

# OCCUPATIONAL STANDARD

## Electronic equipment assembler, level 3

The occupational standard **Electronic equipment assembler of level 3** forms the basis for the compilation of curricula for the vocational education and the in-service training and for the assessment of the competence of persons when awarding occupational qualification.

<b>Occupational qualification title</b>	<b>Level of the Estonian Qualification Framework (EQF)</b>
<b>Electronic equipment assembler, level 3</b>	<b>3</b>

<b>Partial occupational qualifications and occupational qualification titles on the occupational qualification certificate</b>	
<b>Title of partial qualification</b>	<b>Level of the Estonian Qualification Framework (EQF)</b>
<b>Electronic equipment assembler, level 3</b>	<b>3</b>
<b>Cable assembling machine operator, level 3</b>	<b>3</b>

<b>Specialisations on the occupational qualification certificate</b>	
<b>Title of specialisation</b>	<b>Level of the Estonian Qualification Framework (EQF)</b>
<b>Electronic equipment repairer, level 4</b>	<b>4</b>

## Part A

### JOB DESCRIPTION

#### A.1 Job description

The professional field of the electronic equipment assembler consists of three occupational qualifications: electronic equipment assembler of level 2, formed of two partial qualifications; electronic equipment assembler of level 3, formed of two partial qualifications and one field of specialisation and electronic equipment technician of level 4.

Electronic equipment assemblers usually work in industrial enterprises where electronic assemblies or products containing them are made and put together.

**The objective of the work of electronic equipment assembler of level 3** is the production of wiring and cable ties (hereinafter cable assemblies) and/or electronic assemblies according to the specified documentation and instructions primarily for the manufacture of series production.

Electronic equipment assembler of level 3 can specialise in the repair of electronic equipment.

#### A.2 Units

The occupational qualification of the electronic equipment assembler of level 3 comprises two mandatory units and one unit, related to specialisation.

##### Mandatory units

A.2.1 Manufacture of electronic assemblies and detection of visual faults;

A.2.2 Manufacture of cable assemblies and detection of visual faults.

##### Unit, related to specialisation

A.2.3 Repair of electronic equipment

It is possible to apply for the occupational qualification of the electronic equipment assembler of level 3 and to certify it in parts as follows:

Electronic equipment assembler of level 3, partial occupational qualification;

Cable assembling machine operator of level 3, partial occupational qualification.

A list of tasks “Units and tasks” related to the units is presented in Annex 1 to the Occupational Standard.

#### A.3 Working environment and specific aspects of work

The electronic equipment assembler works indoors in premises conforming to special requirements where the wearing of special work clothes may be required. Specific aspects of work may be working with small components that presuppose good vision and distinguishing between colours. The electronic equipment assembler may also come into contact with chemicals in his/her work.

#### A.4 Tools

The main tools of the electronic equipment assembler include mechanical and electrical hand tools, electrical measuring instruments, computer controlled equipment (incl. test equipment), accessories meant for the manufacture of the assembly (e.g. assembly fixtures, etc.), computers and technical documentation, as well as normative documents (standards, instructions).



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<b>A.5 Personal characteristics necessary for this job: abilities and personal traits</b>
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The work of the electronic equipment assembler presupposes logical thinking, routine tolerance, precision of movements and good vision, including distinguishing between colours.
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<b>A.6 Occupational training</b>
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People who have obtained their occupational skills in the workplace, during the in-service training or vocational training usually work as electronic equipment assemblers of level 3.
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<b>A.7 Possible job titles</b>
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The possible job titles for the electronic equipment assembler are assembly operator, operator, fitter, assembler and setter.
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## Part B

### COMPETENCE REQUIREMENTS

#### B.1. The structure of the occupational qualification

In applying for the occupational qualification of the electronic equipment assembler, the certification of competencies B.2.1-B.2.2 and B.2.4 (transversal competence) is required. For the specialisation in the repair of electronic equipment, the competence B.2.3 should be additionally certified.

In applying for partial occupational qualification of the electronic equipment assembler of level 3 the certification of competences B.2.1 and B.2.4 is required.

In applying for the partial occupational qualification of the cable assembling machine operator of level 3 the certification of competencies B.2.2 and B.2.4 is required.

#### Assessment method(s):

The content and the form of conduct of the final work or final examination will be approved by the occupational qualifications committee.

#### B.2 Competences

\*IPC standards –quality criteria for the manufacture of electronics assemblies.

B.2.1 Manufacture of electronic assemblies and detection of visual faults			EQF level 3
Description	Supporting knowledge	Skills	

<p>Assembles the electronic assemblies in accordance with the work instruction and the product documentation, based on the quality criteria set for the assembly, as well as the requirements of the standard IPC J-STD-001 and/or IPC-A-610* or any other equivalent standard.</p> <p>Visually identifies the possible faults of electronic assemblies proceeding from the work instructions and standards.</p>	<ul style="list-style-type: none"> <li>a) Knows the quality criteria concerning the electronic assemblies of standards IPC J-STD-001 and IPC-A-610 or any other equivalent standard;</li> <li>b) Knows different soldering technologies (manual and machine soldering);</li> <li>c) Knows the main processes for the assembly of electronic equipment;</li> <li>d) Knows the cleanliness requirements for the assembly;</li> <li>e) Knows visually the different electronic components and knows their names.</li> </ul>	<ul style="list-style-type: none"> <li>a) Performs manual soldering, following the work instructions, product documentation and/or the quality criteria of the standard IPC-A-610 or any other equivalent standard concerning the electronic assemblies;</li> <li>b) Assembles the electronics assemblies mechanically (riveting, screwing, gluing, pressing, ultrasound welding, etc.) following the work instructions;</li> <li>c) Follows and applies the requirements of the standards IPC J-STD-001 and IPC-A-610 or any other equivalent standard;</li> <li>d) Uses different tools used for the manual soldering and in other assembly processes; Handles and prepares the electronic components and materials for soldering; identifies visually the possible faults of electronic assemblies, proceeding from the work instructions and standards;</li> <li>e) Identifies faulty assemblies in accordance with the prescribed diagnostics instructions.</li> </ul>
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B.2.2 Manufacture of cable assemblies and detection of visual faults.		EQF level 3
Description	Supporting knowledge	Skills

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<p>Assembles cable and conductor ties or assemblies in accordance with the work instructions and product documentation, based on the quality criteria set for the assembly, as well as the requirements of the standard IPC J-STD-001 and/or IPC-A-620 or any other equivalent standard.</p> <p>Visually identifies the possible faults of cable assemblies proceeding from the work instructions and standards.</p>	<p>a) Knows the quality criteria concerning the cable assemblies of standards IPC J-STD-001 and IPC-A-620 or any other equivalent standard;</p> <p>b) Knows the different technologies of cable and conductor ties or assemblies.</p> <p>c) Knows the cleanness requirements for the assembly;</p> <p>d) Knows visually the different components of cable and conductor assemblies and knows their names.</p>	<p>a) Assembles the cable and conductor ties or assemblies mechanically (riveting, screwing, gluing, pressing, welding, etc.) following the work instructions;</p> <p>b) Prepares and makes connections of the cables and cable assemblies;</p> <p>c) Follows the quality criteria concerning the cable assemblies of standards IPC J-STD-001 and IPC-A-620 or any other equivalent standard;</p> <p>d) Performs manual soldering following the work instructions;</p> <p>e) Uses different tools used for the manual soldering and in other assembling processes;</p> <p>f) Assesses visually the components conforming to the cable assembly requirements; Identifies faulty cable assemblies in accordance with the prescribed diagnostics instructions.</p>
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**COMPETENCE RELATED TO SPECIALISATION**

<b>B.2.3 Repair of electronic equipment</b>		<b>EQF level 4</b>
<b>Description</b>	<b>Supporting knowledge</b>	<b>Skills</b>
<p>Restores the functionality of the electronics assembly and the conformity to other requirements in accordance with the standards IPC 7711 and 7721 or other equivalent standards.</p>	<p>a) Knows the requirements and instructions of the standards IPC 7711 and 7721 or other equivalent standards.</p>	<p>a) Follows and applies the requirements and instructions of the standards IPC 7711 and 7721 or other equivalent standards;</p> <p>b) Uses the tools used for the repair of electronic equipment in accordance with the work operation instructions.</p>

**TRANSVERSAL COMPETENCE**

<b>B.2.4 Electronic equipment assembler, occupational qualification transversal competence of level 3</b>	<b>EQF level 3</b>
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Performance indicators:

- 1) Observes the work process, follows and maintains the quality and productivity;
- 2) Uses one's working area purposefully and keeps it in order (5S principles); uses materials and work equipment prudently and economically;
- 3) Checks the conformity of the used measuring and work equipment to the requirements, following the presence of the marking (markings that certify calibration);
- 4) Uses the terminology of the area of specialisation, understands and fulfils the requirements proceeding from the instruction documents; follows the requirements set in the organisation for the documentation;
- 5) Participates in the teamwork;
- 6) Observes the requirements of the working environment and the work safety (incl. waste sorting), using protective equipment for occupational health and safety and safe operating techniques as well as following the principles of ergonomics.
- 7) Uses a computer at the level AO2 (Article 1) (see Annex 2 "Basic computer skills") in his/her work.

Supporting knowledge:

- 1) Principles of the maintenance of tools;
- 2) 5S principles;
- 3) ESD principles;
- 4) RoHS principles;
- 5) Requirements for the working environment and the work safety;
- 6) Principles of ergonomics;
- 7) Principles of waste handling.

Assessment method(s):

Assessment of the transversal competence is integrated within other competences of this occupational standard.

Clarification

5S principles – purposeful use and maintenance of the workplace as well as ensuring that it also remains like this (sort, put in order, systematic cleaning, standardise, preserve).

ESD principles – protection of products and electronic components and equipment against static electric discharges.

RoHS – the European Union Directive on the restriction of the use of certain hazardous substances.

## Part C

### GENERAL INFORMATION AND ANNEXES

<b>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</b>	
1. Designation of the occupational standard in the register of occupational qualifications	08-30112012-3.2/4k
2. The occupational standard is compiled by: names of persons and organisations	Kalmer Kand, <i>Enics Eesti AS</i> Priit Kinks, <i>Rantelon OÜ</i> Arno Kolk, <i>Elektroonikatööstuse Liit</i> Andzei Kuznets, <i>Ericsson Eesti AS</i> Polina Lapõševa, <i>Ericsson Eesti AS</i> Milko Milatskov, <i>Stoneridge Electronics AS</i> Andres Ojalill, <i>Tallinna Polütehnikum</i> Eiko Priidel, <i>Teleplan Estonia OÜ</i> Mihkel Viskus, <i>Incap Electronics Estonia OÜ</i>
3. The occupational standard is approved by:	Sectoral Council for Information Technology and Telecommunications
4. No. of the decision of the Sectoral Council	11
5. Date of the decision of the Sectoral Council	30.11.2012
6. The occupational standard is valid until (date)	29.11.2017
7. Occupational standard version No. (1-n)	4
8. Reference to the Classification of Occupations (ISCO 08)	7. Main group “Skilled staff and craft workers”, code 724
9. Reference to the level in the European Qualifications Framework (EQF)	3
<b>C.2 Title of occupational qualification in foreign languages</b>	
In English: Electronic equipment assembler	
In Russian: Сборщик электронных устройств	
<b>C.3 Annexes</b>	
Annex 1 <a href="#">Units and tasks</a>	
Annex 2 <a href="#">Basic computer skills</a>	



	Units and tasks	Electronic equipment assembler, level 2 / Cable assembly machine operator, partial occupational qualification of level 2 The objective of work is the make of cable assemblies and/or electronics assemblies in accordance with specified documentation and instructions.	Electronic equipment assembler, level 2 / Assembler of electronic equipment assembly (module), partial occupational qualification of level 2 The objective of work is the make of electronic assembly (module) in accordance with specified documentation and instructions.	Electronic equipment assembler, level 3 The objective of work is the make and repair of electronic assemblies in accordance with specified documentation.	Electronic equipment technician, level 4 The objective of work is the make, setup and repair of electronic assemblies and troubleshooting in the range of the whole production process according to specified documentation both in series production as well as manufacture of small-lot production and prototypes.
<b>1</b>	<b>Use of measuring instruments for testing</b>	<b>EQF level 2</b>	<b>EQF level 2</b>	<b>EQF level 3</b>	<b>EQF level 4</b>
<b>1</b>	Use of measuring instruments needed for work				x
<b>2</b>	Calibration of measuring instruments, test equipment and systems as well as tools, if necessary.				x
<b>2</b>	<b>Assembly of electronic equipment</b>	<b>EQF level 2</b>	<b>EQF level 2</b>	<b>EQF level 3</b>	<b>EQF level 3</b>
	<b>Description</b>	<b>Makes cable or conductor ties or assemblies in accordance with the requirements of the standard IPC-A-620 or any other equivalent standard.</b>	<b>Makes electronics assemblies in accordance with the requirements of the standard IPC-A-610 or any other equivalent standard</b>		
<b>1</b>	Performance of manual soldering				x
<b>2</b>	Observance and application of the requirements of standards IPC J-STD-001, IPC-A-610 and IPC-A-620 or any other equivalent standard				x
<b>3</b>	Use of tools used in manual soldering and in other assembly processes				x
<b>4</b>	Handling and preparation for soldering of electronic components and materials				x

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5	Preparation and connecting the cable and conductor ties or assemblies				X
6	Reading of wiring diagrams				X
3	<b>Manufacture of electronic assemblies and detection of visual faults</b>	<b>EQF level 2</b>	<b>EQF level 2</b>	<b>EQF level 3</b>	<b>EQF level 4</b>
1	Performance of manual soldering			X	
2	Mechanical assembly of electronic assemblies			X	
3	Observance and application of the requirements of standards IPC J-STD-001, IPC-A-610 and IPC-A-620 or any other equivalent standard		X	X	
4	Use of tools used in manual soldering and in other assembly processes		X	X	
5	Handling and preparation for soldering of electronic components and materials			X	
6	Visual detection of possible faults in electronic assemblies			X	
7	Identification of faulty assemblies			X	
4	<b>Manufacture of cable assemblies and detection of visual faults.</b>	<b>EQF level 2</b>	<b>EQF level 2</b>	<b>EQF level 3</b>	<b>EQF level 4</b>
1	Mechanical assembly of cable and conductor ties or assemblies			X	
2	Preparation and connecting the cables and cable assemblies			X	
3	Observance and application of the requirements of standards IPC J-STD-001, IPC-A-610 and IPC-A-620 or any other equivalent standard	X		X	

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4	Performance of manual soldering			X	
5	Use of tools used in manual soldering and in other assembly processes	X		X	
6	Visual assessment of the conformity of components to the requirements set for the cable assemblies			X	
7	Identification of damaged cable assemblies			X	
5	<b>Repair of electronic equipment</b>	<b>EQF level 2</b>	<b>EQF level 2</b>	<b>EQF level 3</b>	<b>EQF level 4</b>
1	Observance and application of the requirements and instructions of standards IPC 7711 and 7721 or any other equivalent standards			X	X
2	Use of tools needed for the repair of electronic equipment			X	X
6	<b>Documentation of the work process.</b>	<b>EQF level 2</b>	<b>EQF level 2</b>	<b>EQF level 3</b>	<b>EQF level 4</b>
1	<b>Documentation of activities</b>	<b>transversal</b>	<b>transversal</b>	<b>reflects in transversal</b>	X