators:

1. *Compliance with work instructions, technologies and quality requirements*
Complies with relevant work instructions, technologies stipulated by the manufacturers of materials and the preassigned quality requirements.
2. *Compliance with occupational health and safety requirements*
Complies with occupational health and safety requirements when planning work, preparing the workplace, in the work process and when tidying the workplace, and considers the people and environment around them.
3. *Provision of first aid*
In the event of an accident, provides emergency care, calls for professional help and notifies the accident to the site manager or employer.
4. *Participation in teamwork*
Is open to collaboration, participates in teamwork, adapts to the team and is ready to learn from others, shares all the necessary and useful information with others, and acts in the interest of achieving the best common result; has the will, skill and courage to present opinions and present arguments to defend them.
5. *Making work-related decisions and adapting to changing circumstances*
Consistently applies what has been learned in the daily life, planning work, making appropriate decisions and taking responsibility for the implementation of decisions made, fulfils obligations assumed and achieves work objectives; is motivated and persistent, without losing confidence when striving for the goal; and acts independently in standard situations.
Adapts to changing circumstances, is able find and analyse relevant information for performing their

tasks.

6. *Coping with work-related setbacks*

In the event of an unsuccessful outcome, assesses and adapts their behaviour according to the situation, requesting advice from a specialist with a higher qualification or their line manager.

7. *Planning work-related activities and attending in-service training*

Analyses their strengths and weaknesses, plans their future and, based on that, seeks opportunities for personal development and undertakes occupational in-service training.

B.2.8 Concrete worker, qualification-specific transversal competencies

EstQF level 4

1. *Due organisation of one’s workplace*

Before beginning work, the builder of concrete constructions sets up a proper workplace for their segment in the work process: selecting suitable and necessary work equipment based on the nature of the preassigned work and double-checking their good condition and safety before beginning work.

Stores necessary materials under supervision, ensuring the preservation of their quality.

2. *Ascertainment of materials consumption and working time*

During supervision, using appropriate measuring equipment and methods, performs necessary measurements and stake-out, guided by the preassigned working drawings and ensuring the due accuracy of measurement.

3. *Collaboration with other contractors*

In their work, the concrete worker also takes into account any other contractors operating at the same site. Keeps their workplace clean and tidy.

4. *Using and storing work equipment*

Builder of concrete constructions uses all work equipment and other equipment prudently, regularly tidying and cleaning the work equipment, other equipment and protective equipment, adhering to the instructions for their use and maintenance. Informs their line manager in case of any problems or faults.

Transversal knowledge of the concrete worker:

- a) occupational safety rules applicable to general construction works;
- b) differences due to weather conditions (thunderstorm, high winds, rain, ice etc) when concreting works are performed;
- c) general knowledge about the provision of first aid;
- d) waste management and environmental safety requirements for construction works;
- e) work equipment and other equipment needed for concreting works, and principles of handling them;
- f) measuring equipment needed for concreting works (for example, level, sounding rod, level gauge, tape measure etc);
- g) main practices and their application in various work situations;
- h) ability to read working drawings;
- i) bases of material accountancy;
- j) applicable quality requirements for concreting works;
- k) principles of storing materials;
- l) foundations of entrepreneurship.

Method(s) of assessment:

Assessment of transversal competencies is integrated within other competencies of this standard.

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Part C

GENERAL INFORMATION AND ANNEXES

C.1 Information on the preparation and approval of the occupational standard, on the body awarding occupational qualifications, and reference to the location of the occupational standard in classifications	
1. Occupational standard identification in the register of occupational qualifications	13-20102014-1.8/5k
2. The occupational standard is compiled by:	Indrek Peterson, Estonian Association of Construction Entrepreneurs Jaak Kleinberg, Skanska EMV AS Kalev Ramjalg, Roxor Ehitus Priit Alas, Anmeri OÜ Tarmo Laaban, Tallinn Construction School Tõnu Peipman, IB Printsip OÜ Vahur Külm, AS Columbia-Kivi
3. Occupational standard approved by	Professional Council for Construction, Real Estate and Geomatics
4. Number of the decision by the Professional Council	32
5. Date of the decision by the Professional Council	20 October 2014
6. The occupational standard is valid until (date)	19 October 2019
7. Occupational standard version number	5
8. Reference to the Classification of Occupation (ISCO 08)	7114 Concrete placers, concrete finishers and related workers
9. Reference to the European Qualifications Framework (EQF)	4
C.2 Occupational (qualification) title in a foreign language	
In English: <i>concrete worker</i>	
C.3 Annexes	
Annex 1 Units and tasks	

UNITS AND TASKS OF OCCUPATION	Concrete worker, Level 4 initial occupational qualification	Concrete worker, Level 4
Mandatory units of occupation		
1. Construction of foundations		
1.1 Preparation of substrates for the construction of foundations	X	X
1.2 Installation of waterproofing and insulation materials	X	X
1.3 Inspection and preparation of foundation formwork parts		X
1.4 Installation and timbering of foundation formwork	under supervision	X
1.5 Reinforcement	X	X
1.6 Concreting and compaction of concrete	X	X
1.7 Demoulding	X	X
1.8 Continued care for concrete surfaces	X	X
2 Construction of concrete floors		
2.1 Preparation of substrates for the construction of concrete floors	X	X
2.2 Installation and timbering of formwork and joint profiles	X	X
2.3 Reinforcement	X	X
2.4 Concreting of a floor	X	X
2.5 Finishing of a concrete surface		X
2.6 Demoulding	X	X
2.7 Cutting and filling contraction	X	X

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joints		
2.8 Continued care for concrete floors	X	X
3 Performance of concreting works – construction of walls, floors, posts and stairs		
3.1 Preparation of substrates for the performance of concreting works	X	X
3.2 Inspection and preparation of formwork parts		X
3.3 Installation of formwork	X	X
3.4 Reinforcement	X	X
3.5 Performance of concreting works	X	X
3.6 Demoulding	X	X
3.7 Aftertreatment of and continued care for concrete surfaces	X	X
4 Energy-efficient construction		
5 Advising and supervising a concrete worker with a lower qualification in the performance of tasks		
5.1 Assessment of work-related environmental risks and advising the supervisee		X
5.2 Analysis of errors revealed during the performance of work and advising their rectification		X
5.3 Supervising and advising a concrete worker with a lower qualification in the performance of tasks		X
Optional units of occupation		
6 Production of concrete surfaces with final treatment		
6.2 Performance of preparations for a concrete surface with final treatment		X



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6.3 Casting of concreting		X
6.4 Final treatment of a concrete surface		X